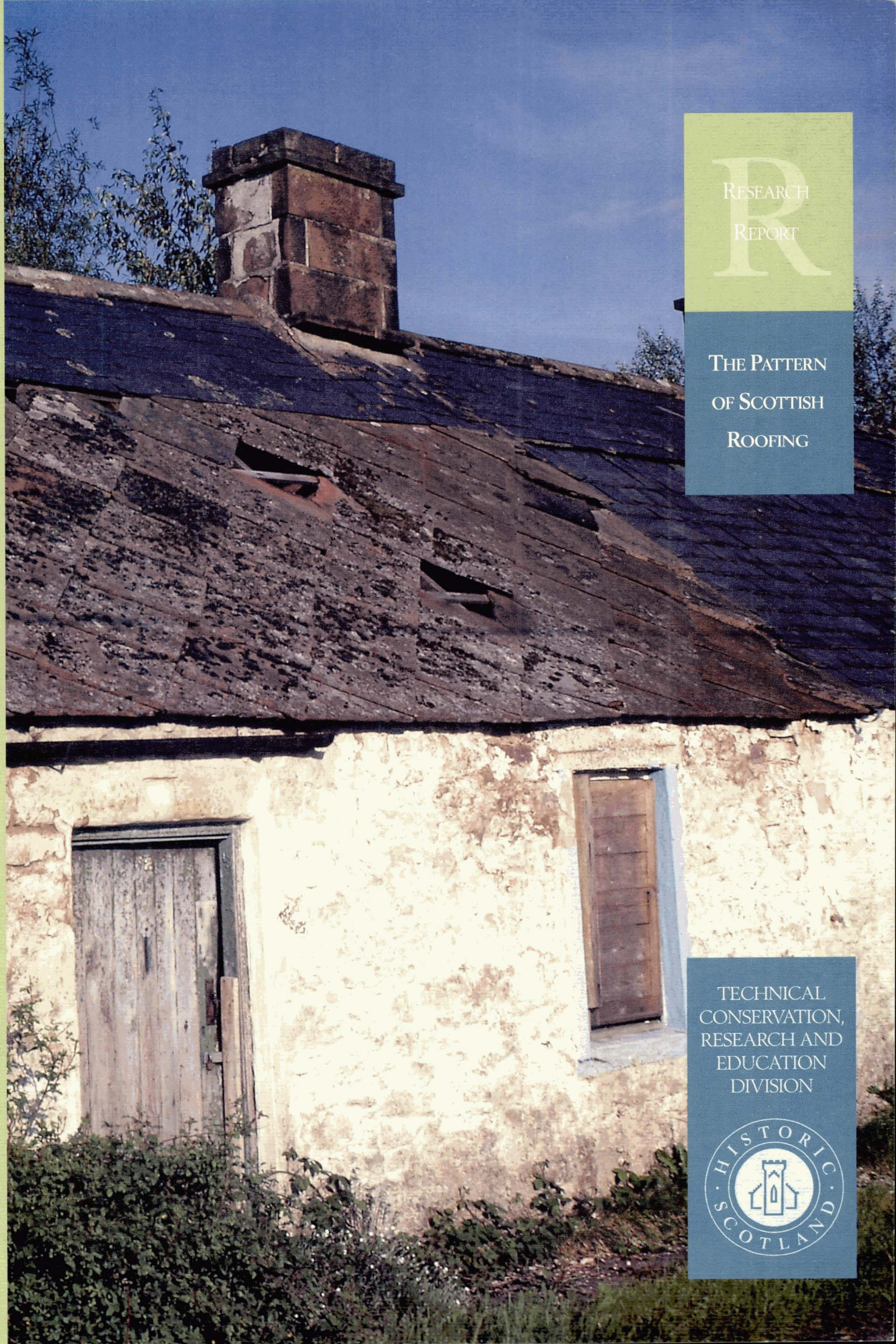

RESEARCH REPORT

THE PATTERN OF SCOTTISH ROOFING

TECHNICAL CONSERVATION, RESEARCH AND EDUCATION DIVISION

HISTORIC SCOTLAND

RESEARCH REPORT

THE PATTERN OF SCOTTISH ROOFING

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RESEARCH REPORT

THE PATTERN OF SCOTTISH ROOFING

by
Gerald Emerton

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Gerald Emerton

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FOREWORD

The materials and craft techniques traditionally used to construct Scottish roofs vary from place to place, with neighbouring villages and towns often exhibiting quite different styles and detail. In each region the diverse Scottish geology determined the fundamental range of available raw materials. From these, the most suitable were selected for use as a roof covering. Roofing techniques specifically developed that were appropriate to these materials and to the performance requirements of the roof including the need to withstand local climatic conditions.

The resulting rich pattern of traditional roofing types has not been systematically studied to date and, for the first time, this volume presents a detailed visual overview of the range of roofing materials and techniques that are to be found in Scotland.

Historic Scotland has been fortunate to be able to reach agreement with Gerald Emerton to publish this research report. Mr Emerton is a fourth generation slater and is the managing director of Emerton Roofing (Western) Limited of Nantwich, Cheshire. He has been extensively involved with the development of both British and European Standards, chairing various technical committees responsible for technical design, workmanship, codes of practice and product standards. He has lectured widely on the history and restoration of slate and tile roofing and is a past president of the National Federation of Roofing Contractors. This research report builds upon Mr Emerton's years of practical experience and his unique photographic archive of traditional Scottish roofs. The photographs have all been taken by the author (unless otherwise stated) with the intention to record roofs, and roofing details of interest, before they disappear. Sandstone, schist, and true slate, pantile and some man-made roofing materials are illustrated and described in detail, as are the traditional fixing techniques that were employed on the roofs. (Thatch is separately covered in TAN 4 and TAN 13.)

Just as we are coming to appreciate their importance, many of these roofing types are under considerable threat. Many Scottish roofing materials are no longer available. True slate is a prime example of this. Despite its important contribution to the character of the built environment, no Scottish slate quarries have been in production since the 1950s. Over the last 50 years sourcing slate for repair work has required the salvaging of slate from other buildings, leading to an overall erosion of the quality and appearance of our stock of traditional buildings. Equally, the craft skills required to repair existing roofs and to re-roof in the local traditions described in this report are becoming more scarce although, fortunately, a small number of slaters with the necessary expertise remain from which we can re-learn these skills if we act quickly.

It is hoped that this study will allow a greater appreciation and understanding of the importance of the appropriate technical detailing and how this underpins the distinctive appearance of traditional Scottish roofs. Its publication also aims to facilitate the choice of appropriate indigenous materials for the repair of Scotland's listed buildings, a condition which has applied to the receipt of grant aid for repairs to listed buildings by the Historic Buildings Council for Scotland (HBC) since it came into being in 1953. However, the HBC recognise that where the materials traditionally used are no longer available, some loss of character is inevitable. Therefore, to support the appropriate repair of Scottish historic buildings, the HBC has called for Scottish slates to be brought back into production.

Recognising the need to assist in the revival of the Scottish slate industry, Historic Scotland commissioned the University of Dundee in 1995, to study the factors affecting the demand for Scottish slate. This work has now been completed and published as a Research Report - Scottish slate: The potential for use in building repair and conservation area enhancement. At the same time the University of Glasgow were commissioned to investigate the performance of Scottish slate from all the quarries listed in the 1944 publication Wartime Pamphlet 40: Scottish Slates. They were also asked to identify, from a geological point of view, those quarries that are most suitable for re-opening. This work has been published in two volumes: a Research Report entitled Methods of evaluating Slate and their application to the Scottish slate quarries and Technical Advice Note 21 Scottish Slate Quarries.

Since these research projects were originally commissioned in 1995, related issues have inevitably moved on. In particular, in May 2000, Rhona Brankin MSP, the Deputy Minister for Culture and Sport, formally launched the Scottish Stone Liaison Group (SSLG). Membership of this group includes the Stone Federation GB, the British Geological Survey, the National Federation of Roofing Contractors, the Scottish Building Employers Federation, Scottish Environmental Protection Agency, the Royal Incorporation of Architects in Scotland and the Royal Institution of Chartered Surveyors in Scotland amongst others. The group was established to provide an appropriate industry-wide forum, and tasked to bring together all those with an interest in reviving the Scottish stone industry. One of its specific aims is:

'To address the question of the availability of indigenous materials (stone and slate) required for the maintenance of our built heritage ...'

This research report, coupled with the related work from Glasgow and Dundee Universities will provide valuable data and evidence to assist in resolving this situation.

Ingval Maxwell
Director, Technical Conservation, Research and Education Division
Historic Scotland, Edinburgh
October 2000

1 INTRODUCTION

Throughout Scotland there is an increasing awareness of the history of the building materials that make up our built heritage, whether humble cottage or stately home. The architecture, whether developed from necessity or from artistic endeavour can be identified for its style, but the building materials (in particular, the slates and tiles used for roof coverings) have to be a compromise between what is available and what can be afforded. There are places other than this report where artistic endeavour can be studied and debated. In fact, education in building tends to concentrate on style rather than on humble craft materials.

Throughout the ages changes in such things as the economy and transport have brought about changes in the types and quantities of building materials available to the builder and this process of change continues at a pace. Today building materials are travelling huge distances by land or sea, by lorry or container, so that a humble roofing slate used in Scotland may have started its life in Spain, China or Brazil. The variety and quantity of these materials is so great, that the prospect of keeping up to date with recognition or familiarity across the range, is daunting.

Roofing methods, introduced to Britain from the Continent, have been modified by local practice over many centuries to overcome the differences of climate and weather, to create basic systems which apply almost equally to all parts of the British Isles. Therefore, when attention is drawn to the seemingly large differences that are usually referred to as 'Scottish practice', closer examination is essential. Much of what might be considered as different has developed during the Victorian period for various reasons which, it is hoped, will be explained as we proceed.

Unfortunately in Scotland, as in the rest of the Britain, there are differences of practice which result from bad habits. As time progresses most bad habits result in roofs that fail prematurely. In a roofing tradition where such failures have been remembered, bad habits are filtered out and successive generations of time-served craftsmen will pass on knowledge of mistakes which should be avoided. It is this refining process that has produced our traditional British roofing methods, which should be fully understood before acceding to the temptation to innovate. However, the pace of change in this respect has considerably quickened with new materials and methods made possible by the availability of inexpensive transport. Additionally, the latter half of the 20th century has seen the gradual demise of the old system of craftsmen and apprentices which previously served to restrict the worst excesses of the innovator, motivated as usual by financial gain, rather than by a desire, which existed in the best of building tradition, to 'build for ever'. In building a constant stream of new materials is introduced by persons without experience in the crafts. They bring with them new methods and shortcuts which are, often, just a rerun of a failed system of a couple of decades earlier. There is a widespread culture in building today of introducing new methods and materials, many of which will fail at the customer's expense.

Much of domestic and public roofing is carried out by the roof tiler, using concrete single-lap tiles. His background, for the most part, is not that of the time-served slater. In fact there are very few craftsmen slaters in Scotland. A sizeable majority of those fixing slates on roofs are not aware of the finer points of slating craftsmanship and, of course, it shows in much of the new slating work being carried out on new and relaid roofs alike. Similarly, we do not have an in-built filter to prevent the inadvised use of unsuitable materials and methods.

All of the above indicates that we must look to the old roofs and seek to understand them. We must look back to before the reign of Queen Victoria. Fortunately, much evidence has survived but time is running out for those who wish to inspect and understand old roofs. More and more roofs are reaching the point where the slates or tiles require to be relaid and the norm today is to relay them with artificial or foreign products. Much has already been lost and modern conditions of trading are not conducive to the reinstatement of the skills tradition that served our predecessors well. It is for this reason that this report looks backwards in time to the roof coverings used on the older buildings of Scotland in an attempt to lock into position firstly, an appreciation of the subject and, secondly, an understanding of old slate and tile roof coverings.

This report provides a brief introduction to the subject. It does not pretend to be a text book or a training manual or even a formal research document and it is hoped the brevity will be excused as the role of the observers book is recognised. Much of the detailed written history of Scottish roof coverings can be unravelled but, because virtually nothing has been published on the subject, a start must be made somewhere. The content of this report is the result of many years of research by the author which reached a meaningful point in a lecture on the history of Scottish roof coverings, presented to the Institute of Roofing in June 1980, at the Marley Roof Tile Company's works at Bishopbriggs near Glasgow.

There are at least three major strands to the research: firstly, an understanding of slating and tiling craftsmanship; secondly, documentary research; and thirdly, observation over a period of many years of existing buildings and roofs, quarries and geology, and the materials used for roof coverings in their historic context. No attempt has been made to deal with thatch or earthen roofs or modern corrugated materials and flexible membranes.

Perhaps it is the fate of roofing to be ignored by many, who stop at the guttering when looking at a building or dealt with as secondary to some other theme. The roof covering is required to perform its detailed role for long periods without attention, only to receive abuse on failure.

2 DEVELOPMENT OF SLATE AND TILE ROOF COVERINGS

2.1 Climatic influences

The earliest traceable history of roof coverings has a not surprising uniformity, even between the types of coverings on the Continent and in the British Isles. The differences from area to area have always reflected a reaction to prevailing weather conditions and these differences are more pronounced when a comparison is made between mainland European conditions and the more arduous conditions that apply to our north Atlantic climate. Obviously wind speeds are important and the fact that windy conditions in the British Isles are significantly more difficult than in most of mainland Europe, has led to a greater attention to either the self weight or the security of roof covering materials.

The fact that rain penetration in windy conditions is a serious factor also distinguishes the British Isles from the Continent. Deluge rain is not such a serious factor and our continental partners certainly have reflected heavy vertical rain in the design of much of their generic roofing.

It is perhaps in the area of frost or, more particularly, wet frost, that a serious distinction needs to be understood. For many years British slates have happily been used on the Continent but the use of continental slates in the British Isles throughout the last century or so has not been an unqualified success. In many parts of the Continent frost reaches far lower temperatures than we experience in Britain. This may give rise to a comfortable feeling that frost, therefore, is not a problem. However, the issue may be more clearly understood where a comparison is made between climatic conditions in Britain and Canada for instance, where wooden shingles give a particularly long service life and a deep frost in the autumn only gives way to a terminal thaw in the spring. If we compare this with a mainland British situation where, under saturated conditions, there may be two frost thaw cycles in one night and up to a hundred such cycles in a particular season, this gives a clue as to why softwood shingles have a significantly shorter service life in the British climate. On low pitches where the shingles remain saturated for the longest periods, the service life is the shortest. The same reasoning can be applied to other roofing materials.

2.2 Double and single lap coverings

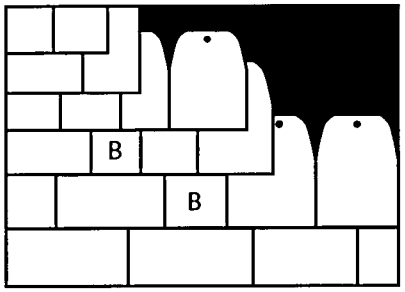
Unfortunately, there is an overwhelming ignorance about the way in which various roofing systems work. No doubt, if, in earlier times, a cheap and easily transportable continuous waterproof membrane had been invented, no history of such things as thatch and slates would be needed.

On the basis that there has never been enough caves to go round, man has had to provide cover for himself and his family. Perhaps the earthen deck should be the first to be considered. This simple system must operate by shedding water at the risk of becoming saturated but have sufficient periods of drying from both upper and lower surfaces to balance out, season upon season. The drying might be by the sun and the wind or by the fire on the open hearth. Roofs of sods and feal fall into this category as do the flat roofs in middle eastern countries.

Thatch must be considered next. The balance here is to have sufficient thickness to remain dry on the inside whilst each strand or fibre on the outer side of the mass is able to conduct the droplets of water outwards, by a combination of gravity and surface tension, dropping from fibre to fibre, guiding the rainwater from the centre of the mass until it is discharged at the eaves.

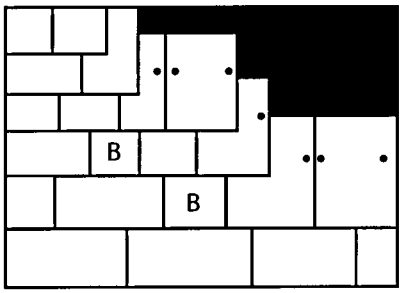
Next we have the double-lap system which uses a carefully positioned network of flat plates to conduct rainwater by gravity down the roof slope. This system allows the use of flat pieces of material which do not have a turned up edge to direct the water and, instead, uses the pitch of the roof slope and the sidelap of each flat plate to take the water to the eaves. There are two thicknesses of flat plate throughout the roof with an extra thickness at the headlaps. An understanding of this system is important. It applies to all slates and plain tiles and, when used properly, appears to be the most successful system to deal with the British climate. The double-lap system, when used with random sized slates, is very flexible with regard to the types and sizes of material that can be employed.

There are two methods of fixing double-lap slating: firstly, the variable gauge system which requires a fixing at the head of the slate unit and, secondly, the fixed gauge system which uses the centre-nailing principle.

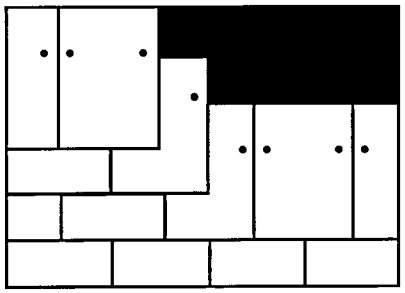


B = Backer

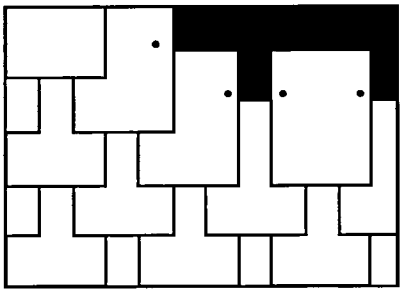
Double Lap - Head Fixed Random Slating



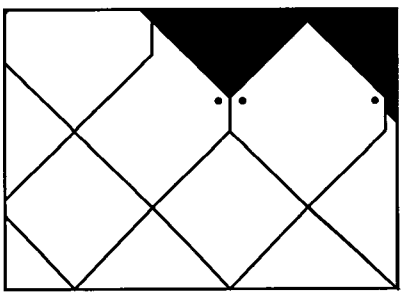
Double Lap - Centre Nailed Random Slating



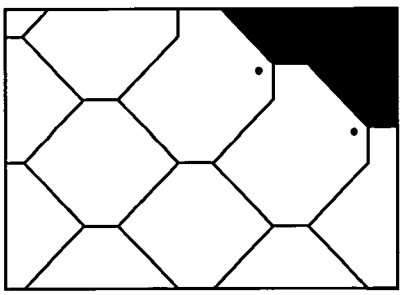
Double Lap - Centre Nailed Tally Slating



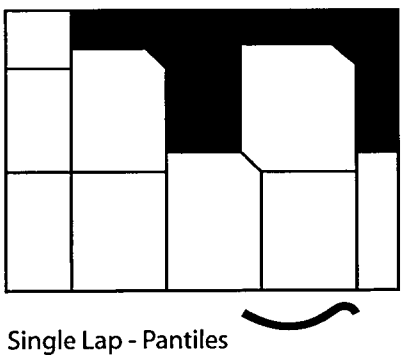
Double Lap - Open Tally Slating



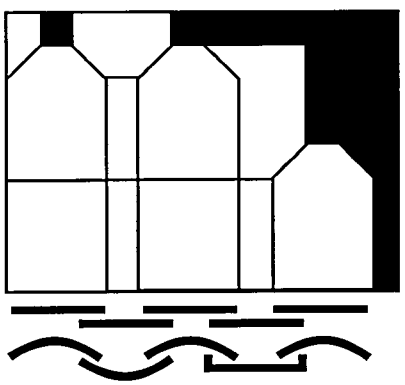
Diagonal Lap - Diamond Pattern



Diagonal Lap - Honeycomb Pattern



Single Lap - Pantiles



Single Lap - Vaulting or Unders and Overs (Spanish or Roman)

1 The principles of lapping slates or tiles

There are two main variations from the double-lap system of slating. The first variation, used on and off since Roman times, is the diagonal lap system which works best when all of the pieces of flat plate are of the same size (not random). Each plate is similar to a double-lap plate except that the corner areas do not have to be provided, changing a square into a diamond shape. This leaves a single thickness in the centre of each plate when laid. Often referred to as diamond pattern slating or diagonal lapping, it is not easily achieved with natural flat or fissile materials and lacks flexibility.

The second variation from double-lap slating is that of vaulting or vault covering, as used by the stone mason to cover vaulted masonry structures. Here again there has to be uniformity: all plates in a given course must be of the same rectangular shape and size and have both corners at one end removed in the form of mitres. These mitres can be laid together to form a headlap in alternate slates in alternate courses. Great reliance is placed on the sidelaps to prevent water ingress and the limitations applying to this system have caused masons problems. The stones are usually formed from thick blocks and produce the heaviest form of roof covering only justified when combined with a masonry structure.

Vaulting or vault covering, provides a link between double-lapping and single-lapping. The Mediterranean clay tiling method of using under tiles and over tiles is comparable with vaulting, but the problems of sidelap are overcome by turning up the side edges of the tile unit and forming two mitres at one end. The tiles are then used alternately, as with vaulting, to form the covering. This can be recognised in the two Mediterranean methods of tiling: Roman and Spanish. The Roman pattern uses unders and overs where the under tile (tegulae) is flat with turned up edges and the over tile (imbrex) is convex and bridges the gap between the under tiles. The end mitres are replaced in the clay tiles with notches to allow the tiles to lie closely where there would otherwise be four thicknesses. In the Spanish pattern both the under and over tile are the same shape but used in alternating positions.

The single-lap system may have been developed from the Spanish tiles mentioned above, simply combining the under and over tile into one tile to form an S-shape. The traditional pantile developed from this combination.

There are two types of single-lap tile: fixed gauge and variable gauge. In both cases the sidelap is insufficient for weathering and therefore relies on some form of turned up edge to prevent the water spreading sideways beyond the tile. The common clay pantile is the parent of a multitude of variations which will not be discussed here as they are, for the most part, irrelevant to Scottish vernacular roofing. Suffice it to say that the S-shape is well-known on the eastern side of Scotland from Berwick to Banff. Obviously, the S-shape offers a turn-up on the left-hand side of the tile and a turn-down on the right-hand side and relies on notches or mitres to avoid four thicknesses when laid on the roof. Because these mitres have to sit closely together, the tiles can only be laid to a fixed gauge.

Variable gauge single-lap tiles, however, are a modern introduction which started to be used in Scotland first before World War II. For the most part, they are made of concrete. They do not have mitres or notches and the sidelaps are a continuous moulding which interlocks within the thickness of the tile which accommodates four thicknesses and can therefore be laid with variable headlaps.

The single-lap system normally has the advantage of being economic since only one thickness of material (burnt clay, concrete or metal) is used on a large proportion of the roof. It probably comes as a surprise to know that sheet lead is normally installed to the single-lap system. The unit size is much greater and four thicknesses at the corners of each unit are of a lesser concern.

2.3 Documentary evidence for historic roofing types

It is most useful to begin by looking back at early references to the roofing trades and, although a seemingly unlikely place to look, a series of volumes entitled Armory and Blazon written by Randle Holme III in 1688, is a useful place to start. His desire was to make a complete record of heraldic devices and, in recording arms for the building trades, he not only records the tools used by the ancient crafts but also the types of roofing that existed in his day. For example the entry for the slater notes:

> 'He beareth Argent, a Slater sitting on a square Stone, with another before him Gules, with his Hewing Knife lifted up in his right hand, and a Slate in the left, proper; cloathed Gules. This may more shorter be termed a Slater dressing of a Slate, cloathed Gules, the rest proper.'

No distinction is made as to where the roofing methods were to be found but it is interesting to note that his national work, although from a north of England base, is remarkably easily applied to Scotland. The list of roofing types found in 'Armory and Blazon' is reproduced at illus 2 and, in the passages that follow, an interpretation of each in turn is offered.

The ſeveral ways of covering Houſes, or other Buildings.

Tyling, is a covering with long ſquare Tiles, made of Clay and Burnt in a Kiln. **Pan-Tyle,** is when they Bend round in form of an S and ſo lap over the edges one of another.

Leading, is by covering them over with Sheet Lead.

Flagging, is a covering made of very large broad Flaggs of fine Greet Stone, a Yard or more in height, and half in breadth. Theſe are called broad Slates.

Slateing, is a covering of Houſes with a kind of Blew Slaggy Marble, which will ſplit into thin pieces of all ſorts of Sizes, acording to pleaſure; ſome that are left thick, broad and long, are **double Slates.**

Shingling, is a covering with cleft Wood, made about 6 or 8 Inches broad, and 12 long, and pinned at one end to hang in the Laths: They are laid as Slates with Moſs under them, which is termed **Bouſeing.**

Caulting, is a cover made Arch-wiſe of great Hewn Stones, as Aſhlers.

Thatching, is to cover them with Straw, Ferne, Ruſhes or Gorſt, which is bound and held together by Laths, Windings and Thatch Pricks, done by the Art of the Thatcher.

Soding, is the covering of little ſhourings and places of ſhade from Rain, with green Turfs or Graſs Sods; or paring of the ſurface of Heathy Earth, which being laid on the Roof of a Houſe keeps it dry.

2 *List of roofing types from Armory and Blazon*

2.3.1 Tyling

Tyling, which we know today as plain tiling, does not figure in early Scottish roofing, despite having probably been introduced with the abbey building programme following the Norman Conquest. However, great quantities of machine-made plain tiles were brought north from the Staffordshire area throughout the 20th century and used on both local authority and private housing, some notable hotels and public buildings. Concrete plain tiles are also widely used and plain tiles generally are a successful roof covering providing the roof pitch is reasonably steep, say 40 degrees or more for the best results. The risk of failure due to frost has been a problem with some pressed clay plain tiles in the past, usually made worse by low pitches or under-burning during manufacture.

Pantiles

Pantiles, on the other hand, have been a part of traditional Scottish roofing since the 17th century and possibly earlier. The first pantiles were brought as return loads from the Low Countries during the great boom in the supply of wool to the Flemish weavers. The Flemish tile makers soon also found their way across the North Sea to the east coast of Scotland to Berwick, Lothian, Fife and possibly to Banff. The important commodity in tile making was fuel for burning and where this could be easily brought to an estuarine or lacustrine clay source, pantiles to replace thatch, bricks for flues, tiles for flooring and, later, tiles for land drainage, were commodities much in demand to meet the needs of the agricultural improvements taking place at that period.

An account of Clydesdale in 1806, written by John Naismith, refers to (pan)tiles as follows: 'There are, it is true, many tiles manufactured and used in the County, but when that manufacture was first begun, the tiles were of a bad quality and those who used them had cause to repent it, which deters others from following their example, so that although great improvement has been made in the manufacture of tiles, they are not very generally used for covering farm houses'.

Whilst the quality of the pantiles may have been an issue in Naismith's day, it does seem probable that the weather was also an important factor. In the Clydesdale area, as opposed to the eastern side of Scotland, pantiles may have been less stable in higher wind conditions and, likewise, wind-driven rain may have been a problem. It is also possible that poor clay and manufacture may have led to frost failures which gave pantiles a bad name.

2.3.2 Leading

Leading with sheet lead is one of the noblest of roof coverings and, being comparatively light in weight, was ideal for important buildings such as castles and abbeys where the greater roof span was a consideration. Even from the time of the Roman occupation only the richest institutions could afford sheet lead. Unfortunately, there is no vernacular pattern to lead sheet, although the trained eye might be able to distinguish between modern milled lead and cast lead sheet. The cost of lead sheet, together with the cost of the necessary timber boarding to support it, before the advent of sawn softwood, was so great that the cost of transporting it was a relatively small consideration. The advantages, however, were many, ranging from the ease of re-use by recasting on site to the collateral value should all else fail.

It should be remembered in considering old buildings that in a significant number of cases a temporary roof covering was used, probably over the boarded roof deck, until such time as sufficient lead sheet could be purchased for the ultimate roof covering. Oak shingles were often used for this purpose. The shingles were secured with pins to the boarding to prevent wind uplift, thereby avoiding the weight penalty of 'flaggs or blew slates' on a wide span building.

2.3.3 Flagging

The name 'Flagging' was given to large pieces of flat stone laid as a flooring or a roof covering. The use by Holme of the term 'fine Greet Stone' is an interesting one, from the point of view that, even into recent times, the term 'grey slates' has been applied regularly to stone slate roofing. Interestingly, neither the grey of the stone nor the blue of the slate were meant to refer to the actual colour. The term 'grey' is a corruption of 'great' and reflected the very large sizes outlined by Holme. This term was used to distinguish stone slates, which are mainly of fissile sedimentary rock, from 'blue slates', which are of cleaved metamorphic rock. Holme used the spelling 'blew' because he was referring to the blewing of metal which relates to iron in the hands of the blacksmith and, in the general scheme of things, colour is unlikely to have been an important factor with the majority of building in those days.

Stone slates occur in several places in Scotland and in earlier times, were used with laths in the traditional British fashion. Scottish stone slates are of great variety: in the Dumfries area New Red Sandstone has been used; some Carboniferous sandstone from the Coal Measures may have been used in the Borders and in Lanarkshire; in Forfar and Angus the Old Red Sandstone, which is not red, these terms being geological, which produced large quantities of

pavement stone in later years, was first exploited for stone slates. The same process of exploitation can be identified for the famous stone slates of Caithness which are different in substance due to the amount of bitumen in the rock. Confusingly, this rock, when used for pavement, wears to a strong iron blue/black colour which Holme would have called 'blew', but not so when used for roofing, thereby saving the title 'blue' for cleaved metamorphic slates.

Sandstone of a different type was regularly used on important buildings in the Elgin area until Georgian times and should not be confused with the mica schist slates of the Speyside area which are an interesting link between stone slates and metamorphic slates which were found in a number of colour blends from a whole range of quarries, some of which were still active towards the end of the 19th century.

The last of the stone slates are of Moinian schist, which were quarried in ancient times on the isle of Mull possibly for a number of the ancient castles around the Firth of Lorn. The quarries were reopened for the restoration of Iona Cathedral earlier in the 20th century. There is every reason to believe that stone slates, where available, were used in each area before metamorphic slates became important. This is clearly the case in Moray and Lorn and is also possible in the Forfar area, where the thin-bedded fissile sandstone outcropped and was used as a fortuitous material, more readily available than the somewhat more concealed attribute of slatey cleavage to be found in metamorphic slate rock in the nearby Grampians. In both Lorn and Angus/Forfar, blue slates ultimately became available near at hand and no doubt contributed to the ultimate demise of quarrying local stone slates.

It is interesting to note that the fissile rocks of both Forfar and Caithness, and possibly others, are rhythmic in their bedding, so that a series of thin beds suitable for roofing is followed by thickening beds suitable for pavement, kerb stone or building block. A quarry was likely to have been opened in roofing thickness stone but ultimately became more important in the pavement trade as the beds thickened and commercial demand changed. Stone slates therefore can be considered the forerunners of the notable 'pavement trade' of Arbroath and Thurso.

2.3.4 Slateing

This brings us to the blue or metamorphic slates of Scotland, seemingly famous for centuries and clearly the most important of Scottish roof coverings. In describing slate Holme says 'thin pieces of all sort and sizes' and this applies equally to all of the historic blue slates in the British Isles. Before the 17th century and, in many cases, up to the late Georgian period, all blue slates were sold in mixed batches of random sizes where even the largest were small and thin compared with sandstone slates.

Perhaps a brief reference to the geological term 'slatey cleavage' should be made here. Sedimentary rock such as sandstone may be sufficiently fissile in its bedding planes to allow flat layers to be parted and dressed to form roofing slates. However, it is possible for some sedimentary mudstones or siltstones, which will have had their own planes of bedding or deposition prior to metamorphosis, to develop a slatey cleavage caused by the grains of silica and alumina, etc, being compressed, mainly by tectonic pressure, into flat grains of mica all lying in the same direction. It is possible to split such rock accurately parallel with these platelets to form slates, regardless of the direction of the original bedding.

Whilst dealing with the actual physical make-up of slates, it may be useful to draw attention to the language of the geologist. There may be confusion in what is termed 'slate'. There are good blue slates which are indistinguishable to the builder, but may on the other hand be considered to be other than true slate by the geologist. Where low grade metamorphosis coincides with the original bedding, this may not be considered to be true slatey cleavage. These rocks may be called shale rather than slates by the geologist. This is a minefield and the use of geological terms and assessments may not help an understanding of the history of building materials. As we progress it should become clear as to what, for building history purposes, may be considered to be blue slate, schist slate, or stone slate.

Likewise, colours are subjective when describing slates. They appear to be different shades of grey but a bewildering number of colour names are invoked, particularly by people selling slates. Here the term 'blue slate' means a metamorphic slate or shale slate, regardless of colour.

Blue slate quarries which in later centuries may have produced large slates did not do so in earlier times. To be more precise, it was usual to supply blue slates in a size range where the longest was around 16 to 18 inches and the rest of the consignment would diminish in size sometimes to as little as 6 to 8 inches. Blue slates have always been produced with the grain (as in wood) or direction of weakness aligned with the length of the slate which, when laid, would be down the roof slope.

Slates were not produced to a measure but were simply the largest size that the slate maker or quarrier could achieve for the piece of rock to hand. The old method of extracting the slate rock in the quarry by wedges, levers and hammers was such that crude work, even if

the rock would allow, could not produce large slates. The consignment of slates for a particular building would be estimated by tradition of use on the basis that a batch of pieces, usually called a thousand but rarely as little as a thousand by count, on average would cover a certain measured area of roof; if the slates were laid to a 'fair band' or lap (headlap). Later, slates were sold by weight. The most important aspect, however, was that slates could be too thin. In the old tradition all slates were head-fixed and, if the slates were not of adequate thickness to give them sufficient self weight, they would blow off the roof in gale conditions. Stone slates were produced in the same way but had the advantage of thickness to give weight for security on the roof.

The Slater's Art

Once the quarrier had produced the slates and the carter had taken them to the building site, and in the 18th century a 20-mile land journey could double the cost of the slates, the art of the slater was required to convert an apparent confusion of totally random shaped slates into a disciplined roof covering. This applies to random slating to this day. The initial assumption is that a sufficient quantity of slates has been delivered to site. Next, the slater sorts the slates to length and calculates the number of courses of each size length of slates that can be achieved. The slater then marks out the roof in such a way that the required traditional headlap for the pitch and exposure of the roof is applied. Where the size length of the slates reduces from one course to the next course above, the headlap in the particular change course has to be adjusted so that the resultant courses of slates diminish evenly. In this way, the slater applies the slates progressively until the smallest lengths of slates are used in the uppermost area of the roof.

It should be mentioned that, having achieved a setting out of the roof in order to ensure adequate headlaps, the slater had next to ensure that the sidelaps were adequate. This was (or is) done as the slates are fixed into position on the roof. The slates, being of an infinite variety of widths, would have to be used with strict attention to the amount that the slates were bonded, course on course.

Sidelaps are important. Generally, slaters will attempt to ensure that the sidelap is at least equal to the headlap and this is often sufficient in the case of small slates. However, where larger slates are concerned, a sidelap ratio of half the margin of the lower slate is a more reliable figure. The margin is the distance between the tails of successive courses of slates. When the margins diminish, as in random slating, this care with sidelaps is important.

Much poor workmanship today is the result of poor sidelaps. The use of roofing felt under slates on modern roofs has led slaters and tilers to rely increasingly on the durability of the felt rather than the slates or tiles for their waterproofing. Of course, the real purpose of the underlay is to prevent draughts rather than to keep out water and to act as a substitute for torching mortar between the battens. In the days before roofing felt a poor sidelap would rain-in and the slater would soon be told.

In applying his art, the slater would be confronted with a roof of slates where the number of slates along the eave would be significantly less than the number of slates along a similar length of top edge or ridge-line of the same roof slope. To increase the number of slates in a course the slater requires to sort out sets of slate widths which, when laid in combination, will allow one wide slate to carry a 'whole slate and two half slates' in the course above. This function has to be performed for each extra slate in the top course over the number in the eave course. This will be performed at positions somewhere in the roof or at the verges, according to the slates supplied by the quarrier. In most of the vernacular terminology for stone slates, this 'whole slate', which lies entirely upon the wide slate, is known as a 'bachelor' or 'backer', probably from the allusion that there is only one wholly in the bed; there has always been such humour in the building trade. In order to work the 'backer' must be wide enough to accept a properly sidelapped vertical joint in the next course above. The wide slate was often referred to as the 'widebutt' or 'wibet'; there are many variations. No such list has yet been recorded in Scotland, but, nonetheless, this function applies to all truly random slating.

The slater can only create the roof covering in accordance with the slates supplied by the quarrier. This means the regime of diminishing courses will reflect the proportions of the different size lengths that have been provided by the quarry.

One of the most interesting aspects of looking at random slating (where a roof has not been unduly disturbed) is the pattern or fingerprint of the diminishing courses which in many areas can help us to recognise the quarry from which the slates came. Pale Silurian slates in the Galloway area tend to be larger than the darker Ordovician slates of the Lowlands such as Stobo, where the smallest slates are in high proportion and are very small. Highland slates (from the Highland Boundary Fault) tend to be larger in overall average than either Lorn slates or slates from the Grampian area.

The background to traditional small random slates has been explained. It might be useful now to consider how things changed, starting in the 17th century, with the development of random slates by quarries in the neighbourhood of Bangor and Caernarfon in North Wales; which were of much increased size range. The fact that Holme does not mention what became known as 'ton or tun slates' rather suggests that their introduction to the market had been too recent for Holme to record. They were popular during a period from c1650 to 1840 when they were superseded by tally slates.

The natural distribution area for what became known as Bangor tun slates includes the Mersey and Dee estuaries and their links with Lancashire and Cheshire via the river systems. Later, when the early canals were developed, these slates travelled more widely, for instance into Yorkshire. These large random slates met the demand created by the agricultural improvements and the early Industrial Revolution. The slaters who had learnt their trade fixing stone slates; the 'great slates', of almost exactly the same size grading range, could readily adapt to fixing Bangor tuns. These slates became ever more widely distributed and can be found around the Irish Sea, Galloway being no exception. Water-borne transport was their key to success. However, in Scotland, only few examples exist and these are mainly to be found in the south-west, but this part of the history of the slate industry needs to be taken into account in understanding later developments in the slate trades in Scotland.

The Bangor tun slates were followed by similar slates, known as 'Kirkby roundheads', which were quarried fairly near to the coast in Furness. These can also be found on numerous roofs in Galloway. Both of these types of slate were made thick and heavy to resist wind damage and compared favourably at 36 inches or more in length down to 20 to 24 inches in length, with the gritstone slates of the Pennines which were used in profusion in the English counties mentioned. However, the only slates native to Scotland which begin to compare for size with these slates are those of Caithness sandstone.

Random slating or, more correctly, diminishing course slating using slates of random length and width, is the truly British method of providing roof coverings suitable to resist the climate of the British Isles and, whilst the system has been employed in other continental countries, none have the variety and complexity to be found in the British Isles.

Two Size Ranges

In his list Holme refers to 'double slates'. This refers to the one concession to the market place that early quarriers generally adopted. Clearly, it was in the interest of the quarrier to convert every piece of rock extracted from the quarry face into a saleable roofing slate. In fact, in some quarries, people living around the quarries, particularly boys who would later become quarrymen, were encouraged to scour the rejected material on the waste tips for any pieces which could be made into slates for which the quarry would pay a small consideration. This mode of conversion of course led to an over-supply of small rough slates which the discerning purchaser was reluctant to buy and which would devalue the main production of the quarry. Almost universally amongst ancient quarries, slates were divided into two qualities: those which the quarry would seek to sell over as wide an area as transport and economic factors would dictate; and a lesser quality retained for local use nearer to the quarry where lesser competition might favour a sale.

It can be taken for granted that no quarrier would refer to any of his slates as being of a lesser quality. Invariably, any choice would be represented as a colour, thickness or size grading. During the Victorian period, when Welsh quarries dominated the British slate market, the term 'best quality' meant the thinnest slates or, in the quarrier's terms; those slates that were the most profitable. Therefore, when Holme mentions 'double slates', he is referring to a different grading, where the area covered by the slates would be greater for a 'thousand' slates than would be the case for ordinary or 'singles' slates, but, clearly, this did not mean slates that were twice as big.

'Doubles', therefore, were the larger grading sold to the widest market, in Holme's case in Chester from the Welsh quarries, whilst the others, not actually referred to as 'singles' at that time, were the slates of lesser grading due to rougher shape and smaller size range. In Scotland in general and Lorn in particular, these two levels of grading were perpetuated during the 19th century by the supply of slates referred to as 'sizeable' and 'undersized'.

In many areas of Britain the various slates within a random consignment would be given names to indicate their function on the roof. This in itself is a complicated study of the craftsmanship and not just a list of names for various courses of slates on the roof. In Scotland there do not appear to be sets of names used by the slater in this way. In any event these names fell out of use early in the 19th century and were usually applied to stone slates. It would be interesting to know if such sets of names were applied to the sandstone slates in Forfar, Moray or Caithness, for example.

It should be mentioned here, to avoid confusion, that there is a completely different set of names given by General Warburton of the Penrhyn Quarries to the regular sized (tally) slates created by the reorganisation

of the Bethesda quarries along 'industrial' lines. These were based partly on corruptions of Welsh size names, such as 'duchess', 'countess' and 'ladies' and were not introduced until the end of the 18th century and became widely used during Victorian times. Subsequently, blue slate quarries throughout the British Isles adopted these names but in Scotland as elsewhere, price lists using these names were largely wishful thinking. The marketing of a quarry's products often included prices for slates which the quarry would find it almost impossible to supply.

2.3.5 Shingling

There is no physical evidence of the early use of shingles in Scotland, mainly due to much early work having been taken down or substantially changed. Even as a temporary covering prior to lead sheet, as previously mentioned, records are unlikely. Where shingles were used they would have fitted Holme's description and would have followed a British tradition of being made from cleft oak. Scotland's reserves of oak were depleted at an early date therefore the availability of shingles would have been limited. Shingles, however, would have been easily transportable.

During the Arts and Crafts revival period there was a resurgence in the use of oak shingles, mainly on English church spires or fleches. They are mentioned here for completeness and do not figure in the vernacular pattern of roofing, although they are an important part in the history and evolution of roofing. An important consideration would be the security of a shingle roof. Unless either nailed down or held down by weights, shingles would have been too light to withstand strong winds. If nailed in place, they could be fitted to steep roofs thereby helping durability, but, if they had to be held down by some form of ballast or ropes, a modest roof pitch would be needed.

2.3.6 Mouseing

Reference to the use of moss, normally a long bog moss rather than common mosses found on walls, etc, could be a slight misinterpretation on the part of Holme, in so far that mossing was generally carried out where lime for mortar torching or where roof sarking boards had not been used. Shingles are light in weight and the forcing of moss between the laps could have been questionable. However, where slates such as stone slates were large enough to be used without boards, mossing may well have been used. We would need to turn to the stone slate areas for evidence of this. It is probable however, that, in exposed areas, where lime mortar for bedding the slates onto the boards was expensive, the use of vegetable matter to prevent the ingress of wind-driven powdered snow would have been common practice.

2.3.7 Vaulting

Holme's description of vaulting falls short of a true understanding. This method of roof covering was important in Scotland, mainly on ecclesiastical buildings. The system used thick slabs of stone and was used mainly for its exceptional strength when combined with the arched masonry structure upon which it would be normally constructed. We more commonly use the term 'vaulting' to describe the arched structure as viewed from the inside of the building, but the name 'vaulting', when applied to roofs, refers to work normally carried out by stone masons rather than slaters. Regular sized slabs, as much as 3 inches or more thick, are laid in an alternating mitred layout. The system is very expensive not least because of the need for many stones all of the same size. The lapping system is reminiscent of Roman tiling, as described in the section 2.2.

The first eaves course would be laid, bedded into position, with gaps between each slab equivalent to the slab width minus twice the sidelap. The second course would be laid on top of the eaves course by bridging these gaps and bearing on the eaves course by the width of the sidelaps. The top corners of the second course would each be mitred to a diagonal based on the headlap and the sidelap. The third course would be in the same plane as the second course and would be similarly mitred, only this time at the bottom two corners, so as to fit tightly to the top mitres of the second course and so, the second and third course layout would be repeated to complete the roof. The whole assembly would be bedded onto a masonry substructure with the use of lead-run dowels or notches to prevent slippage. The laps, which in some cases could incorporate drainage channels, were normally bedded in a strong putty lime mixture which would be laid to set before frost damage could occur. This was the work of the mason rather than the slater or tiler.

2.3.8 Thatching

Much is written about thatching and, undoubtedly, every true Scot would have the hum of rain and the reek of thatch in his very make-up. This book will not deal with thatch, except to confirm Holme's understanding. Reference to the various Agricultural Transactions of the last century or from the period of the First Statistical Account will give details of the methods used in each region which, in most cases and, due to the exigencies of the weather, go beyond the mild and often romantic view of man's original shelter.

In 1789 Robert Douglas wrote of buildings in the Border area as follows: 'Clay built walls and thatched roofs are fast upon the decline and, if the present spirit continues, will in a few years become a mark of disgrace' – 'their roofs are of coarse and slender timber, covered with turf and rushes. A hole in the

middle of the roof, surrounded at the top and a little way down into the house by a wicker frame, plastered with a mixture of straw, mud or clay, is the only chimney'.

2.3.9 Soding

'The use of green turfs or grass sods or heathy earth to keep the house dry'. This then is Holme's description of a type of roof covering, a few remnants of which can still be found in parts of the Highlands. It is interesting to note that 'soding', a term which to the modern ear sounds rather like bad language, was widespread in the Highlands and the following account by W Marshall in 1794 helps our understanding:

> 'The roof is set on with couples or large principal rafters, stept in the walls 2 or 3 feet above the foundation; generally upon large stones set to receive their feet. Upon these couples lines of pantrees or purlines are fixed, and resting upon these rough boughs (stript however of other leaves and smaller twigs) are laid rafterwise and termed cabbers'.
>
> 'Formerly the cabbers were wattled and interwoven with rods or twigs so as to be proof against a sudden assault, which in times of retaliations, was not infrequently made through the roof'.
>
> 'Upon these (cabbers) divots or thin turf laid on in the manner of slates, and upon this sod covering a coat of thatch, composed of straw, rushes, heather or fern, the latter being drawn up by the roots, or cut close to the ground, in the month of October, and laid on with the root end outwards, making a durable thatch. The gables and ridges are loaded with feal, thick sods taken from the deepest best soil'.

3 Vaulting at Stirling

3 IMPACT OF AGRICULTURAL IMPROVEMENT

The term 'Improvements' is normally applied by historians to the great agricultural improvements of the 17th century onwards, which changed the face of the Scottish countryside and, more particularly, helped to change the style of building.

It is the change of building methods that concerns us as we consider the effects on the roof coverings of buildings.

It has already been mentioned that the best hard roofing materials were used on high-ranking buildings and, to some extent, on the most important buildings in some of the Scottish towns and cities. A good example would be that of the Stobo quarries, where slates were quarried from an early date and used on the most important buildings, not just around the quarry but also on roofs as far away as Edinburgh. The use of slates was an expensive aspect of building and country buildings and most town buildings would have remained thatch-covered prior to the 'improvements' slowly taking place.

The great problem of the 17th and early 18th centuries was the shortage of affordable timber for construction purposes. We may read elsewhere of the denuding of native timber and the cost of importing Scandinavian timber during this period, which denied the humble building of the better construction methods which have since become commonplace. However, the great landowners soon realised that improvement could not be sustained without adequate supplies of timber. It was under the very shadow of the Stobo quarries that a first move to ensure adequate timber supplies is recorded when, in 1707, the first larch trees were planted in Dawyck Park, surely a precursor to the fashion generated amongst Scottish country estates to plant commercial timber on a huge scale. Only the wealthy large estates could afford the waiting time of perhaps 70 or more years before their investment could materialise.

It is interesting to note that this important issue, the supply of construction timber, was one of the main causes of the variation of building techniques peculiar to Scotland. In most of the rest of Britain supplies of hardwood remained available into the 19th century, although, it must be said, the practice of building with oak timber frames had died out by the beginning of the 18th century. The main problem in England was the lack of power prior to the introduction of steam-driven machinery. All of the available water power was devoted to the grinding of corn, and was even supplemented by wind power on a somewhat unlikely basis in many areas. Builders in England had to wait until steam-powered sawmills could be set up before supplies of sawn softwood purlins and rafters became an economic proposition. Generally, the reign of Queen Victoria had started before slaters were able to discard cleft hardwood laths in favour of sawn softwood battens to meet the demands of the Industrial Revolution.

When the plantations of softwood reached maturity, the great estates in Scotland built water powered sawmills. This movement started at least 50 years earlier than steam powered mills elsewhere. The availability of abundant sawn softwood at economic cost enabled builders to change from cumbersome couples with rough-hewn pantrees and even less enticing cabers or rafters made from rough branches to neat rows of collared roof construction.

In addition sawn battens or sawn boards became available with an insignificant cost penalty for the latter, due to the closeness of spacing of battens for small Scottish slates. It was the availability of these materials and this form of construction in the late 18th century that enabled the Scottish slate quarries to find a market for their roofing slates.

The interpretation given above may seem somewhat simplistic but there is no doubt that great advances do come as a tide, sweeping away former practices, just as the railways swept away the stage coach. Many examples could be quoted.

Planting

In the Province of Moray in 1798 where innovations were taking place, such as the use of lime mortar for extra strength and as a render to protect earthen walls. Estate planting of deciduous trees to replace Scots fir had started much earlier in the 18th century but that the latter were still being planted at 1200 to the acre, there being many such plantations, 'some formed on barren heath'. Plantations were sold for felling and re-planting, with fir manufactured into deals and timber for the roofing of houses. A sawmill, built at a waterfall in 1765 to process forest timber, had four wheels and

seven blades. In Abernethy an uninterrupted manufacture of deals from less matured timber had been carried on for more than 60 years and the earlier method of making deals had been by 'splitting the timber with wedges and trimming the boards with the adze or ax'. Highlanders' houses were constructed in the old fashion with a fireplace near the middle with the family seated around it, described as 'black earthen hovels, darkened by smoke and dripping upon every shower', where about 30 years previously a landlord would provide timber to improve buildings of sod, paid for by rent reduction over 19 years. Other improvements included the recent organised building of roads and the use of gunpowder for blasting. The Duke of Gordon had been constructing planned villages, and the larger farms were receiving commodious and neat two storey houses 'of substantial masonry, stone and lime, and for the most part slated'.

Welsh Slates

To complete this understanding of how Scottish practice varied from a medieval norm, it is necessary to look more closely at the available slates in Scotland at a time when transport was expensive. In fact, the market for Scottish slates remained until transport costs lost their significance and until the huge advantages of Welsh slates finally took their toll. We should ask what these advantages were (and are). For the answers we must first turn to geology and a comparison of the formation of the rocks from which the slates are obtained.

It is not intended to pursue complicated geological reasoning at this point, but, rather, to explain how, despite the durability of the slates being comparable, the advantages and disadvantages of manufacture are significant. It has been mentioned in the section referring to tun slates that a break with the tradition of making small random slates was made in the two areas where large slates could be made, namely Bangor (Gwynedd) and Cumbria, both of which sent blue slates to Scotland. The reason that they could do so lies in the formation of the slate beds and the way in which they have been influenced by tectonic pressure upon the common rocks.

In both Gwynedd and Cumbria the folding of the deposition is on a grand scale giving a distance of many miles between folds, with the result that the slate, is less contorted and containing long lengths of unbroken rock that can be cleaved in large sheets, particularly where the quarries are deepened. In the Scottish quarries the distance between folds can be as little as a few metres. The straight sections of rock between ruptures therefore can only provide very small pieces of cleaved slate. In Welsh blue slates the average production can be of much larger sizes than is possible from the Scottish blue slates.

The fact that Scottish slates are small was a mixed blessing. Firstly, resistance to prevailing weather conditions, particularly wind uplift, requires head-fixed slates to be relatively thick and heavy and this suits Scottish slates. However, the use of small slates dictates laths or battens that are very close together. This was solved by using the ultimate in close battens, namely boards or, more properly, sarking boards.

Softwood

At the same time as the use of boards was introduced, the same sawn softwood could be used to make rafters and cross-braces, known as couples. The boards became part of the strength of the combined softwood roof structure and the disadvantage of having small slates was thus to some degree alleviated. Before sawn softwood boarded roofs became available, all types of slates and tiles would have had to be hooked over cleft hardwood laths, using wooden pegs, with lime mortar torching to the underside to aid security and provide draughtproofing. However, significantly fewer roofs were slated or tiled. Where slates were used on higher ranking buildings, such as castles and religious buildings or in some burgh towns, there is the possibility that slates were fixed to boards. These would have had to be hardwood boards which were traditionally prepared by being split from the trunk and adsed to an acceptable finish. This would have been very expensive and, as mentioned previously, was mainly justified only for important buildings and the boards would be more likely to be ultimately covered with lead sheet. Boards of hardwood produced by being hand sawn in a sawpit would normally have been too expensive for roofing.

The use of pegs with boarded roofs is a difficult procedure to adopt. although there is one report of boards being drilled for timber pegs; there are some examples of this work in France on old buildings – a very tedious process, probably restricted to stone slates. The difficulty then arose as to how the slates would be attached to the softwood boards. Wrought iron nails became the generally accepted fixing method.

After the widespread introduction of sawn softwood in the latter half of the 18th century, the Scottish blue slate industry prospered despite the setback of a tax levied on slates transported coastwise. The country slates of Banff/Aberdeenshire were used over a wide area and roads were developed to aid their distribution. The same applied to slates from the Highland Boundary Fault, from Dunkeld to Aberfoyle and Luss on Loch Lomond. The quarries at Stobo near Peebles and other

quite large quarries at Parton and Cairnryan in Galloway, along with scores of smaller quarries spread along the main deposits, carved out a respectable distribution, with the main competition coming from seaborne slates, mainly from Lorn. In Galloway, significant quantities of Cumbrian slates were imported, together with the Welsh tun slates already mentioned.

Tally Slates

During the same period, the late 18th century, the Welsh quarries, notably those in the Cambrian deposits south of Bangor and Caernarfon, were undergoing industrial development on a massive scale. The natural production of these quarries was such that, whilst the average Scottish quarry would produce slates mostly in the 16 inch down to 9 inch length range, Bangor, in addition to tun slates, was consistently producing slates in the 24 inch down to 14 inch length range and in such large quantities that they were able to sort their production into actual measured sizes.

Thus was born the production of tally or regular sized slates such as the Princess (24 x 14 inches), Duchess (24 x 12 inches), Small Duchess (22 x 12 inches), Marchioness (22 x 11 inches), Countess (20 x 10 inches) and Ladies (16 x 8 inches). There are names for other intermediate sizes. There were also 13 other sizes between 14 x 12 inches, and 10 x 6 inches, all of which were made in large numbers as a by-product.

The production of the regular sizes and their sale not just in the British Isles but in many markets overseas became a massive industry. The introduction of sawn softwood battens in England and Wales, around 1835, had permitted slates to be fixed by a system called 'centre-nailing', rather than head-fixed and the larger sizes could easily accommodate the extra sidelap needed. These tally slates dominated the roofing market for all types of buildings on a scale never known previously and unlikely to ever be reached again. The bonus was that centre-nailing proved particularly resistant to wind uplift, even when the slates were made thinner, with more slates made from each block.

The success of the Welsh quarries in selling the regular sizes of tally slates led firstly to a reduction in the production of tun slates and, secondly, to an overabundance of the smaller tally sizes, which, because of the cost of fixing, were difficult to sell.

The Scottish slate industry did not have the option of sorting production into regular sizes, simply because the mass of slates produced was too small. Any attempt to take out or select particular preferred sizes would leave the bulk of production unsaleable.

The small leftover slates of the Welsh quarry production, however, were in the middle to upper size range of Scottish slate production. The Welsh quarries could afford to sell these slates in Scotland at competitively low prices, to very great advantage, with the result that the Scottish quarries could not compete. From the middle of the 19th century onwards, traditional Scottish random slates, therefore, could only be sold on a traditional basis, rather than a competitive basis, leaving no margin for better pay or investment and the Scottish slate industry unable to survive.

For these reasons, the supply of Scottish slates remained as consignments of random slates; only very few were sold as regular sized slates. Conversely, Welsh slates in Scotland, with the exception of some tun slates in the south-west, were sold in sized consignments, usually of one size per consignment. Of course, there was no problem in using thinner Welsh slates since centre-nailing could be as easily carried out on boards as on battens.

4 ANCILLARY ROOFING ELEMENTS

In the preceding chapters an attempt has been made to give a general view of Scottish vernacular roofing of slates and tiles. This chapter discusses the use of elements associated with slate and tile roofs.

4.1 Fixings

The traditional hardwood roof structures which developed through time relied on ropes and pegs, etc, or heavy ballasting of vegetable material to hold the whole assembly together. Where buildings required more substantial roofs with the cross-pieces supporting the roof covering comprising cleft laths or sarking boards, nails to fix these to the rafters or cabers were required. Throughout time the nail-making blacksmith has provided these in sizes to suit the particular job, but so fragmented has this trade been in former times that very little has been recorded, rather it has been taken for granted as a basic fact of life. Nowadays we buy machine-made nails, more or less on demand, without thinking of the way things used to be done.

In former times iron would have been transported to the blacksmith and nails would have been a local product. At about the same time as the industrialisation of slate quarrying took place, a steady concentration of nail-making by traditional methods led to the nails being taken from industrial centres to the place of use in finished form. By the end of the Victorian period, the making of nails had changed completely. Unlike modern nails which are made from wire of a particular metal the traditional nail was made by cutting a tapering piece from a plate of grey iron. Other metals, mainly copper, were introduced towards the end of the 19th century. Some nails at this time were cast and coated with zinc but these were used for larger slates.

Although ferrous products can oxidise or rust, wrought cut nails have had a long life on the roof, both slate and board nails having served for a century or more. Modern ferrous wire nails do not have the same durability and are best used with a zinc coating either hot dipped galvanised or sprayed, sheradised or pour coated. These nails have good durability when used to nail lath, batten or board to rafter, where the zinc coating will not be damaged. They are less successful where the zinc may be damaged by the slate or tile being fixed. The most successful nail for fixing slates is the copper wire clout head nail. Aluminium alloy nails are more often used with tiles with a shorter durability. At the end of the traditional nail period, large quantities of cut copper clout head nails were used for slating and, whilst these proved durable, their tapered shape reduced their nail withdrawal resistance. This was not a problem with similarly shaped wrought-iron nails due to surface oxidation providing a better grip. At the present time restorers are seeking to use stainless steel nails in the hope that durability will be good. This is a gamble for a number of reasons, not least for those set out towards the end of Chapter 1.

The most important issue regarding nails is the adequacy of sizes. The diameter of the nail and the length of penetration into the board or batten are important to provide withdrawal resistance. With board and batten nails, ring shank nails can be used to increase the resistance. With slate or tile nails, smooth shank nails of adequate size are preferable to the unforgiving ring shank nail which can cause broken tiles and slates during any roof settlement that may take place.

4.2 Mortar

Another item of major expense for the traditional roof was that of building lime. The process of producing slaked or putty lime for building is well-known and is not repeated here. Not all areas had lime available at a convenient distance and it is interesting to note how this influenced building methods, such as the use of moss for draughtproofing, etc. Development of building was held back in areas where lime was scarce or too costly.

Mention has been made of the use of lime with sand to make a gap filling mortar suitable, for the most part, as a draught excluder and as a supplementary fixing to hold the heads of the slates or tiles firm, the precondition being that the lime mortar did not become wet on a regular basis. Normal lime mortar used for bedding is not frost-resistant and therefore has to be kept dry. In the case of slates and tiles, This means it cannot be used in the covering assembly where rain water regularly flows. In other aspects of traditional building, lime mortar had to be protected from getting wet, as at abutments for example, by being protected with a generous coating of limewash or whitewash, itself made from neat slaked lime. This had to be re-applied regularly to provide the necessary protection.

It is often forgotten that, as recently as the 1950s, local builders had regular work raking out and pointing the mortar joints of masonry and brickwork and replacing it with new pointing. In former times pointing was formed with a strong lime mortar and this included some verges and ridges. However, this one-time regular practice has given way to cement mortar pointing which, if properly done, is more durable but can cause other problems, quite apart from its often unacceptable appearance and lack of authenticity. It should be remembered that traditionally, and particularly during Victorian times, the slater also carried out the harling of walls with lime mortar mixes. Likewise, in other parts of Britain the trades of slating and plastering were conjoined as was the case with the writer's great grandfather.

The term 'mortar' in older writings may not refer to lime mortar or cement mortar, but could easily be clay straw mortar or some other kind of earthen mix. Likewise, the use of the word 'cement' was different to our now accepted reference to Portland cement. This is however beyond the concern of slating and tiling. An important point in understanding the use of mortar in modern building is that the performance of mortar is judged by its resistance to compression. Other aspects, such as its use as a facing or a gap filler, are rarely considered as serious. The major aspect with regard to modern roofing is the use of mortar in tension, as an adhesive, used to hold down a component which, in itself, could not resist wind uplift. Much modern tiling is dependent upon cement mortar bedding and pointing. The manufacture of Portland cement was not improved until the end of the 19th century and not used on building sites as a regular component of mortar until the latter half of the 20th century.

4.3 Ridging

Ridging or ridge coverings are of particular interest because of the need for a material which will cover the angle between two roof slopes. The rock used for slates is not generally used for this purpose and where a material is available that can be formed into an angled shape the availability of transport played a part. Most older slate roofs were formerly ridged by using heavy sandstone ridge pieces in the form of an inverted V-shape. The sandstone would be freestone and not the fissile stone from which stone slates were made. These heavy stone ridges served to hold the top of the roof slating firmly in place against wind uplift, purely by weight. The nature of the stone and the thickness required for strength meant that stone ridges are more than adequately heavy. Stone ridging has protected blue slate roofs very satisfactorily since it is not reliant on mortar for either compression or tension. Stone ridges fell from favour in the early part of the 19th century giving way to other more portable products. One such product was the pale clay ridge tiles made at the Hurlford Brick and Tiles Works near Kilmarnock. This company also made other products such as chimney cans and garden tiles. They were sold via merchants all over Scotland, and were transported via sea or canal and, later, by railway. It is interesting to note that similarly concentrated manufacture of ridge tiles occurred in North Wales to support the Welsh slate industry. These ridges, made at Buckley near the Dee estuary, were mainly of a hard blue burnt clay.

The other main ridge products, which were mainly transported by rail, were even more portable due to their ease of handling and fairly light weight. These are the zinc sheet or preformed galvanised capping pieces used in lengths twice as long as a stone ridge and four or five times longer than a clay ridge tile. They are pre-formed with a roll and two wings. Both wing edges have a bent rim which, with the roll, gives adequate stiffness lengthways. Due to their light weight a series of galvanised steel brackets or saddle pieces is used to hold the assembly firmly in place.

4.4 Flashings

The zinc ridge cappings are often confused with the other main ridge covering system, ie lead sheet dressed over a timber roll. This system is as old as stone ridging. The lead must be heavy in order to provide satisfactory wind uplift resistance.

Any building design which included valleys in the roof would have been more costly. Lead sheet was normally used in preference to other metals due to its durability. Some isolated attempts have been made to replicate a slated style of valley, following the supposition that lead sheet for valleys would traditionally have been too expensive. Whilst slated valleys have been widely used in the past in England and Wales, many are the creation of the Arts and Crafts period and much care needs to be taken in identifying any valley made to work without some form of metal flashing. Generally speaking, where a valley was introduced, sheet lead would be afforded.

Skew abutments have also been formed with sheet lead flashings in the form of a soaker for each course of slates and a lead cover flashing apron. Most older roofs did not have the luxury of such lead flashings. The simple and widely used method of preventing leakage was to form the slating with a slight upturn towards the skew which caused the water to flow away from the junction between the slating and the wall face. In most cases this was achieved by having a narrow board tapered in cross-section, fixed in the form of a fillet lengthways at the ends of the sarking boards, the slating being carried onto this fillet thereby forming the upturn. The skew capping would then oversail the slating. With pantiles this upturn was not necessary.

4.5 Skylights

Once the open fire hearth had given way to the chimney, the use of the roof space as accommodation, was a regular feature of domestic buildings and the need for some illumination was satisfied, firstly, by overlapping the slating onto both sides of a rectangular piece of thick glass in the form of a deadlight. With pantiles, such deadlights could be formed using specially made glass pantiles. The ultimate lighting of the roof space was by constructing dormers or dormer bay windows.

By far the most popular skylight was the cast-iron opening light which has a channelled rim down both sides and an apron flange at the top and bottom edges. The actual opening light had rebates to accommodate pieces of glass bedded in linseed oil putty. Although originally painted with grey lead paint when manufactured, they were rarely painted thereafter, certainly not where the slates or tiles overlapped, but their durability has been remarkable.

Pennant, writing in 1769, tells us, 'Carron iron works lie about a mile from Falkirk and are the greatest of the kind in Europe: they were founded about eight years ago' – 'and above twelve hundred men are employed. The iron is smelted from the stone, then cast into cannon, pots, and all sorts of utensils made in the foundries'. The cast-iron opening and deadlights made here were famous well beyond Scotland and known as 'Carron Lights'.

4.6 Skews

An interesting issue here is the treatment of simple abutment skews in the days before cement became popularly available and affordable, probably in the 1930s. The slates would have been run to the wall with a slight upwards tilt to turn the water 'into' the roof (away from the abutment). Where sheet lead soakers could not be afforded, which was the majority of cases, a fillet of strong lime sand mortar would have been applied to the vertical face of the abutment masonry, lapping only narrowly onto the slates. In order to maintain a weatherproof surface this lime mortar would have had to be coated with a strong limewash at intervals of, say, every third year throughout the life of the roof. An important issue here is the fact that vertical lime mortar with a limewash coating will function, whereas sloping the surface of the mortar to any degree hastens the absorption of water and drastically reduces its durability.

4 Map showing the distribution of the examples illustrated in chapter 5

5 SANDSTONE SLATES

5.1 Introduction

The following chapters are made up of large illustrations with captions. The captions will deal with items of particular interest in the subject shown, together with broader ranging background items which help an understanding of vernacular roofing.

Just where to begin a tour of the slate roofing of Scotland is not an easy decision to make but there is plenty of excuse for starting with old slates and old buildings although, there are very few remaining in anything like their original form.

Slate roofs of the 17th century and earlier were, of necessity, made from materials that were near to hand. They were limited to perhaps the more important buildings in the burghs, towns and cities or to castles and other important public buildings. The use of the most local material was also promoted by land and estate ownership. The costs of transport were such that slates rarely travelled far, just ten miles could double the original cost. Whilst there are examples of long movements by sea, they can normally be assumed to be exceptional. Therefore, we should look first at the materials that were the most difficult to transport, like these heavy sandstone slates quarried at some distance from water transport and yet still in evidence in their natural vernacular area of distribution.

This chapter therefore deals with the main sandstone slates or Great Slates of Moray, Caithness, Forfar, Dumfries and the Borders. The distribution of the examples illustrated in this chapter is shown in illus 4.

5.2 Fixing of sandstone slates

Old systems of fixing, like some modern ones, have a period of durability which is unlikely to last as long as the roofing materials they seek to hold in place. This gives rise to the need to re-fix slates or tiles on the roof. This may be as soon as 80 years in the case of some church buildings, where intermittent use and resultant condensation often causes the nails to rust early. On other more favoured buildings, particularly where a modicum of heat has percolated through the building on a reasonably regular basis, an old system of wrought iron nails or hardwood pegs may well cause the covering to last for 150 to 200 years, particularly where assisted by lime/sand/cow hair mortar which has been kept dry. Most, if not all, pre-Victorian buildings have now been re-roofed at least once. Where a roof can be shown to have been left undisturbed for a long period, a great deal of information regarding the history of building methods can be gleaned by careful study.

5

6

5.3 Examples of sandstone slates in Moray

5.3.1 Elgin

NJ227628 Main Street, Elgin Illus 5 and 6

Stone slates, sometimes referred to as grey slates or flags, occur in several places in Scotland, but one of the least known is the area around Elgin where it is said that as far back as 1605 the famous Dallas quarry was producing slates which were used on the old Tolbooth of Elgin.

This fine building in Elgin, which is dated 1694, is protected by a good example of the local random sandstone slates. A close look at the slating tells us that the 24 diminishing courses may start in excess of 26 inches at the first full course and diminish to as little as 10 inches in the last full course. In sandstone slate terms these slates must have been difficult to produce and lay, with uneven bedding planes and rounded corners. The latter may in part be due to the number of times these sandstone slates have had to be refixed over the centuries.

Whilst sheet lead detailing in the valleys and around the dormers is tidy, it is a pity that there is such an obvious reliance on cement mortar at the skew abutment and around the chimney.

The roof looks in good condition, having been relaid in recent times as illustrated by the mixing-in of moss covered slates. The sidelaps show a good standard of slating and the roof generally is a pleasing example of Scottish roofing history.

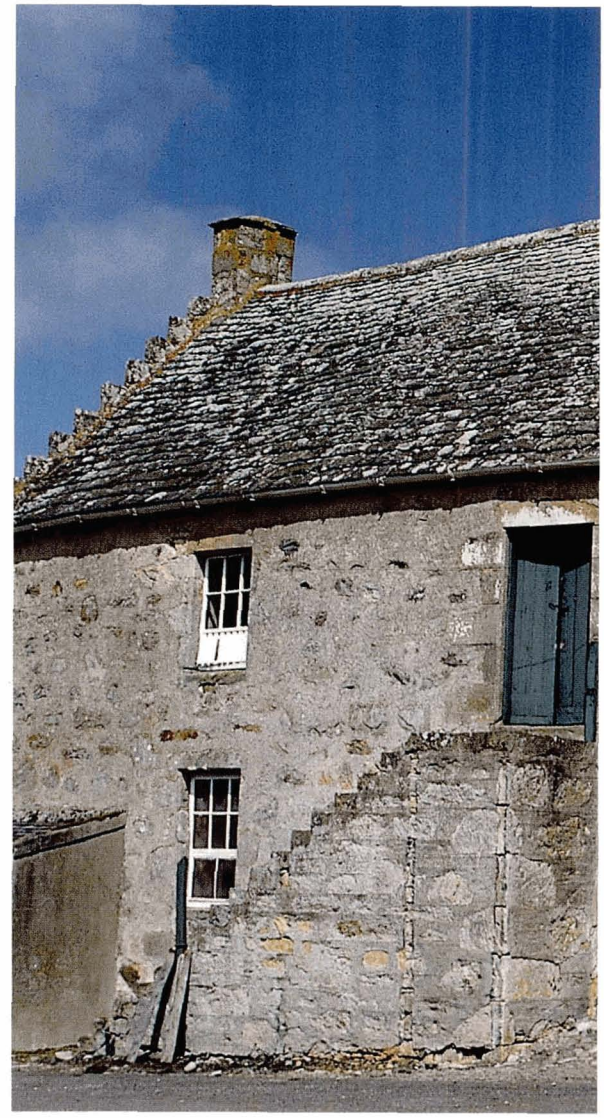
5.3.2. Dallas

NJ112530 Dallas Lodge Illus 7a, 7b and 8

Another roof of Dallas sandstone slates photographed in 1988, can be seen in Dallas village where one side of the roof is much covered with vegetation, remaining largely undisturbed and, with 28 diminishing courses, may have a slightly smaller grading and a slightly longer rafter length. The existence of cement mortar is thankfully less obvious on this roof.

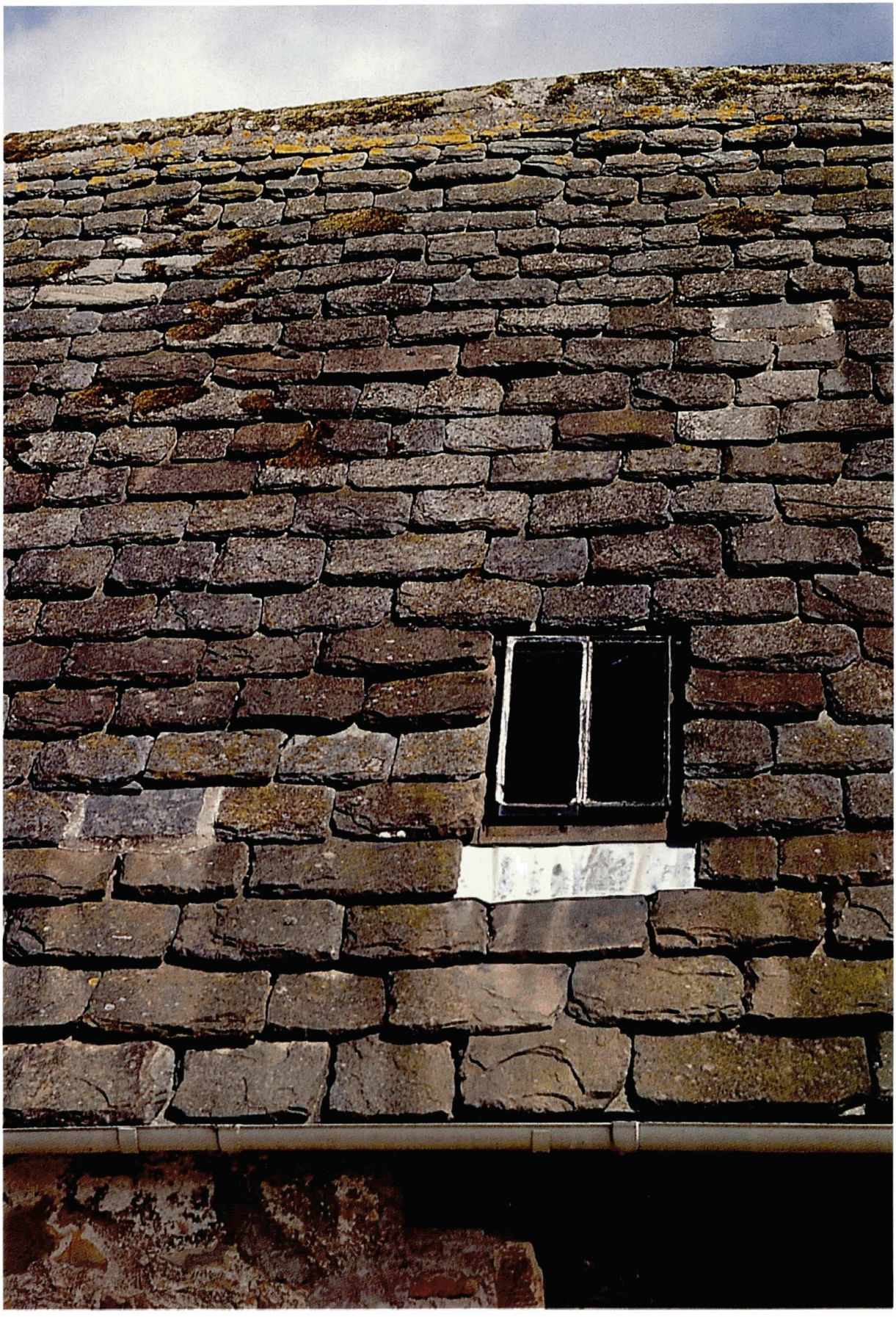
Sandstone slates were no doubt obtained as required on various estates in this area, an example being the Slatehaugh quarry in Newtyle forest in Rafford parish where fissile beds used for roofing are repeated with thicker beds used for other purposes. It is possible that other estates such as Cawdor and Croy had quarries. These sandstones belong to the Old Red Sandstone group of rocks although, clearly, the geological name should not be taken literally, the mixture of colours being mostly greys and buffs with, occasionally, a hint of browny pink

A closer look at these roof slates shows a variation in the texture and colour which must result from a variation of the rock in the original quarry. The patches of thick moss may result from lime mortar used in repair work, whereas the yellow lichen along the ridge testifies to the fondness of the local bird population to meet at this place. The thickness of the assembled sandstone slates can be judged by the way the cast-iron Carron light lies flush in the slating, although one wonders what happens during wet weather at the hole at the top of the slipped pane. All Carron lights needed to be laid with a sheet lead apron to accommodate the change of plane that takes place between the light and the slates, according to the thickness of the double-lap covering.



7a

7b



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5.4 Examples of sandstone slates in Angus, Forfarshire and Fife

5.4.1 Pavement Quarries

Numerous quarries were opened in the Lower Devonian rocks of the Forfar district to meet a demand for roofing slates and local building stone. The quarries were development in the 18th century to meet the demand for paving, initially stemming from Edinburgh. The fissile layers in most of the Forfar quarries were found to range from thin, suitable for roofing, to thick, suitable for paving and kerbs in rhythmic deposition. Whilst many quarries started as stone slate or grey slate producers, the pavement trade proved much more important and profitable through the 19th century. Ultimately, evidence of the quarries' origins as stone slate quarries was subsumed by years of industrialisation.

Records of the time refer to some quarries as 'strictly pavement quarries' but this does not exclude roofing slates. The inference from the records is that the quarries did not produce freestone for building.

Some of the names used for quarries around Forfar were Tolbooth, Balmashanar, Slatefield, Truant and West Craig. Around Turin Hill were Pitscandly, Myrestone (which also produced ridges), Carsegownie, Tillywhandland, and Blagavies. At Guthrie were Dubton, Mostonmuir and Montreathmont. Other groups of quarries were at Friockheim and Leysmill, Carmylie and Monikie. More than 30 quarries were developed in the Old Red Sandstone deposits in the Forfar area.

5.4.2 Edzell

NO600690 Edzell Castle *Illus 9a and 9b*

Dated 1602, this old building is an example of the type of building that, by virtue of its importance, would have been fitted with a substantial slate roof covering rather than a less substantial thatched roof covering, as would have been the norm at that time.

Photographed not many years after restoration, it can be seen that the sandstone slates are of superior grade with only 18 diminishing courses on a full-length rafter. The ever popular turret is here used as a semi-circular projection with the heavy and cumbersome slates neatly taken round in courses compliant with the main roof. Whilst the sidelaps in places are somewhat economic and the style of valley slating is less than traditional, the whole roof covering gives an authentic presentation, without intrusive cement mortar, and provides a fitting record of the slating associated with Forfar and Angus and the local quarries.

9a

9b

5.4.3 Guthrie

NO567504 Guthrie Illus 10

This small garden house, not seen easily from the road has a covering of sandstone slates laid in the diamond lapping method. This system of lapping was used by the Romans in Britain and then virtually disappeared until continental asbestos cement slate manufacturers began to use the method from the late 19th century. In this country the method was used with asbestos cement slates for lightweight roofs for the first 50 years of the 20th century and then lost favour. Early 20th century concrete tiles were made to an interlocking diamond pattern design but they proved too expensive and failed to gain popularity.

Where natural slates are concerned the diamond pattern system is very wasteful due to each slate having to be of the same dimension in both directions. Clearly the creator of this building at Guthrie had influence at the nearby quarries and was able to persuade them to produce these equal sized slates.

Just as these sandstone diamond pattern slates are unique so also are the diamond pattern slates from Dumfries shown in illus 18.

10

NO567505 Guthrie Illus 11a and 11b

This rough pile of sandstone slates gives some idea of the confusion which confronts the slater at the start of creating a roof covering of random slates. These are leftovers from a re-roofing job. It is interesting to note the sandstone slate on the right, which has been carefully worked by the stone mason in the quarry to give a recessed hole, into which a piece of glass can be bedded in putty to form a small deadlight (a non-opening skylight). Forming this type of skylight within the double-laps of slating requires care in setting out. The half bonded slates both above and below the light must be cut away to expose the light, but the sidelaps in the slating should not be reduced, hence the use of wide slates for this purpose.

11a

11b

5.4.4 Pitmuies

NO568499 Pitmuies Illus 12a and 12b

The rather pleasant sandstone of the walls and the close-fitting slating in sandstone slates make a convincing unity avoiding mechanical repetitive detail. It is testimony to the craft of a slater that, from a mass of irregular pieces, a unity of form can be created which performs the actual function of keeping water out of the building. Unlike random walling, accurate lapping at both head and side are necessary for this to be achieved. On this roof at Pitmuies sheet lead detailing in the form of abutment gutters, aprons, facings and hip coverings on the piends of the dormers create a sound form of construction. However, the modern practice of using an underlay beneath the slates enables slaters to be somewhat less careful about the sidelaps than was the case in the past when any leak would show inside the building without delay.

A careful look at the photograph will reveal that a vertical joint in the slating has been formed over the left hand dormer and for several slates the courses do not run through. Perhaps this is due to the roofs having been relaid at separate times.

12a

12b

5.4.5. Gagie

NO444370 Westhall Terrace, Gagie *Illus 13a and 13b*

Most slating in Scotland is laid on and nailed to softwood boarding. However, where the slates are sufficiently large, as is the case with these sandstone slates from Murroes near Dundee, the slates are pegged over sawn softwood battens. Before softwood revolutionised Scottish building practice, the rafters would have been split and the laths would have been cleft from hardwood. On this roof at Gagie the softwood battens can be seen where the slating has collapsed.

There is more to this roof than meets the eye. No doubt the slating was originally torched with lime-sand-hair mortar on the undersides to keep out draughts and fine powdery snow. This torching must always be kept dry otherwise frost will loosen damp mortar, allowing it to fall away leaving the roof vulnerable to wind. Clearly, this has happened here and cement mortar has been used to point the joints on the outside of the roof, in an attempt to compensate for the lost mortar torching. This pointing of joints has allowed a significant amount of rainwater to be retained over long periods within the laps of the slates and this has provided ideal conditions for the growth of mosses and other vegetation. They, in turn, have caused further dampness, causing the batten nails to rust and fail. You can see on the photograph where the slates have slid into a bunch at the verge. This prolonged dampness has also disturbed the fine balance of durability of the slates, hastening frost damage, as can be seen in the lowest course.

13a

13b

5.4.6. West Water

NO536684 Bridgend Illus 14 and 15

The Highland Boundary Fault runs across the foothills at the north side of Strathmore and metamorphic or blue slates occur in various quarries or trial holes almost as far as Fettercairn. The photograph shows a junction between two different types of slates on a roof at Burnfoot, Bridgend. Neither type of slate is from a local blue slate quarry. The use of sandstone slates in this location suggests that they were formerly preferred to the small blue slates from the Highland Boundary Fault.

This photograph provides a useful comparison between the sandstone slates on the right and Welsh Bangor centre-nailed slates of a regular size, possibly 12x8 inches, on the left.

There are 26 courses of Bangor slates and 19 courses of random sandstone slates and the differences in the margins and the thicknesses are clear. The random slates start at nearly twice the length of the Bangor slates at the eave but are approximately the same length at the top of the roof. No doubt the Bangor slates were used to replace an earlier covering. The reason for the junction is not known, but the slater has chosen to form the junction by using sheet lead to form a channel, with the slates overlapping at each side. Subsequent movement has caused this arrangement to fail. The Bangor slates to the left have been extensively cut in width in the upper part of the roof to make them fit. Apart from the damage, some of the sidelaps are meagre.

14

15

5.4.7 Culross

NS985860 Culross Illus 16a and 16b

This roof taken in 1987 in Culross gives a taste of the original more expensive roof covering of sandstone slates from Arbroath, used in this area before the introduction locally of clay pantiles, probably in the late 17th or early 18th century. The retention of the stone slating on the gable wall, at the time that pantiles were fitted rather suggests that the stone slates are bedded on a significant bulk of masonry, presumably using lime mortar which had not been damaged by frost to any great degree in this coastal location. In more recent years the roof has received attention from cement mortar at the abutment and ridges.

If, as suspected, the roof was originally covered with stone slates, there would have been approximately 28 diminishing courses on a rafter slightly over 12 feet, suggesting that at best the lower full course would not have been longer than 20 inches, which in turn suggests that these 'grey' slates were not of the best grade.

Whilst the sandstone slates from Forfar and Angus, often referred to as Arbroath slates because of the importance of that port to their one-time distribution coastwise, are also of Old Red Sandstone geological age, the practised eye may well distinguish their neater trimming and sharper corners from the Elgin and Dallas sandstone slates. In fact, the Arbroath slates are much nearer in appearance to the sandstone slates of similar age, sometimes referred to as tilestones, to be found along the mid and southerly Welsh/English border.

16a

16b

5.4.8 Kilconquhar

NO495022 Kilconquhar Illus 17a and 17b

No doubt the successful bedding of the lower courses of this sandstone slate roof at Kilconquhar, photographed in 1987, together with the gauging of the pantiles, influenced the leaving of courses bedded onto the wall head (beam-filling), when the lighter load of clay pantiles was fitted.

You will find numerous references in these pages to the inappropriate use of cement mortar.

The skew abutment mortar fillet on this roof is an example of this where a large quantity of mortar has been used to bridge a gap between the pantiles and the gable cappings. This has produced an unsightly mess which would not have been durable if formed in lime mortar.

17a

17b

5.5 Examples of sandstone slates in Clydesdale, Dumfries and Galloway and the Borders

5.5.1 Diamond slates, Closeburn

NX909915 Croal Chapel Illus 18a and 18b

The small town of Thornhill in Nithsdale is in an area of red sandstone which, in geological terms, is of a different age to the Old Red Sandstone of Forfar. It is the New Red Sandstone of Permian age. This stone has become famous for building and the name Caerlaverock no doubt springs to mind as being a superb freestone exported in great quantities from the Dumfries area during the 19th century, to markets in Liverpool and Dublin. However,

18a

this freestone has little to do with roofing, being wrought from beds which can be as much as 6 feet in thickness and of very consistent quality. The same New Red Sandstone also occurs in Annandale and in the past it is at quarries away from the coast that the thinner beds have been exploited for the production of roofing slates.

There are very few complete roofs remaining that give any indication of the extent to which red sandstone roofs were popular in the Dumfries area in the 18th century and later. It is reasonable to suppose that red sandstone slates were used in earlier times on special buildings such as castles and churches, but the overwhelming importation of blue slates from other districts has almost completely confused the recognition of original Galloway roofs.

This roof near Croal Chapel, photographed in 1981, illustrates the diamond or diagonal lapping principle of roofing used with these sandstone slates to limit the weight on the roof, which would have been much greater had the double-lap principle of random slating been used. There seems little doubt that this roof would have been completely slated with the diamond pattern slates as would many other late 18th and early 19th century roofs in this immediate vicinity. This roof has obviously been re-laid at some time with a loss of more than half the slates and by the time that this picture was taken was already well on the way to needing another facelift. The Bangor slates at the top of the roof have been used to make up for the lost diamonds.

18b

5.5.2 Diamond slates, Newton

NX915964 Newton Illus 19

Old privately owned photographs show that in 1921, when the local estate was sold most of the local roofs still had sandstone diamond slates, but, progressively over the years, Bangor slates have been used to replace them. A slate to the upper centre of the roof in the photograph shows fracture marks which are no doubt the precursor to the slate breaking up. This defect obviously does not occur at the beginning of the period of exposure on the roof but may occur at any time in a nearly two hundred year life. Clearly, such slate failure has caused the ongoing disappearance of the local sandstone roofs over many years.

Careful study of this photograph reveals that this seemingly complete roof has actually been made up of slates from various roofs. Some of the slates have chamfered edges which would make a total roof of such slates look more refined. Most have square edges possibly indicating that the quarry offered different grades or qualities of these slates.

A prize essay in 1837 named Muirhead and Co as tenants of the Newton Sandstone Quarry, and roofing slates were stated as being 20 inches square at 2 pence each. The other local quarry is given as Kitlawbridge, rented by Mr Tenant. This is a reference to the Gatelawbridge quarry near Thornhill. Spellings in older books can lead to confusion. The essayist got slightly carried away and gave us the following description:

'These quarries produce great quantities of pavement and roofing slates, but the colour is gloomy, and the slates apt to give way, yet both objections might be greatly modified by painting the roof of a deep blue colour, which would add to its appearance and preserve the slate – coal tar has been used for this purpose, and it prevents the rainwater penetrating the slate for many years – twenty of these slates will cover six and a quarter yards, or 100 will serve for a rood'.

There is nothing new in devastating a roof with coal tar and, not surprisingly, none of these so treated remain in service. It is difficult for the modern eye to see coal tar as being of a deep blue colour. However, it is clear that by 1837 the demand for blue slate roofs was already well established, just as red tiles became popular 60 years later.

19

5.5.3 Lochmaben

NY080825 Lochmaben Illus 20

A careful look at this roof in Lochmaben reveals that the lower courses are of sandstone slates. The rest of the roof has been carefully slated using Bangor slates of two types, both regular sized tally slates, possibly 12x7 inches or 14x7 inches. Six courses are of heather blue colour and of medium thickness, whereas the upper nine courses (including the top short course) are thinner and of a plum colour.

The sandstone slates are likely to have come from Templand or a similar local quarry and are of the conventional (at the time) random type which are laid to diminishing courses. The unanswered question must be – why three courses (with undereaves) of sandstone slates are used at the eave when Bangor slates would have been adequate? Bangor slates have been used at the eave on the similar next door property. Both have local sandstone ridges, whereas Bangor slates were normally used with clay ridges or preformed zinc coated sheet steel ridge cappings.

The rafter length on this cottage is rather short at about 9 feet which rather suggests that it may have supported the greater weight of a roof covering of double-lap random sandstone slates, and what we are looking at are the remains of such a roof. As so often happened the lower courses of sandstone slates have been retained, along with the mortar bedding (beam-filling) which seals the roof covering to the top of the wall.

As previously stated, these sandstone slates have had a variable durability and, faced with a roof where over half the slates may have been defective, the Bangor slates were the best alternative.

Earlier forms of construction did not extend the rafters to the eave and the tilt was formed by the top edge of the wall masonry. Later construction detail did provide for the smaller slates to be nailed down to the eaves. It is also apparent that the sandstone slates, when laid to a double-lap, may well be less durable than the diamond variant, due to the greater retention of moisture in the laps.

Sandstone slates from the New Red Sandstone and from similar beds to Nithsdale and Annandale are to be found in the Eden valley in Cumbria where a number of random roofs survive.

20

5.5.4 Lauder

NT598497 Bruntaburn Illus 21a and 21b

The Upper Old Red Sandstone reaches into the Silurian and Ordovician rocks of the southern uplands in the area around Lauder and in the past it may have been from these sandstones that local estate quarries have been able to obtain fissile rock for roofing slates, there being several examples on Victorian roofs hereabouts. The buildings themselves, being late Victorian, are possibly influenced by the period when there was a revival fashion for old styles of building and, as such, may be covered with stone slates from elsewhere. It should be noted that the ease with which materials could be transported long distances during this late Victorian period makes the identification of vernacular roofing materials on buildings risky. In fact, around the turn of the century, one fashion for building lych gates at churchyards, meant that some stone slates were transported long distances away from areas of traditional use.

It is recorded, however, that slates were obtained at Spottiswood near Lauder, early in the 19th century but, as the report is confusing, it is uncertain whether these slates were metamorphic or sandstone, the latter being probable and these sandstone slates on a house in the locality may be from this source. The similarity of these slates to those of Forfar, in both size and colour, add to the confusion. The roof is difficult to date, having been well laid originally with leadwork ridge cappings and other detailing, suggesting an early Victorian date.

21a

21b

5.5.5 Gritstone slates, Snabe

NS640389 Drumclog Illus 22a and 22b

Snabe is part way between Darvel and Strathaven, in the very mixed geology of the hill country south of Glasgow. In Britain wherever the coal measures occur, there are to be found numerous beds of sandstone which, for the sake of differentiation, are often referred to as gritstones. These beds lie in the Carboniferous rocks in the Central Valley of Scotland, in South Wales and, possibly the largest mass of all forms the Pennine Chain of hills from Staffordshire to the Borders. In the most hilly parts the mountain caps are often formed of Millstone Grit, which overlies the Carboniferous Limestone. However, on top of the Millstone Grit lie the multiplicity of sandstones or gritstones of the coal measures. In South Wales and the Pennines large quantities of gritstone slates have been

22a

used for roofing and it would seem strange if similar beds in Central Scotland did not provide slates, Examples are rare, however, and this example at Snabe illustrates what should be looked for where coal measures sandstone in the form of gritstone slates has been won from open quarries or, possibly, during the process of mining for coal.

Delineating Scotland in 1799, Heron tells us that the banks of the River Nethan, south-west of Lanark, had 'beds containing coal, ironstone, limestone, marble, slate and freestone in the parish of Lesmahagoe'. As it is unlikely that blue slate would exist amongst such a confusion, we may therefore have a reference to gritstone slates amongst the coal measures sandstones.

John Naismith, writing in 1806, wrote a gloomy picture of conditions in Clydesdale, stating

'the high price of slates, and the distant land carriage to many parts of the county has much discouraged the use of them, which is also a disadvantage to husbandry as thatched roofs give great harbour to vermin, and the covering of so many of them, at the end of every short period, with straw, consumes a great deal of what would be better bestowed in littering livestock and making manure...'

He goes on to say that the manufacture of tiles, presumably pantiles, failed due to bad quality so that they were not generally used for farmhouses.

Perhaps we can deduce from this that, during the period when local roofing materials, rather than blue slates from a greater distance, were in everyday use, the economy of the area could only provide for straw thatch and the idea of providing not only expensive stone slates but, also, a roof structure strong enough to support their great weight, would not be sustainable. Perhaps in this area important buildings such as castles may have been covered with these gritstone slates, but the evidence has been lost in subsequent reroofings.

The picture that this gives of the west end of the Central Valley of Scotland suggests that a ready market for the blue slates from Lorn was already in the making.

22b

5.6 Examples of sandstone slates in Caithness, Sutherland and Orkney

The fissile rock extends in a broad band from east to west, Olrig to Reay, and in a further band east to west from Wick to Halkirk. It is not possible to differentiate between pavement and stone slate quarries. The first group, with more than 13 quarries, can be found around Castletown and the west side of the Hill of Olrig, Achscrabster, south-west of Thurso, and at the Hill of Forss. The second group with a similar number of quarries extends from Helman Head to Lybster, south of Wick, and at Banniskirk and Halkirk which include Spittal and Achavrole, which are still in operation. A quarry is also reported to have worked at one time near Barrogill, east of Mey.

We have previously looked at sandstone slates from the Old Red Sandstone found in Moray and Forfar. The Caithness flagstones are also from the same geological age, and all are linked by the fossil evidence which abounds in this particular rock. From a roofing point of view, however, all three sandstone slates are different. The slates from Dallas being thick and uneven with a difficult fissile bedding, whereas the sandstone slates from Forfar have been relatively easy to produce. The Caithness sandstone slates, however, differ significantly in that they have a bituminous organic content which helps to render them particularly strong. Rhythmic deposition has been mentioned previously and it is interesting to note that the layers of sediment can be as thin as an eighth of an inch gradually increasing to 4 inches and more.

5.6.1 Castletown

ND197678 Castletown Illus 23a, 23b and 23c

The Castlehill quarries at Castletown near Thurso were developed by Mr Traill in the early part of the 19th century to make pavement flags. In order to encourage men and their families to establish themselves in the new industry, Mr Traill allotted land at a cheap rent and provided stone with which to build homes, the result being the extensive village of Castletown. These early buildings were covered with the local sandstone slates, but very few examples of roofs so covered remain.

These photographs show a cottage roofed with ageing stone slates which have had their fair share of the cement treatment over the years. The local sandstone slates are laid in diminishing courses with 21 courses. The first full course is more than 30 inches in length with a margin of approximately 14 inch margin. The top course is about 12 inches long with no more than 5 inches exposed.

23a

23b

23c

The cottages on either side have been re-roofed with modern materials which provide a comparison in scale, shape, texture and colour. The replacements are both cement products, that on the left being fibre cement double-lap slates with a blue/grey surface colour, which show an exposed area of approximately12 inches wide by a 10 inch margin with 20 courses. The roof on the right has concrete interlocking single-lap tiles with a greenish/grey mineral surface colour, which show an exposed area of approximately 12 inches wide by a 12 inch margin with 17 courses.

5.6.2 Thurso

ND116684 Thurso *Illus 24a and 24b*

24a

This rather attractive, even if dour, full fronted terraced house has a sandstone slate roof that has suffered much less at the hands of the property repairer than the roof in the previous photograph. There are some patches of ill-advised cement work, but, on the whole, these slates are of superior quality and have weathered over the years to a not unattractive brown mixture and will no doubt soon be due for a careful reslating. The diminishing courses are similar to the previous example. The Carron light lies almost flush with the slates and the apron appears to be missing.

To the right of the picture is a roof showing a small area of new sandstone slates which are freshly weathered. When the slates are first quarried, the colour is predominantly a dark blue from the organic content. Oxidisation soon follows but in a most pleasing way and for some considerable time the slates, when exposed on the roof, provide a pleasant mixture of colours as can be seen here. Ultimately, the darker metallic minerals predominate as on this roof. It is hard to believe that the pavement flags in Thurso, which have the blue appearance of smooth cast iron, are of the same material.

A final note on this picture draws attention to sidelaps – the most important issue in the control of the slater as he lays the slates. The older roof has good sidelaps which, for the most part lie with the joint occurring centrally on the slate below. The modern practice of using an underlay, which provides a fortuitous although temporary secondary waterproofing, can be seen to have influenced the efforts of the slater in the roof on the right.

24b

5.6.3 Sibmister

ND166662 Sibmister Illus 25a and 25b

This old cottage, photographed in 1986, helps in an understanding of the Caithness sandstone slates. Firstly, the double course at eaves, which is a necessary part of double-lap slating, can be clearly identified. The fact that there are only 13 full courses suggests that the slates are of a good proportion of lengths. Battens can be clearly seen which show that, as in Forfar and Dumfries, in the 19th century large slates were not usually fixed to boarding and, as mentioned previously, boarding or sarking became Scottish practice due to the small sizes of blue slates.

Although the roof probably dates from the middle of the 19th century and the roof will have given 150 years of service, many of the slates at the top of the roof are complete and sound and could be re-used and traditionally head fixed, with the prospect of serving for another 100 years. However, many of the slates will not be re-usable because of the thin fissile layers that are present in parts of the beds of rock. Where the rock is made up of beds which are too thick for roofing slates, other products such as paving would have been made. Where the beds are a good thickness so that one bed makes one slate thickness, the best durability can be expected. However, where the rock is comprised of thin layers and the slates are made up of a number of thin beds, taken from a thicker block by halving, it is possible that, in the fullness of time, the thin laminates will separate, as can be seen on this roof. But 150 years is not a bad record even so.

A glance through the front door of the cottage shows a damaged piece of flagstone which was originally large enough to serve as a partition unit, a common practice in buildings near the quarries, in the same way that field walls have been constructed from rows of vertical slabs. The Caithness Flags are perhaps unique in mainland Britain in providing such large slabs of material with such durability. Where these field walls exist the general observer will know that there were sandstone slate quarries nearby in earlier times.

25a

25b

5.6.4 Halkirk

ND135595 Halkirk Illus 26

Despite the shadows and the wires on this photograph of a cottage in Halkirk, it is useful in studying roofs to have a date stone as a reference, in this case 1881. There is also a comparison to be seen with a more general slate product. The slates to the right are Bangor regular sized slates fixed to a closed or boarded roof. The slates to the left, are of Caithness sandstone which still retain the last remnants of the multi-coloured effect which is so pronounced when the slates are first weathered. There are signs which suggest that this roof has been re-laid over felt in fairly recent times and some of the mixed colours may be due to extra slates added to the roof. It is the sidelaps that tend to give the game away.

26

5.6.5 Murkle

ND166684 Murkle *Illus 27 and 28*

'Mony a mickle maks a muckle!', so they say, and this must be true of a slate roof. The overall quality and the large sizes achievable with Caithness sandstone slates is demonstrated by a significant departure from normal slating practice, represented by the very large flags used on some of the local farm building roofs, in the areas near the Caithness quarries. This photograph taken in 1986 on the roadside at Murkle near Thurso will surprise anyone interested in roof coverings. The coincidence of a large or muckle slate with the place name Murkle rather suggests that the name 'Muckle Slating' would be appropriate.

The square grid of stones gives a very straightforward appearance, Additional items such as small glass panels and special carved ventilation ridges, serve to create a convincingly efficient looking roof of considerable durability, all constructed on sawn softwood battens and coupled rafters. It is, however, slightly less convincing when most examples are to be found on farm buildings or animal housing rather than cottages or houses but there is a reason for this, which can be understood by looking at the sidelap arrangements. The slabs are only of the same size on one roof slope and, even then, there may be wider and narrower sizes in courses up the roof. An average size would be about 54 inches long by 36 inches wide. Sorting the slabs for thickness, during manufacture, would have been important.

The slates that are visible in 'muckle' slating are only part of the story. The headlaps are obvious but the sidelaps can only be formed by inserting underslates at each vertical joint. These underslates are in a slightly higher alignment than the heads of the overslates. This staggering of the heads avoids the age-old difficulty of having four thicknesses. The underslates are 10 to 12 inches wide and the weakness in this system of slating lies in the fact that a 4 to 6 inch sidelap for a length of perhaps 50 inches is vulnerable to wind-driven rain and, no doubt, these roofs had a reputation for wind-blown rain ingress. The use of moss or strong putty lime mortar to block the gap between the edge of the underslate and the underside of the overslate, may have been a temporary solution which would have had to be redone every few years.

27

This close-up photograph shows muckle slating in a state of disrepair. It can be seen that leaks over the sidelap of the underslate has caused deterioration of the rafter. The ratio of sidelap is approximately 0.1 to 1, whereas a normal double lap slate system would provide 0.4 to 1 or greater. However, with the use of a simple concealed bed of linseed oil putty or a suitable modern mastic down each side edge of the underslates, this 'muckle' roofing system of Caithness sandstone slates could be second to none.

28

5.6.6 Orkney

Map reference not known Orkney Illus 29 [photo: Dennis Tunstall]

These slabs on an old building on Orkney show a variation on muckle slating, or perhaps they illustrate the historic method from which muckle slating developed.

29

The structure beneath these locally quarried slates is not recorded, but the wall-head has been closed with a strong sloping capping which provides strength against wind uplift. The first course is lodged upon these cappings with the slabs laid side by side. Two more courses complete the roof. The covers, which are the equivalent of the underslates previously mentioned, are laid on top. Careful study reveals that some of the covers are missing. This, when added to the liberal use of cement mortar, makes the roof look rather untidy. This traditional way of laying these slates has all the necessary laps and orderliness when in original form and can be likened to muckle slating laid upside-down.

5.6.7 Scourie

NC155449 Scourie Illus 30

This small shed by the harbour in Scourie is covered with Caithness sandstone slates and illustrates the readiness to transport these slates around the coast from Caithness, suggesting that there was no other local hard roofing material available. As Lorn slates became more abundant, these heavy slates would have been ignored. However, along the north coast from Durness, Caithness slates are to be seen on many of the older buildings.

30

31 Map showing the distribution of the examples illustrated in chapter 6

6 SCHIST SLATES

6.1 Introduction

The following views of roofs and slates taken in the Speyside area are of schist slates in their various colours and are from mica schists associated with the geologically named Findlater Flags, part of the Dalradian Assemblage, whose correlation has provided geologists with problems over the years and for which no attempt will be made here. Mention is also made of Moinian schist slates on Mull.

These slates are not metamorphic slates with the slatey cleavage common to the blue slates that are dealt with later. Whilst there is metamorphism, from a building slate point of view it can be ignored. The schist slates are separated through fissile bedding planes rather than being split through cleavage planes. The slates themselves have a glinting micaceous surface appearance which is still present after many years exposure on roofs.

6.2 Examples of Speyside schist slates

Various minerals give the slates a variety of colours, the best known of which is the silvery green of the schist slates from a quarry at Tarrymount near Enzie. A similar slate occurs at the Cnoc Fergan quarry to the west of Tomintoul. Similar slates to Tarrymount were quarried near Newmill, Keith. The schist slates to be found in Fochabers may have come from Tarrymount.

Dark grey/brown schist slates have been quarried near the Hill of Maud, Cullen, where settlers from the Highland Clearances were permitted by Lord Seafield to build crofts and work at the Slateheugh schist slates quarries. Very dark graphitic schist slates were quarried near Auchindown and Mackalea, west of Dufftown. Other old quarries have been worked near the Spey and in Glenfiddich. Silvery-grey schist slates were quarried near Speybridge at Grantown and much darker schist slates were quarried at Dulnain Bridge and Bridge of Brown. Other quarries were tried on a very local basis at Alvie, Kingussie and Newtonmore. All had the same characteristic of being fissile in their bedding planes with a micaceous surface, and are rather thick at most commonly around three-quarters of an inch. Their strength and durability undoubtedly owed something to this thickness.

6.2.1 Aberlour

NJ267428 Aberlour Illus 32

This cluster of discarded mica schist slates may help with scale and identification.

32

33a

NJ267428 Charlestown of Aberlour Illus 33a and 33b

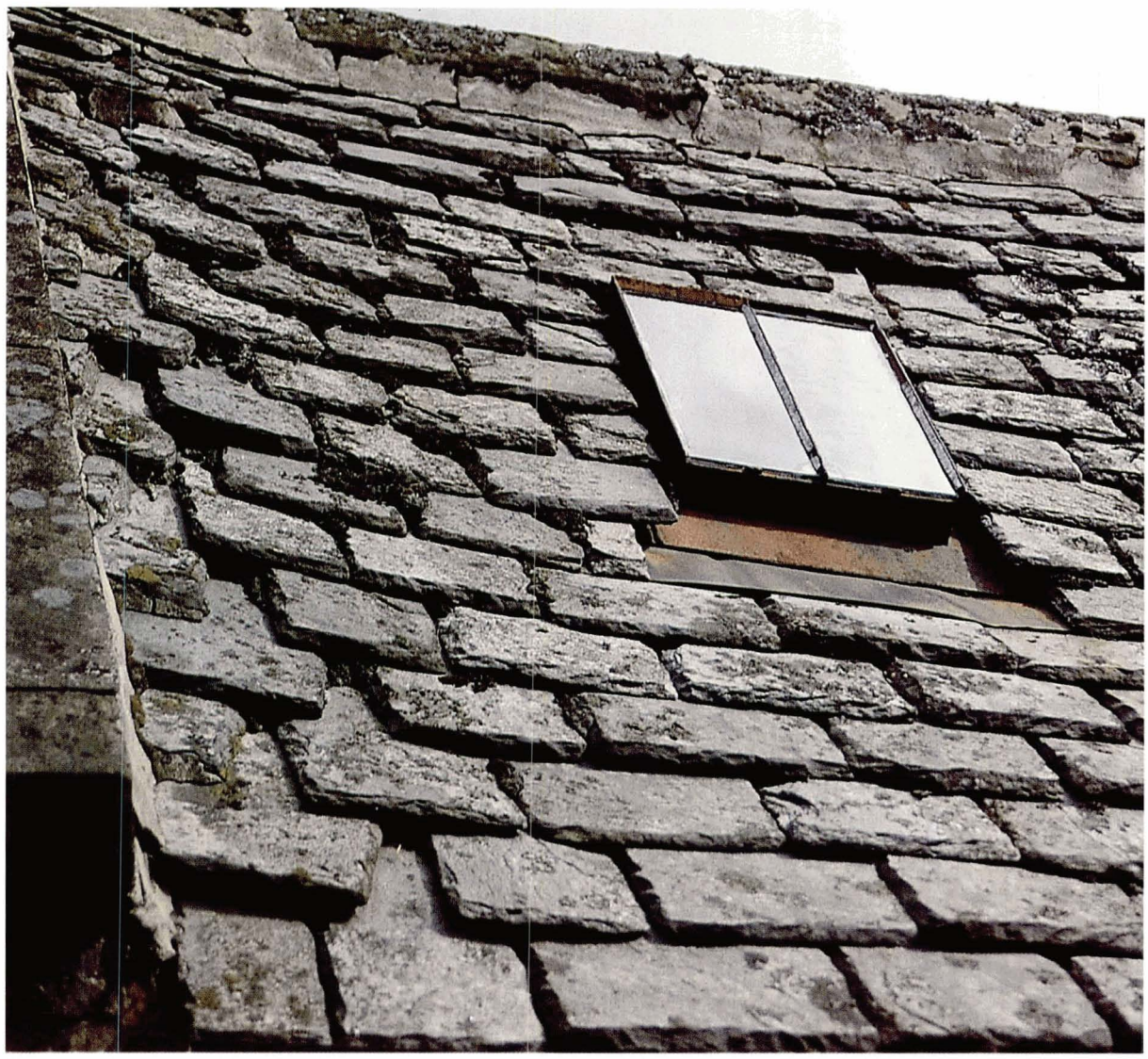
This roof of schist slates appears on the photograph to be pale and perhaps greenish, but this effect is given by the mosses and lichens that cover the slates on this north-facing slope. The slates are actually grey/brown in colour. They come from a quarry where the slates cannot be made large when compared with other schist slate quarries, giving 32 courses on a modest slope. The slates are of a second grade with many small slates at the top of the roof, which appeared largely undisturbed when this photograph was taken in 1986.

As with Scottish blue slates, it will take a lot of patience to re-fix these slates. However, the modest thickness, at about halfway between blue slates and sandstone slates, has helped to give this roof both security and durability.

33b

NJ269432 Aberlour Illus 34

This closer view of the local type of schist slate, which is in this instance of a larger grading and a thicker quality, shows how the edges are formed by trimming with a hammer which gives a slightly sloping edge with the dark grey colour being more evident. Heavy stone ridges have been used which can hold the top courses in place without the dreaded cement mortar which is all too evident. A slight tilting up of the slate courses as they approach the abutment skew reflects a method of finishing this part of the roof that was regularly used on older roofs to guide rainwater away from the vulnerable junction with the wall parapet which on older property would not have the benefit of leadwork flashings due to cost. However, in this case, lead soakers have been introduced at sometime in the 160 years or more of the roof's life, but all the signs are there to show that, apart from the roof sinking over the years, the gable wall is also moving, emphasising the stretched gaps between the end slates in each course which are carried on the soakers.



34

35a

NJ266430 Aberlour Illus 35a and 35b

At 32 courses to a longer rafter, these thinner (perhaps half an inch) schist slates are of slightly better proportion than the previous examples. They are of the green variety and may have come to Aberlour from the Newmill or Tarrymount quarries. This roof has been relaid in the recent past with care taken to make the slates lie closely and with, for the most part, good sidelaps. A modern plastic coated metal and timber skylight has been fitted and the ridges have been rebedded without the mortar appearing obtrusive.

35b

6.2.2 Tomintoul

NJ167190 Tomintoul Illus 36a and 36b

Tomintoul is a planned village founded in 1779 by the Duke of Gordon. The village was roofed with schist slates from the Cnocfergan quarry, which now lies deserted in the bottom of Strathavon several miles to the west. It was a long and arduous climb for the slate carters but well worth while, for roofs of schist slate like this one have given good service ever since.

By the time these buildings were constructed sawn softwood was regularly available in Scotland and the practice of roofing with couples and sarking boards was well established. With 26 courses, it can be seen that the Cnocfergan slates were of a good grading with long slates reaching well up the roof.

This roof has three Carron lights for the bedrooms in the roof. An interesting question regarding this roof is whether the diamond pattern feature in the centre of the roof slope was put in at the same time as the skylights. It is also interesting to compare this decorative feature with that on the cottage at Balvicar on Seil Island (see illus 58). There is plenty of moss on this roof which hides the otherwise attractive appearance of these slates.

36a

36b

NJ169187 Tomintoul Illus 37a, 37b and 37c

The Cnocfergan quarry continued in use until 1938 when it had to be closed due to a lack of investment in labour saving machinery. However, transport must also have been a consideration as the markets for the slates were a significant distance away from the quarry although Cnocfergan slates were used over a wider area once suitable road transport became available. Examples of the slate were used as far afield as Inverness and Aboyne in the

37a

1930s. It is interesting to note that the building of Tomintoul itself was only made viable as a result of the building of the military road through the district in 1754.

This roof with its Hurlford clay ridges is of schist slates, but the workmanship is not that of the original slaters. Whether the slates had been laid on an open roof (battens) or a closed roof (sarking boards), any lack of attention to sidelaps and headlaps would have resulted in the roof leaking without delay and the slater would have had to return, or, more particularly, would not have got it wrong in the first place. An old rule of thumb would have resulted in 4 to 5 inches of sidelap on this roof in this exposed area.

37b

Traditionally, eaves guttering would have been supported on brackets with no timber showing at the eave. The use of facia boards was avoided because of the maintenance requirement. Now, with modern plastic guttering there has to be more support and a timber facia board is the easy way to provide this. The insertion of facia boards on traditional buildings is unfortunate.

37c

NJ168189 Tomintoul Illus 38

This later building shows the green colour of the Cnocfergan slates to better effect, although the slates have been relaid with generous cement at the ridges, a none too straight valley which does not appear to have any cross-laps in the lead sheet and, with a hip that has been changed. The original cuts show a margin with an area clear of moss which suggests that the slates were previously used with a hip covering. Piend roofs were not popular in Scotland. The problem of making the cut slates secure on hipped roofs remains for the most part unsolved. In this case there appears to be a single strip of lead sheet formed into a channel onto which the hip cuts are laid. Signs of movement are already evident. There are also a number of poor sidelaps which indicates that felt must have been laid, before the slates were fixed, which will carry wind-driven rain water from the poor sidelaps to the eave.

38

6.3. Mull schist slates

NM286245 Iona Abbey Illus 39, 40a and 40b

From the earliest times in all parts of Britain where stone slates were available they were likely to be used in preference to blue slates. Stone slates were used in Edinburgh in preference to blue slates at an early date. No doubt where a castle was intended, the strongest and heaviest material on the roof would have been preferred. Whilst this assumption can be disproved in some particular cases and it is very hard to find adequate evidence in support, a national overview supports this theory. One reason may well be a delay in an understanding of slatey cleavage. Another would be the common use of wooden pegs in former times. These would stop a slate from slipping down a roof slope but would not prevent wind uplift, whereas the weight of stone slates would have made it possible for even the most exposed and vulnerable roof to be secure over long periods.

The ideal candidate to fill this role in the Inner Hebrides must be the heavy schist slate quarried at one time at the Ross of Mull. Said to be of Moinian schist, this source of roofing slates was reopened at the beginning of the 20th century to provide authentic slates for the re-roofing of the nave of Iona Cathedral. This photograph of some of the spare slates kept at Iona shows the large size and considerable thickness of these slates.

39

Otherwise described as micaceous flags or metamorphic flagstones, these rocks have a variable fissile character, much of it in the quarry being too thick for roofing. However, the hardness and thickness were considered ideal for traditional flooring. Old castles and cathedrals are not regular features of the landscape, even in the Firth of Lorn. Any quarry may have been opened just for one project at the time, very much in the same way that these rocks were worked in 1910. This view of the nave roof of Iona Cathedral shows that these schist slates are large and, whilst the courses do diminish, some effort has been made to avoid the use of small slates. Historically, this may not have happened because of the expense of discarding smaller pieces.

40a

40b

41 Map showing the distribution of the examples illustrated in chapter 7

7 THE SLATES OF LORN

7.1 Introduction

The so-called 'black slates', which are termed Dalradian by the geologist, are subdivided into the Easdale group and the Ballachulish group, to which the main Lorn slate quarries belong. In practice it is difficult, if not impossible, to differentiate by appearance between these two major deposits. Some slates, however, belonging to outlying groups such as the Loch Awe group, which is on the mainland side of Lorn, and the older Torridonian slates at the western extremity of Islay can be recognised, not only by the geologist but by their appearance on the roof.

Perhaps we should recap the issue of colour. Firstly, we have already seen that the term 'blue slates' refers to the type of slate rather than the colour. The term 'grey slates' refers to stone slates and likewise has nothing to do with colour. In the area of Lorn we have the Easdale and Ballachulish slates which are the darkest slates in Britain and have been referred to by the geologists as black slates. Many of these slates have the added characteristic of fine grained pyrite. These contrast with slates of blue/grey colour, pale and pale/banded slates which are also found in Lorn.

Slates of similar colours are to be found in quarries along the Highland Boundary Fault which can be confused, if produced in regular sizes, with slates from Ffestiniog in Wales. However, they are not comparable geologically. It is therefore important to consider other issues when comparing Scottish slates or slates in Scotland, such as the shape, texture, edge dressing, random size range in both length and width and, not least, the proportion of long slates to short slates in a given consignment for a particular roof.

Some may say that the slates of Lorn have been used so widely over Scotland that a vernacular pattern is not appropriate. The same can be said of Welsh slates or Cumbrian slates. It could also be said that the Lorn slates came from an area where there are few buildings. However, going back to the areas around the quarries and interpreting the local older roofs is the best way of recognising which type of slates came from particular quarries. In doing so, the vernacular pattern unfolds in the area of origin and, where Lorn slates travelled to other parts of Scotland they were usually inserted over the local vernacular materials and it is important to recognise the differences.

7.2 Sizes of slates

Prior to 1800 the main Easdale quarries sold all slates as they came with no attempt to market the two gradings of sizeable and undersized. The roughest slates would always have been sold locally and prior to this date general sales would have included more of the small slates.

The great majority of Scottish slates of all types (except diamonds) were sold as randoms and there is always room for doubt on the part of the slater as to the proportions of longer slates in a particular consignment. Slate quarries would or will avoid committing themselves in advance, regarding random slates, as to what proportions are likely to be supplied. No doubt this is usually due to the vagaries of the quarry, but, at times, is due to the quarry wanting to move disproportionate quantities of smaller slates.

It is recorded in slate company minutes held by the Scottish Records Office that:

'The number (of random slates) supplied in a thousand, costing 20 shillings, were 100 at 16x12 inches, and 300 each at 12x9,10x7 and 9x5 inches'. Here we have an example of the misleading (to us) way in which these things were set down, for what this really means is that all the slate widths are random and that there would be 100 slates of a length of 16 inches down to 12 inches, and 300 each of 12 inches down to 9 inches, 300 of 10 inches down to 7 inches and 300 of 9 inches down to 5 inches.

No doubt these referred to undersized slates about which a customer had complained. It might have been the person having received a consignment like those at Tarbert, Loch Fyne! (see illus 56). The four groups of sizes would be those resulting from the work of the slate dresser. It is likely that a different rate of pay was applied to each of these groups. The overlap in size lengths can be explained by the slate width. For example, a dresser and

his crew would be paid the 12 inch group price for a wide 9 inch slate, but only the 10 inch group price for a narrow 10 inch slate. There's nothing like money to sort these things out!

However, once competition with other industrialised quarries in Lorn hotted up, it was necessary to apply marketing refinements. It should also be remembered that slates from the Highland Boundary Fault were naturally slightly larger and thinner in grading.

At an even later period of competition, regular sized slates, which required far less labour on the roof, were readily available from the Welsh quarries. These regular sized or tally slates (slates of one size sold by count) were supplied by a fleet of steam cargo vessels owned by the North Wales quarries and devoted to the supply of Scotland and the east coast of England. Most of these slates were of a heather blue/purple colour and came from Bangor quarries, but others came mainly by railway from Ffestiniog quarries. The Ffestiniog slates would be difficult to distinguish from any slates of similar size produced by the Lorn or Highland quarries.

42a

7.3 Quarries

7.3.1 Introduction

The birth of the Lorn slate industry dates from the middle of the 17th century when slates were provided for Appin and Stalker castles. Later demand was created during the improvements in building construction which started to take place towards the end of the 18th century. The black slate quarries of Lorn changed from being a part-time living for various seaside crofters, producing slates which were sold to passing merchant venturers, to large well-organised businesses with special housing for workers, organised transport and markets, mainly in the Clyde, and an integrated system of distribution which included the convenience provided by the Crinan and Caledonian canals.

42b

NH777825 Tain Illus 42a, 42b and 42c

It was a further 100 years before the roof shown in illus 42 dated 1874 was laid in Tain. This conventional roof on softwood boards with Hurlford clay ridges, leadwork to the dormer hips, cast-iron guttering with no facia board, and a modern plastic-coated skylight probably replacing the original cast-iron Carron light, has a set of sizeable Lorn slates, with modern cement applied to the abutment.

The ease with which slates could be transported by sea, either through the new canals or, in fine weather, around Cape Wrath and the Pentland Firth, provided slates for many buildings such as this one in Tain for a period up to the end of the 19th century. This served to eliminate the old order of local quarries, with less attractive material, which had previously provided the slates for roofs of the historic vernacular pattern that we seek to identify.

The most important market during the 19th and early 20th centuries for Lorn slates was Glasgow and the Clyde. Generations of slaters in this area have been brought up on these slates and, it should be remembered, the Ballachulish quarries were strongly active for quite a long period after the Easdale quarries had started to diminish in productivity. J Allen Howe, who wrote of the geology of building stones in Britain, and mentions Scottish slates as being available in 1907 from Ballachulish, Balvicar, Cuan, Cullipool, Easdale and Balnahua (sic.). In the Highland Boundary Fault (Highland quarries) he mentions Aberfoyle, Craiglea, Birnam and Luss.

The great thing about roofing history, which we are attempting to follow with this report, as opposed to the history of quarries, is that, as you wander around the older buildings, you can be looking at slates from quarries which are not only forgotten, but, in many cases, all but disappeared. Certainly, slate quarrying in Scotland has for the most part been consigned to the history books. The building trade, where and when it does think, only considers Scottish slates in terms of second-hand salvage from demolished buildings. The road builder and the bulldozer have seen to it that great centres of slate such as Ballachulish, Birnam and Dunkeld, have been stripped of their slate importance once and for all.

42c

7.3.1 Easdale

NM737173 Easdale Illus 43

This recent photograph shows flooded quarries at Easdale island which, together with quarries at nearby Ellanbeich, were at one time the centre of the Scottish slate industry. Other quarries or groups of quarries in this immediate area include Ardencaple, Camuslaich, Bren Phort and the Balvicar group, all on Seil Island. Other quarry islands include Luing and Belnahua. Similar slates were quarried at Kerrera Island, Drumvargie and Quarry Road (Oban), Ardentallen and Clachan Sound. Historically, slates of the Loch Awe group were quarried at Kilchrenan and on Shuna.

43

44

7.3.2 Belnahua

NM715127 Belnahua Illus 44

Significant quantities of slates identical to those at Easdale were quarried on the isle of Belnahua or Balnahua as it should be more properly spelt, which, at its peak, was home to 150 people, all connected to the slate quarries which first opened in 1766. A tax on slate levied in 1794 was not repealed until 1831 and Belnahua suffered as a result.

The photograph shows one of the quarry pits which have effectively removed the core of the island, leaving just the trap rocks and a defensive shoreline against the sea. As with most other Lorn quarries all of the slate waste was tipped into the sea and the beaches on Belnahua are made up of sea-washed slate pieces. The quarries finally closed in 1915. Slates for Glasgow University are said to have come from here.

The isle of Luing has a number of quarries. Most closed early in the 20th century, but some small enterprises still persisted into the 1960s. The Toberonochy quarry, last worked in 1943, is now flooded and its waste tips more recently provided a berth for the fictional Para Handy. There were other quarries at Black Mill Bay and Tir na Oig. There were several quarries strung along the coast at Cullipool which, at one time, was a scene of great industry. Further north were Port Mary quarry and South Cuan quarry, said to have provided slates for Iona as late as 1944.

7.3.3 Ballachulish

NN085583 Ballachulish Illus 45

The similarity between the slates of Easdale and Ballachulish is such that other evidence than just appearance is needed in order to differentiate between them. Many people will identify a Ballachulish readily on the basis that, in building trade circles, this is the most common name used for Scottish slates.

Ballachulish quarries were developed later than those of Easdale and similarly relied upon transport by sea to reach their markets. Carriage by sea from Lorn became less important by the start of the 20th century and carriage by rail from Ballachulish kept these quarries in the forefront of Scottish slate sales. Figures for 1937 confirm that whilst quarries at Aberfoyle and Luss employed 72 men between them and 3 Easdale area quarries employed a total of 100 men, Ballachulish still employed 200 men and produced 4 million slates.

However, there remained the problem of small sizes with undersized random slates accounting for nearly 40% of production at the Ballachulish quarries.

45

7.4 Examples of Lorn slates

7.4.1 Iona

NM286245 Iona Abbey Illus 46

In geological terms the blue slates of Lorn, such as those from Easdale and Belnahua, have been referred to as black slates. When faced with additional roofing at Iona, the decision was made to use blue slates, but to have them cut to an extra thickness, as can be seen on this photograph of the porch to complement the thickness of the schist slates on the nave roof. There is no doubt that thicker slates generally have a greater durability, but for obvious reasons, with blue slates, the quarrier tends to obtain as many slates as possible by subdividing the slatey cleavage from a given piece of quarried rock. Therefore, it is not often that we see the effect of cutting Lorn slate to extra thickness and, whilst beauty is in the eye of the beholder, there is an attraction in the rugged shape of these broadly riven slates.

46

7.4.2 Islay

NR167524 Portnahaven Illus 47a and 47b

The modest rafter length on this traditional cottage in Portnahaven has 37 courses of the particular slate of Torridonian age obtained from quarries at nearby Kilchiaran, which, although probably long established, were still said to be working in 1907. The colour of the slate is similar to those of Easdale, but the shape and texture are different. The sizes appear to be shorter than Easdale 'sizeables' at the eave but longer at the top, both being the result of having to trim thick slates. On average the slates appear narrow.

The Kilchiaran slates have obviously been on the roof for many years and may be original to the cottage. The two well placed cast-iron Carron opening lights, show much repair using cement mortar.

The roof of the cottage to the left of the photograph is covered with small regular sized Bangor slates. Perhaps a number of local roofs have been treated in this way over years, losing their local slates in the process.

47a

47b

NR167524 Portnahaven Illus 48

It can be seen that these Kilchiaran slates are thick and heavy and of quite unique appearance, looking in shape more like old oak shingles than blue slates. The grain of the slate from head to tail is quite easily split, resulting in slates with square vertical edges that, for the most part, fit quite closely together. This same grain in the slate has caused the bottom edges to be rough and broadly riven when made. Close examination of the slates reveals lines and splits which may be a form of false bedding through the slates. However, there is reason to believe that they are durable if not damaged, being heavy and strong enough to resist the Atlantic gales to be expected on this exposed part of Islay. Both this and the previous photograph were taken in 1983.

48

49

7.4.3 Bowmore

NR312599 Bowmore Illus 49 and 50

This roof in Bowmore has at some time been reslated using the existing slates, which are pale banded slates from the Loch Awe group and probably from the Tarbert quarry on the Isle of Jura. Several black slates from Lorn have been scattered in the reslating, The roof has been completed by using blue slates of a pale variety which probably came originally from the nearby Emeraconart quarry on the north side of the main road between Bridgend and Port Askaig. This photograph is useful in that the three types of slate used on the roof can be clearly distinguished.

The ridge is covered with preformed zinc and the verges are formed with small barge boards, fillets and cappings, a system regularly use by Victorian builders to hold down the vulnerable edge of the slating in the absence of a skew abutment.

50

7.4.4 Port Ellen

NR364455 Port Ellen Illus 51a and 51b

This roof has been reslated in a different fashion by, first of all, slating the first 14 courses with regular sized Bangor slates, possibly 14x7 inches, finishing the top 9 courses with the remaining banded pale random slates which may have come from Tarbert in Jura or from similar beds to be found on the Oa peninsula (Carraig Fhada) near Port Ellen.

51a

51b

NR364454 Port Ellen Illus 52

Nearby in Port Ellen this roof has been reslated using the original local slates of both types: the blue/grey slates, possibly from a quarry at The Ard, and the paler slates often found in the same quarries around the Sound of Jura, where they occur in the Loch Awe or similar groups. The paler or banded chloritic slates are said to be of sporadic distribution, not following any particular geological horizon. However, from the roofing point of view, they are distinguishable from the black slates of the Easdale group by being both paler and smoother to the touch.

52

53

7.4.5 Knapdale

NR704813 Keills Ilus 53 and 54

The slates to be found in Islay, Jura and Knapdale are, for the most part, of only local importance, although quarries have been opened to some extent clearly exceeding local demand. The pale slates, as seen on this roof near Tayvallich, mixed with the slightly darker slates, would not have been of general interest in the Victorian slate market. The darker slates, when exported from this area, would have been difficult to distinguish from many other Scottish slates once removed from their local environment.

The quarry near Tayvallich at Tigh a' Mhuillin (which means Mill House), and corrupted on the map to Tayvullin, has produced these slates, sometimes with metalliferous staining. Other quarries in the area at Cairnbaan and Dunardry, near to Crinan Canal, are of the same general type although with less of the paler slates.

54

7.4.6 Ardlussa

NR650880 Ardlussa Illus 55

At Ardlussa on the east coast of Jura is a slate quarry which has produced quantities of the blue/grey slate of a similar character to those of Knapdale but without the very pale slates. This roof at Ardlussa shows small quantities of softer moss-covered slates obtained from near the surface of the quarry, together with the blue slates and with repaired patches of black slate from the Lorn quarries. At 32 courses there is nothing exciting about the proportion of lengths of these slates, although the slates at the top of the roof are not as small as some. The hamlet at Ardlussa is said to have been built for the quarry and, later, the reason for lack of development of the quarry was blamed on the brittleness of the slate.

The term blue/grey applied to the Loch Awe group refers to the colour of the slate and these slates are usually smooth in texture, although they can be variable in shape, particularly thickness.

55

56a

7.4.7 Tarbert

NR874688 Tarbert Illus 56a, 56b and 56c

This roof at Tarbert, photographed in 1983 has a set of undersized slates from Lorn, where the fairly long rafter requires 70 courses. There were years when the Easdale quarries produced 10,000,000 slates, but with a roof of this size taking more than 15,000, this would bring the number of roofs supplied down to a not so great 700. However, the figure would be better than this due to the large size of this fine Victorian house. It is of interest to note the metal ridge capping, timber barge boards with timber cappings fixed over the edge of the verge slates and a wealth of detailed design ornamentation.

56b

56c

7.4.8 Balvicar

NM766168 Balvicar Illus 57

The importance of Lorn slates to the roofing history of Scotland is undisputed. What may be less clear is the part played by quarries other than the big two, that is Easdale and Ballachulish. No doubt in the heyday of Victorian slating more would be known by the building designers and slaters of the relative merits of various other quarries which by their extent must have played an important role.

Balvicar, on Seil Island, is a series of five quarries exploiting an outcrop of slate rock on the east side of the island at the south end of Seil Sound. It has its own harbour for loading slate vessels at Balvicar Bay. Nearby are the old quarry sheds which were in use in 1937 when 40 men were employed in these quarries.

It has been said that some of the Balvicar slate was of poor quality, but, clearly, much slate was quarried and the slates on the old shed shown here appear to be functioning well some 60 years after the main work ceased. Sizeable slates of a slate slightly paler than those of Easdale could be produced in good quantities and the slating on this roof shows the older slates re-used with less attention to sidelap.

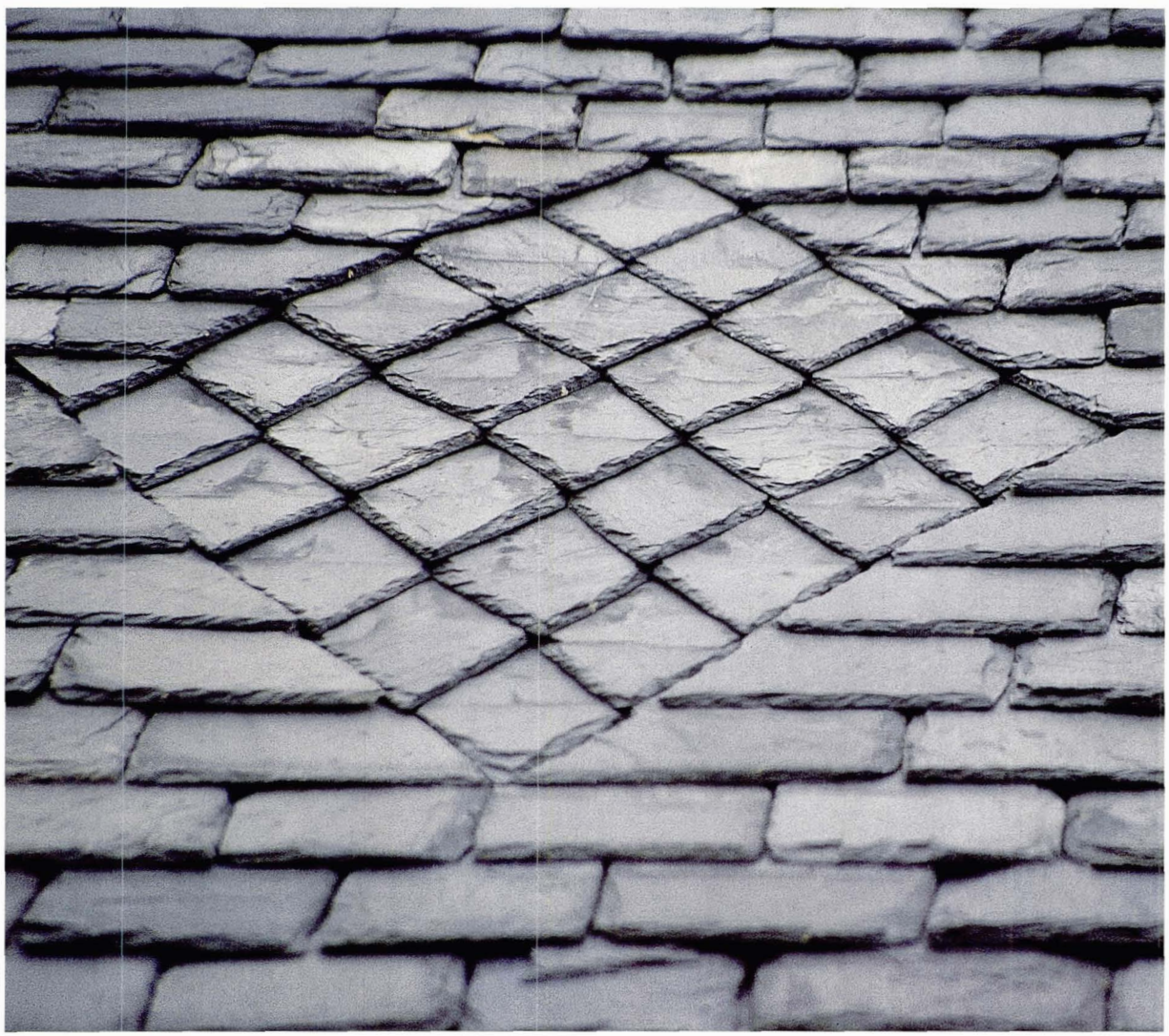
57

7.4.9 Balvicar Diamond

NM766168 Balvicar Illus 58

Having very little relationship to the diamond sandstone slates mentioned earlier, this little diamond-shaped feature, produced fairly recently by a local slater near to the Balvicar quarry, has been a feature of slating in Scotland over the years. Such detail should only be laid in reasonably sheltered places since the bottom part of the sidelap has to be cut away to form the pattern. In chapter 6 on schist slates a similar feature is shown in Tomintoul (see illus 36) and you are invited to make a comparison.

In this case at Balvicar the slates used have been previously used and some slight staining of the previous laps can be seen on the face of the slates. Whilst the bottom corners have been removed to form the diamond shape, the upper part of the slate remains complete. The important part, that makes this offering better than the one in Tomintoul, is the way in which extra wide slates have been cut to make up the lower half of the sides of the diamond, extra effort on behalf of the slater but well worthwhile.



58

7.4.10 Newtyle Forest

NJ062533 near Rafford Illus 59

This building in Newtyle forest is near to the site of an old stone quarry but the blue/grey slates are not easy to identify. A local expression 'Portsoy slates' does not seem to fit what might otherwise be called tally slates. They may be one of those rare consignments of regular sized slates from a Lorn quarry, or they may have come from a Welsh quarry which at 8 inches wide were called 'Ladies'. Neat slating such as this example belongs to the late Victorian or early 20th century and required far less labour in fixing than sizeable or undersized Scottish random slates.

59

7.4.11 Kilchattan

NM745089 Kilchattan Illus 60a and 60b

It is often useful to study roofs that are partly dismantled, since much can be interpreted, not only of the building construction, but, also, of the work of the slater and local habits. Of course, we are looking at work carried out over a 100 years ago when slating was king and Portland cement was a rarely used luxury.

These slates probably represent the thicker undersized slates from the Toberonochy quarry just half a mile away from this farm building on the isle of Luing. The old sarking has been cut away and the rafters show how many nails were necessary to hold a board or a board joint. Various modern galvanised steel clout head nails can be seen left over from repairs, being modern galvanised steel clout head nails. The original slate nails, now rusted away, would have been forged by a nail-making blacksmith and would have represented a significant cost in the original roof. The stumps of these original nails can be seen in places. Such areas of board as can be seen illustrate that side-nailing was not locally important.

60a

Whilst these softwood rafters have been set to overhang the wall, no facia board was used; a tapered tilt fillet slightly thicker than the boards was the favoured form of construction. Clearly to be seen is the 'beam-filling' – masonry which is built-up to complete the wall to the underside of the roof, a practice common in all old systems of building.

60b

7.4.12 New Aberdour

NJ888634 New Aberdour Illus 61 and 62

This roof at New Aberdour has a comfortable set of sizeable slates approaching the end of the life of their first set of slate nails. At 35 courses on a modest rafter length these Lorn slates were obviously of the better grading. At this grading a single fronted terraced house would need about 2000 slates, or more if it had a rear projection or lean-to. It is possible to pick out some Bangor slate repairs

61

62

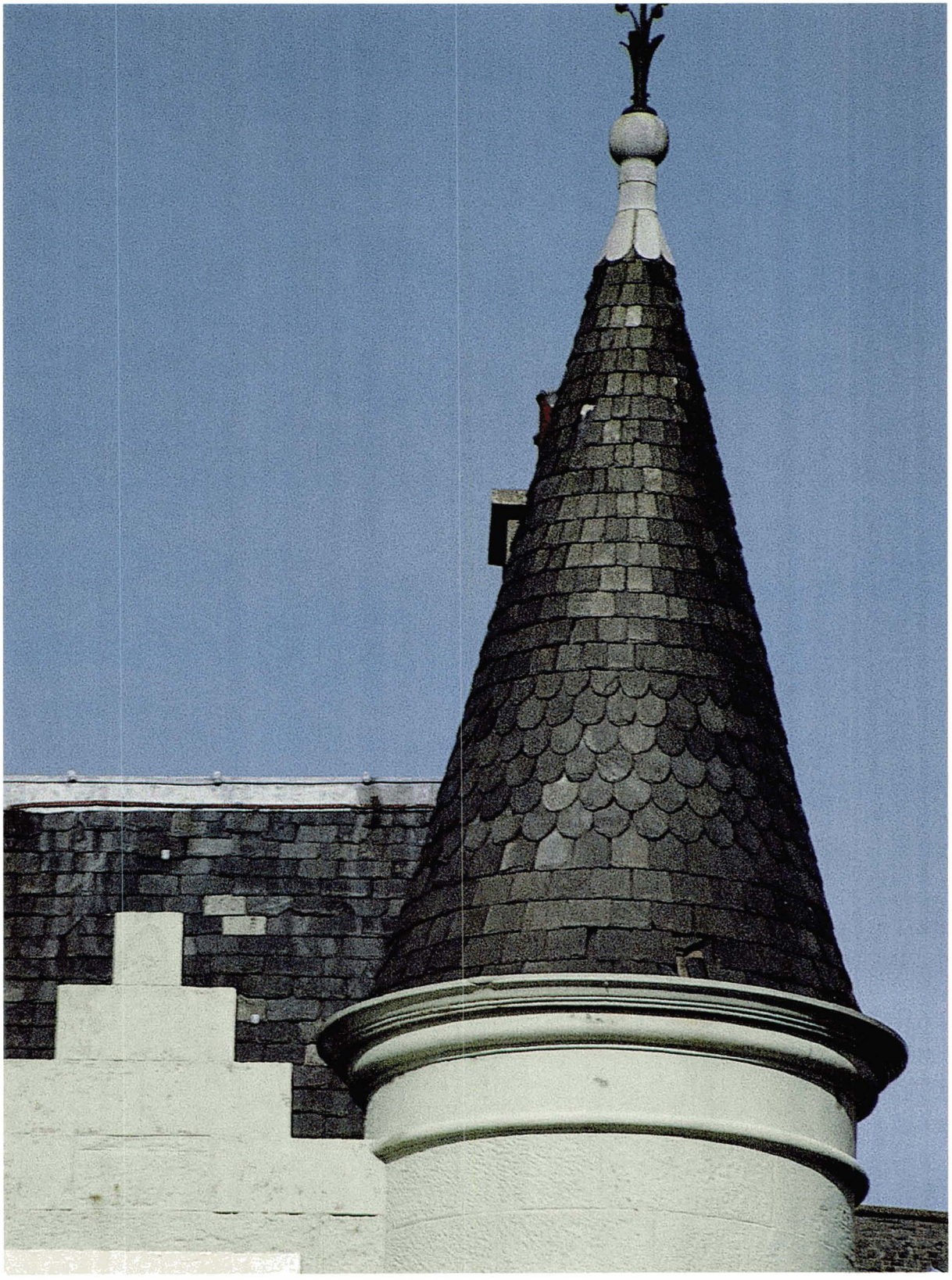
7.4.13 Slated turret, Oban

NM858303 Oban Illus 63

This turret in Oban has clearly been at the receiving end of damage by the time this photograph was taken in 1993. Such turrets are a feature of our Scottish heritage and considerable care needs to be taken in their design and construction. There are several ways of setting out slating to a turret in order to be weatherproof. In most cases the Victorian desire for mechanical accuracy dictated that the perpendicular joints in the slating had to be above one another from eave to top, as in this case. This means that the uppermost courses were likely to have insufficient sidelap. This difficulty was usually overcome by bedding the slate heads in strong putty lime mortar as the work proceeds.

Whilst it is Scottish practice to slate onto boards, it is not always necessary. However, with any kind of detailed ornamental or curved work it is advisable always to use sarking boards rather than battens since battens will split with the number and closeness of nails required. It was a common practice in many areas to bed slates in sand lime mortar on sarking boards. This gave additional security and draughtproofing. In recent times, however, the practice of laying a felt underlay over the boarding has been adopted. This adds nothing to the security and can lead to moisture being retained in the sarking.

The ornamental courses on this turret are normal slates with the bottom corners rounded in either a bullnose or a shield shape; the other variation is the diamond shape given earlier. When using ornamental slates such as these, it is advisable to increase the headlap by using longer slates.



63

64 Map showing the distribution of the examples illustrated in chapter 8

8 THE SLATES OF SOUTH WEST SCOTLAND AND THE BORDERS

8.1 Introduction

The vernacular areas of slates are unlikely to conform to political boundaries although it is remarkable that Scottish slates in general stop almost suddenly at the border with England. The slates of the Southern Uplands which stretch in a band of Silurian and Ordovician rock from Stranraer to Peebles have a divided pattern with the Galloway slates reaching across towards Dumfries and into Ayrshire and the Stobo slates occurring in upper Tweedsdale, with Annandale having received a mixture exclusive of both.

The Silurian slates have been said to be less durable than Ordovician or Cambrian slates. The Dalradian Assemblage being generally ascribed to the Cambrian. The slates at Cairnryan are of Ordovician age.

8.2 Blue slate quarries in Dumfries and Galloway

8.2.1 Cairnryan

Above Loch Ryan are slate quarries at the village of Cairnryan which by 1799 had been 'wrought these many years'. No doubt earlier extraction had laid the base for an increase in local trade during the period of the slate tax (1794-1831). There appear to be five quarries local to Cairnryan, which was an important group of quarries in this western end of Galloway, others being recorded at Mull Farm, Kirkmaiden, at Castlewig, Whithorn, where both slate and marble were quarried, at Fell of Carleton (Slateheugh) which was disused before 1850, at Meikle Ross and Burrowhead, where marble and slate were both worked.

8.2.2 Parton

NX695704 Parton Illus 65

Some of the history of Parton quarry has been recorded. In 1791 the quarry was closed due to bad management but re-opened later with 8 to 10 men working good quality slate for many years, probably well into the Victorian period.

Unlike other local quarries such as Marnoul, Barloes Hill and Knocknalling near Kells, the Parton quarries are close to the shores of Loch Ken and boats could have been used to transport these slates to something more than just the immediate locality.

The waste from the quarry was not dumped into the loch. Instead, some considerable waste tips are to be found near where the quarry was worked. Here we see part of one of these tips exposed from beneath years of vegetation. It can also be seen from the photograph that the slightly heather colour that results from weathering has formed on some of the pieces of waste slate.

65

8.3 Examples of local slates

8.3.1. Cairnryan

NX087633 Innermessan Illus 66

This roof near Cairnryan shows the local slates on an outbuilding. Whilst they are of reasonably generous size grading, being considerably larger than Lorn sizeables, they are now somewhat soft, but clearly, hard enough to have served for well over a century.

At the present time many foreign slates with claims of durability are being imported into Scotland. It should be remembered that, when historic sources suggest that a particular local slate in Scotland is 'less durable', the comparison will have been with Welsh or Scottish slates that are extremely durable. It remains to be seen which foreign slate will have sufficient durability to compare with the slates on this roof.

66

8.3.2 Bargrennan

NX348765 Bargrennan Illus 67a and 67b

These random blue slates on the old schoolhouse at Bargrennan are likely to have come from a local quarry. Information about such quarries is as difficult to find as the quarries themselves. From their appearance, with larger slates occurring at the eaves, these slates may well represent all production at a quarry rather than being a grading such as 'undersized'.

Other quarries may have existed at Woodland Bay and Camregan Hill near Girvan and farther to the east at Craiglure and Bradan in the Carrick Forest. Much work is needed if we are to find and prove many of the old slate quarries in this area.

67a

67b

8.3.3 Kirkcowan

NX328610 Kirkcowan Illus 68

Now that many older roofs have been reslated due to their original fixings having failed, it is not unusual for the older Silurian slates to have been dispensed with. However, just occasionally, tucked away out of sight on the back of a roof, some of the older slates that were deemed fit for re-use may survive. Often the smaller slates would be thrown away because of the extra labour required in fixing. On this roof in Kirkcowan can be seen some of the local Silurian slates re-used. They can be distinguished by their thicker grading and rougher shape.

68

8.3.4 Corsock

NX800727 Craigadam Illus 69 and 70

Sandstone ridges and gable cappings assure us of the age of this cottage at Corsock and the slates themselves would have a great story to tell if only it could be translated. At the eave is a group of five Victorian Burlington slates from Kirkby in Furness in Cumbria. Many such slates were brought into Galloway, but were usually of a smaller thicker type. Most of the rest of the slates are from a local quarry with a number of mainly small and regular sized (tally) Bangor slates thrown in for good measure.

The thick large random slates are likely to have come from the Parton quarries on the shores of Loch Ken, only a few miles over the hill to the south-west. It is interesting to note that the Parton quarries were capable of producing slates to a large grading and a typical roof may have contained slates from 30 inches down to 12 inches. On this roof 24 courses are sufficient for a medium length rafter and, whilst other 'make-up' slates have been incorporated, the regime of diminishing courses does not appear to have been altered substantially from the original grading of Parton Slates. On this photograph the slightly heather colour of the Parton slates shows well. This colour tends to occur as a weathering after the slates have been exposed, the slates in the quarry being of a blue colour when first made. Not all of the slates change colour in this way.

69

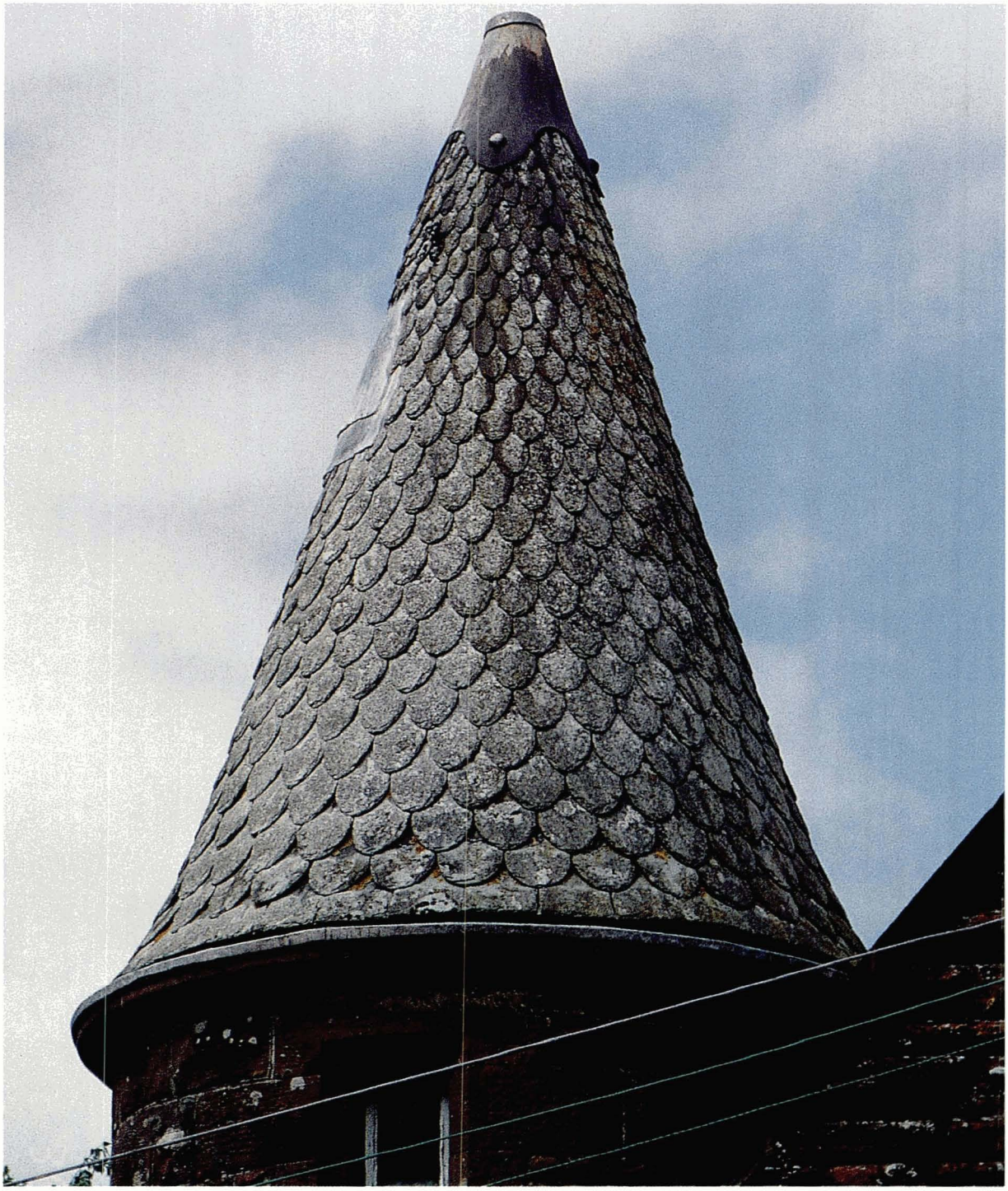
70

8.3.5 Slated turret, Threave

NX755605 Threave Gardens Illus 71

This neatly slated turret, to be found near Castle Douglas, has taken vegetation to a great extent despite being steeply pitched. Normally, steeply inclined roof slopes take less vegetation than lower pitches. However, where a slate is more porous more mosses and lichens will grow, particularly in damp sheltered areas or roof slopes. On this roof the discoloration suggests that the slates are of the local Silurian rocks such as are to be found at Parton.

The undisputed skill of the slater is here for all to see. Only with double-lap slating can such detail be achieved. Manufactured products are either not adaptable, too difficult to cut, or offensive to look at, in such applications. Study this picture for its detail. Only if we train craftsmen slaters will we ever perpetuate this aspect of our built heritage.



71

8.3.6 Annandale

Map reference not known Annandale Illus 72

The truly local slates of Annandale were most probably the sandstone slates dealt with in chapter 5. Sources of blue slate appear to have been some distance away north of Moffat; at Elvanfoot, Glenochar and Slate Brae, west of Dumfries; at Dalwhat Water near Moniaive or at Parton where water transport may have made their distribution a better proposition. The early salesmen from Burlington were not slow to supply the demand, particularly after 1831 when the coastwise tax on slates was repealed.

It so happens that the Silurian rocks of both Parton and Burlington are difficult to tell apart in both colour and grading, although Parton slates were smaller at the top of the roof. When new, the ash slate texture of Burlingtons can be separately identified from the smoother Parton slates. However, when both have been on the roof for about 150 years, the slates are likely to have softened, becoming flaky and dull.

This roof near Lockerbie is certainly not of Glenochar slates which are small hard and blue black in colour, being of Ordovician age. The likelihood is that these softened slates (you can see the softening by the hole in the corner slate) are from Furness. Note the contrast with the two small Bangor tally slates wedged into the eave.

72

8.3.7. Stobo

NT178368 Stobo Illus 73

In the upper valley of the River Tweed are two country estates that in the past have influenced roofing; one is Stobo Castle and the other Dawyck House.

On Quarry Hill above Stobo Castle are the quarry pits where Stobo slates have been wrought for at least three centuries. They are of Ordovician age and are blue/black in colour. The contortions of the rocks has limited production to small sizes and this was the ultimate limiting factor in the popularity of these slates. Perhaps the greatest period of production would have been from 1660 to 1860. The introduction of railways into the district literally side-tracked the quarries.

In a part of the country where stone slates were not available, these blue slates were used at an early date for important buildings and an interesting insight into the past comes from the record that in June 1661 Peebles Town Council were responsible for providing sufficient packhorses, each one carrying about a hundred slates, 'the haill able horsis for carieing sklaitts from Stobo to the hous of Crigmillar'. This was the house of Sir John Gilmore in Edinburgh.

Other quarries attempted in these slates were at Hamilton Hill, Peebles and at Wrae Hill near Drumelzier. The slates on this lodge gatehouse are fairly generous in size and are likely to be from the nearby quarry at Stobo. Their size, possibly the equivalent of sizeables, may illustrate the influence of the owner, or, being difficult to distinguish from Lorn slates, may have intruded after the best days of Stobo quarry were over.

73

NT156357 Altarstone Illus 74a, 74b and 74c

There is no doubt regarding the origin of the slates on this farm building roof just below the quarry and probably the direct work of the quarry lessee in former times. At 44 courses with the lower course no more than 14 inches long, these must be some of the smallest slates in Scotland, with even smaller slates on the house roof beyond. However, Stobo slates are durable and have served well.

It is probable that modern day slaters in Edinburgh would confuse these slates with those from Lorn, which are more plentiful. The danger, however, is that the smaller sizes will be discarded when being refixed to old roofs, simply because of the inconvenience and certainly not because of durability. In this way the authenticity of the historic Stobo slate roof will be lost.

74a

Beyond the house roof in the picture lies the parkland of Dawyck House, which can be considered to have influenced the course of roofing in Scotland. As stated earlier, sawn softwood became the most important building material by the latter half of the 18th century. Most hardwood had gone by at least a century before and the need to buy Baltic softwood for building purposes created its own cost limitations, a problem of which estate builders were well aware. There would be no problem in establishing water driven sawmills if only adequate home-grown softwood was available. Early in the 18th century Sir James Naesmyth was credited with planting the first larch trees in Scotland at Dawyck and is said to have created the fashion for home-grown timber on estates throughout the country. It was the availability of this timber, later in the century, that enabled the development of the sarking board system of coupled roof construction, making the use of small slates an economic proposition. This method of construction has continued as standard Scottish practice to the present day.

74b

74c

8.3.8 Traquair

NT326352 Traquair Illus 75

Just opposite Traquair Castle on Grieston Hill is a quarry that once produced slates for local use. They are to be seen on this small building nearby and may well have been used on parts of the main roof of the castle at some time. These slates differ significantly from the Stobo slates being grey/green in colour with a smooth lustrous surface which feels greasy to the touch when new and with some iridescent veining. They are of Silurian age and are clearly able to withstand many years of exposure.

A local story tells of men working at the quarry fording the river on their way to work using stilts 'in a very dextrous manner'. A further quarry in this locality is at Thornilee, Walkerburn. There may also have been a quarry at Raecleugh near Duns.

75

8.4 Imported slates

Between 1650 and 1840 large quantities of large random slates were distributed from the Bangor/Caernarfon quarries in North Wales. The first leg of their journey was by sea, most going to the Mersey estuary for distribution inland. However, large quantities were sent to most of the ports around the Irish Sea and to the Galloway coast.

Closely related to the ton slates but even larger and almost half the thickness, Queens became popular from 1770 onwards. Much prized by the architects of the late Georgian period, they were used on polite city property, country mansions and spa towns in England. Only a small quantity found their way into Scotland.

Modern trading names are usually different from the names by which these slates used to be known. The quarries in the Furness area of Lancashire, now in Cumbria, were associated with the Earl of Burlington by which name the quarries now trade. At one time these slates were known as 'North Country slates' or 'Lancashire blue' slates. Later they were known as 'Kirkby roundheads' due to the manner of dressing the top of the slate concealed from the outside. Nowadays the slates which enjoyed the generic name of 'Bangor slates' around the Irish Sea are known as Penrhyn slates, since Penrhyn is the only productive quarry in this type of slate. The quarry takes the name from Lord Penrhyn who previously owned the famous quarries at Bethesda in Caernarfonshire, now known as Gwynedd.

76a

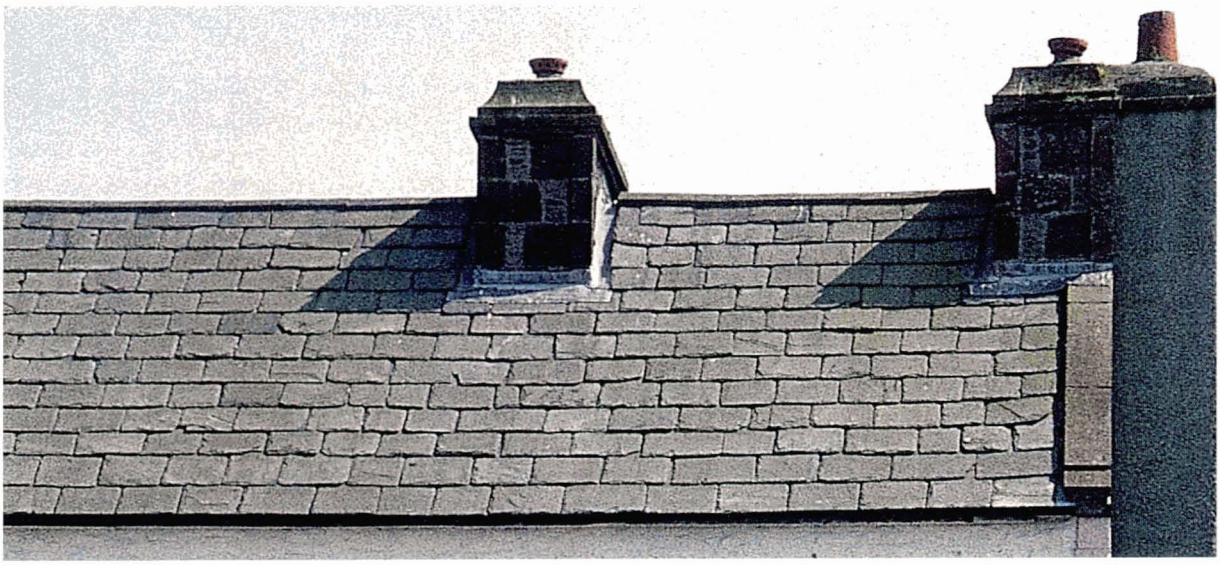
8.5 Examples of imported slates

8.5.1 Bangor Ton Slates in Wigtown

NX434553 Wigtown Illus 76a and 76b

Here we see a Georgian building in Wigtown sporting an impressive set of slates which are probably at least 36 inches long at the eave, down to 24 inches long at the ridge, requiring 13 courses. A similar roof of Lorn sizeables would need about 36 courses and one of undersized would require around 50 courses. This gives some idea of the ability of Bangor slate to be worked in large sizes.

Most Bangor tons (they were sold by weight) were hooked at the head with a substantial wooden peg and the slates themselves were usually heavy enough to withstand wind uplift by self weight alone. Although they came in various shades of grey, these slates usually display a degree of heather purple colour.



76b

8.5.2 Welsh Queens in Wigtown

NX435554 Wigtown Illus 77

A simplification of a Welsh expression for quality gave these Bangor queen slates their name. They are normally held in place either by pegs with considerable mortar torching or, later, centre-nailing.

The new bedroom windows on this cottage in Wigtown prevent us from seeing just what a full roof of queens can be. Compare the width of the slates with the size of the front door. It is not unknown for the lower courses in these slates to be 44 inches long, all widths being random.

77

8.5.3 Kirkby Roundheads

NX420588 Carsegowan Illus 78a, 78b and 78c

There are no prizes for knowing where to find this range of traditional farm building and the farm fare on sale. Shown here are details which are complete with protective limewash, sandstone cappings on the skews, and the local red sandstone ridges made in random lengths often exceeding four feet. The local vegetation tends to make both sets of slates look similar, but the upper roof comprises 15 courses of Bangor tons compared with 18 courses of Kirby roundhead slates on the lower roof.

78a

78b

78c

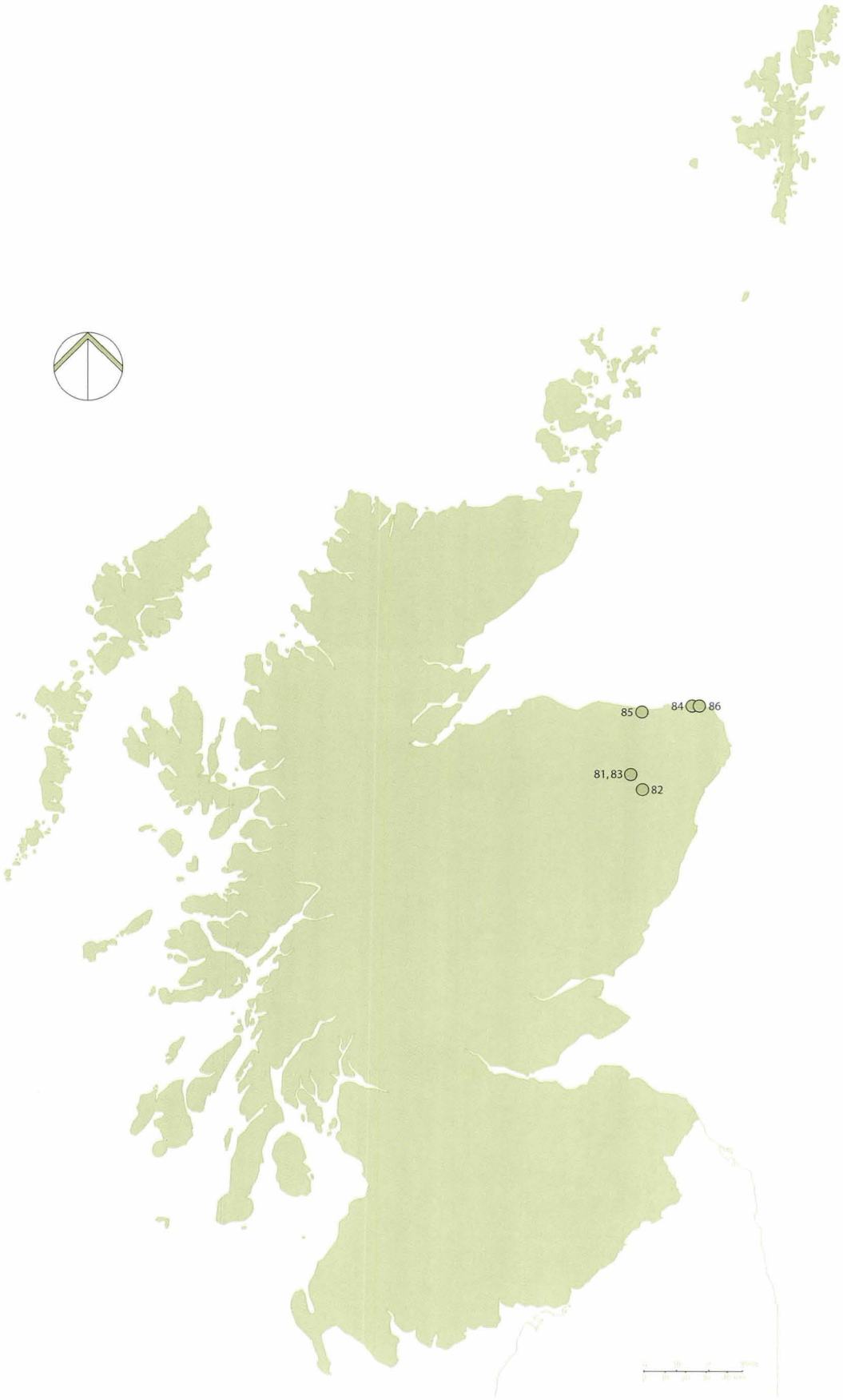
NT160910 Boreland, near Lockerbie Illus 79a and 79b

The Burlington slates shown at Carsegowan previously are quite large in grading for the period. These slates on a traditional cottage at Boreland near Lockerbie are of the more regular grading which for a similar rafter length requires 24 courses of random slates rather than the 18 shown at Carsegowan.

Lorn and Highland slates, as we have already seen are, small in size, and where a slater elects to use a one inch grading for size lengths from 16 down to 9 inches there will be 8 different lengths which, in, say, 36 courses may give an average of 4 to 5 courses per size length. These Burlington slates may be in as many as 18 size lengths which means that most courses would be to a different size length, necessitating many change courses and loss of lap. In order to save lap, to simplify the setting out and to help where a single size length may not reach the full distance along both sides of the roof, slaters sometimes opted to separate the slates into odds and evens, possibly using three-quarters of an inch intervals, putting the odds on one side of the roof and the evens on the other.

79a

79b



80 Map showing the distribution of the examples illustrated in chapter 9

9 THE SLATES OF ABERDEENSHIRE

9.1 Introduction

Twenty miles or so from the Foudland Hills and Macduff and the distribution area of Banff slates is more or less identified. The slates are best found away from the coast and the confusion of names persist. If we name them Grampian slates they become confused with the Highland slates of the Highland Boundary Fault. If we name them Macduff slates we use a name convenient only to the geologist. If we name them Banff slates we have a convenient county name which reaches almost to the quarries but only part of the old area of distribution and, of course the same applies to Aberdeenshire. On balance reference to these Dalradian slates as Aberdeenshire slates seems the best compromise.

The Upper Dalradian metamorphic rocks of what is generally called the Macduff Group are the source of blue slates in Aberdeenshire, close to the border with Banff. The main quarries are situated along a row of hills where the rocks with slatey cleavage outcrop. There are 24 quarries and numerous trial holes along the outcrop which starts in the west with Clashindarrock and the Hill of Kirkney, through Corskie and Wishach Hill to Foudland, Skares and the Hill of Tillymorgan. This ten-mile stretch has provided good quality slates for distribution over a wide area which, in their best period, included Huntly, Keith, Elgin, Fochabers in the north, into the Dee valley to the south and, interestingly, to the east at Kintore and down the turnpike road to Aberdeen or via Port Elphinstone (south of Inverurie) and the Aberdeenshire canal, which opened in 1804. Transport by canal was half the price of road transport. However, this area had a good set of turnpike roads at an early date to help distribution.

9.2 Working with Aberdeenshire slates

NJ632332 Jericho Illus 81

Looking at this picture of Foudland slates, it is possible to appreciate the amount of work necessary to create order from chaos, which is the work of the slater, the random slate fixer.

81

9.2.1 Splitting and trimming

This collection of left-over slates shows how they were traditionally prepared and the resultant shape, which made best use of the cleaved layers of slate rock. The same method applies to all blue slates and consists of blocks obtained from the quarry, preferably with one flat edge across the grain, being halved, the stresses induced by the chisel being resisted equally in both pieces. The block may start off at 2 to 3 inches thick and this first split would produce two pieces at half thickness. The slate maker would repeat the subdivision making four pieces, each of which would be subdivided again, making eight flat plates of about five-eighths of an inch thick (approximately 60 mm down to 7.5 mm). He would then decide the best position across the grain for the bottom edge and cut this using a slate knife. He would then trim the two sides at right-angles and simply tidy the remaining end which would be concealed when fixed to the roof. No attempt would be made to conform to any preconceived dimensions.

9.2.2 Sorting and laying

After delivery to site, the slater would pick a hole for the slate nail through the slate as near to the rough top edge as strength would determine. The next task would be to sort the slates into lengths to the nail hole. Having decided how many courses of each size the roof shape would permit, a raddle-line (a chalk line dipped in wet sheep dip, red colour) would be used to mark a straight line to which the slates would be laid. This line could either be struck on the sarking boards or on the tails of each course of slates, each slate being nailed to the boards. In most districts it was necessary to drive an supplementary nails between the slates at intervals across the roof as an additional guard against wind up-lift.

82a

9.3 Examples of Aberdeenshire slates

9.3.1 Inverurie

NJ696255 Pittodrie Illus 82a and 82b

This farm building at Pittodrie is of traditional construction with sandstone ridges and sandstone verge cappings, cast-iron skylights and a set of sawn softwood couples with sarking boards. The slates, from Foudland, are of sizeable grade. As is usual, no facia board is used with older forms of construction.

A closer view of the slates at Pittodrie Smithy shows a well-balanced set of slates with good sized middle courses well represented. At 28 courses on a modest rafter length, these blue/grey slates compare well with Lorn slates.

The local quarries claimed to produce slates as long as 20 to 24 inches long but these were rare. The more regular sizeable grade would include slates from 16 inches down to 9 inches. We have seen how the Lorn slates were made in four batches, the proportions in a consignment being 100 of the longest and the other three batches being of 300 each. Taking a sample of remaining roofs of Foudland slates, it would be reasonable to suggest a comparison as being three batches of 100. However, since these quarries were not organised on industrial lines, it is likely that each consignment comprised all the slates as they were produced, thereby creating on the roof a true fingerprint of the quarry.

82b

9.3.2 Jericho

NJ632332 Jericho Illus 83

This roof is at Jericho in the Skirts of Foudland, on a building once associated with a whisky distillery but now sadly neglected. At 36 courses the slates may have been of a second or undersized grade, but, in any event, the average Foudland slate is of a reasonable size when compared with the sizes produced in the Lorn or Stobo quarries. The main district names used for these Aberdeenshire slates are Gartly, Foudland and Tillymorgan.

Although roofing slates are likely to have been available from early times, the main growth in quarrying started in the early 18th century. By 1770, Lorn slates were competing, particularly in areas nearer the coast. The advent of the slate tax (1794 - 1831) brought back prosperity to the quarries although they were always worked individually with no real effort to industrialise production. By 1860, there was some difficulty in letting the Aberdeenshire quarries due to competition from Lorn and Welsh slates. By the end of the 19th century, all the quarries had closed and Welsh slates had taken over the Aberdeenshire market.

83

9.3.3 Rosehearty

NJ932677 Rosehearty Illus 84a and 84b

Advertising in 1832, the Gartly Slate Quarries, near Huntly, offered the best quality slates to a wide area at delivered prices, from quarries that 'are now in full operation'. They offered, at the quarry, first grade blue slates (probably like those on Pittodrie Smithy, see illus 82) at 47s. 6d. per thousand (1s = 12d = 5p), second grade blue slates (possibly like those at Jericho, see illus 83) 42s. per thousand, and green at 38s.

It cost 4s. (four shillings) to bring a 1000 slates from the quarry on the hill down to the nearest road at Gartly and 37s. 6d. from the quarry to Banchory. This is the cost factor that produced the vernacular distribution pattern that we seek to identify.

If you wish to purchase green natural slates today, you would have to pay a considerable premium and this has been the case since the days of the Georgian architects. Why, therefore, should green slates be the cheapest on offer at the Gartly Quarries and, probably, similar slates obtained from quarries at Mill of Melrose near MacDuff and at Troup Head on the north coast? The answer lies in the quality of the slate rock. In most quarries the upper rocks or those nearer to the surface are usually, for a number of reasons, of a less durable nature or can have been affected by ice age pressures and movement. Alternately, they may be of a different mineral composition, as with the Loch Awe group mentioned earlier.

84a

In the Macduff slates generally there are upper beds of this poorer slate which by comparison appears grey/green but is capable of adequate cleavage. They were known to be less durable, although the example shown here in Rosehearty is still serving, many decades after quarrying. At 28 courses to a normal rafter, these slates compare with 30 courses of Bangor slates, which may be 14x7 inch tally slates, on the adjacent property on the right of the picture. It is a reasonable assumption that this is an original planned Rosehearty roof, most of the other original buildings having been re-roofed with Welsh slates.

This does highlight the issue of durability. When Rosehearty was built, a conscious decision must have been made to use slates known to have a lesser durability, which have subsequently, at least in this example, lasted until now. A big question regarding durability must hang over imported slates, where there is little or no experience in their use in the Scottish climate.

84b

9.3.4 Macduff

NJ690642 Macduff Illus 85a and 85b

There is no guarantee that this roof in Macduff is laid with slates from the local quarry at Old Haven, Mill of Melrose, but it is likely. Firstly, although wet in this picture, the slates are of the type of blue slate to be expected, bearing in mind that the local quarry was not as successful as the Gartly quarries. We can possibly see the reason for this here. It is unlikely that such small slates, particularly at the top of the roof, would be transported any great distance by land or sea.

It is interesting to note the tiny cast-iron skylight at the left-hand skew. How long will it be before this roof is covered with Welsh slates, or worse – foreign slates, or worse still – artificial tiles? This photograph was taken in 1986 and it may well have happened by now.

85a

85b

9.3.5 Sandhaven

NJ960677 Sandhaven Illus 86a and 86b

This neat building in Sandhaven has Aberdeen bonded granite, originally pointed with strong lime mortar, but what was the original roof? Would it have been MacDuff type slates? Even the roofs on the neighbouring properties have been changed. All now sport a covering of Bangor heather coloured tally slates – this one with new plastic- coated skylights - and only the Hurlford ridges suggest what may have been.

86a

86b

87 Map showing the distribution of the examples illustrated in chapter 10

10 THE SLATES OF THE HIGHLAND BOUNDARY FAULT

10.1 Introduction

Each of the groups of blue slate quarries along the Highland Boundary Fault has its own distribution area which can be recognised in the overall vernacular pattern. The slates around the Kyles were of only local importance and did not influence the older roofs outside the area around Bute. Luss slates were ideally placed to provide local slates and to take advantage of the river Clyde as a distribution area. Aberfoyle slates could prosper in their time, feeding a good farming area towards Stiring and the growing industry of the Glasgow area. The Dunkeld group served a prosperous local market plus Perth and the river Tay.

The blue slates of the Highland Boundary Fault have been much used for roofing although they are somewhat obscured in memory by the more romantic sound of slates from Ballachulish and Easdale. The term 'Highland Boundary Fault' comes from the geologist who identified a massive change in the rock formation, running along the southern end of the Grampian mountains. In fact, apart from the change of rock structure the fault or huge displacement reflects all kinds of boundaries in the makeup of Scotland, of which most people are unaware.

Whilst not attempting to become too detailed, the northern side of the great fault is made up of Upper Dalradian schists, grits and phyllites and the southern side comprises sedimentary rocks of Devonian age, most notably of the Old Red Sandstone. It is in the metamorphosed rocks of the Dalradian that bands of slatey cleavage occur close to the fault boundary. Surprisingly enough, examples can be found along almost all the length from Arran to the hills west of Stonehaven.

To summarise the colours in the Highland Boundary slates, there is a basic blue/grey which will range from dark to light and there is a medium grey, described in one place as lead grey, all of which are to be found throughout the series of quarries. Then there is often reference to purple slates, there being a purple quarry at Luss, with purple occurring as blue purple slates in Aberfoyle and Birnam.

There is a wide range of purple colours in the slates around Bangor in North Wales and some clarification should be made. These purple colours are confusing, ranging from a deep blue/purple, through heather shades, to a dull grey/red often referred to as plum. It is the heather shades, without the extremes, that occur in Highland slates, all debased by shades of leaden grey or metal blew. However, where chlorite minerals replace iron minerals, the illusory colours change from heather to green and these occur in amounts varying from quarry to quarry, as already outlined.

10.2 Slate quarries of the Highland Boundary Fault

10.2.1 Firth of Clyde

Following the great fault to the north-east, a number of small quarries tried their best but without much success, at east and west Midpark on Inchmarnock, and on Bute at Hillton, St Colmac and Ardmaleish. The Hillton quarry was worked for slates for Kames Castle about a 100 years ago. Slates from these quarries are of blue/grey colour.

On Cowal, slates have been quarried at Innellan Tom and nearby at Chapelton. Slates of a darker colour were quarried above West Bay, Dunoon, and at Corlarach, west of Innellan. An attempt was also made to quarry slates further north-east above Rosneath on Gareloch.

10.2.2 Luss

A further group of quarries on the Highland Boundary Fault occurs over an area about a mile wide at Luss on Loch Lomond. Ten quarry pits were opened and worked extensively; a group of four at Camstraddan around a quarrying feature called 'The Trough'; three quarries to the west of the hotel at Luss; a quarry at Craig na Gaibhre, halfway between these two groups; and two quarries, the last still working during the 1940s, to the west at Auchengaven.

Apart from the blue/grey slates at the Luss and Camstraddan quarries, there were also two types of green slate. One of the green slates was rather similar to the green Macduff slates which were really a greeny/grey slate of not very durable quality (by comparison) and, no doubt, it was these slates that got Luss a bad name with some people both in agriculture and in the roofing trade in the 19th century. The other green slate was from areas of the quarries where the best durable slate was obtained, and was a colour variation of which we see more in other quarries along the Highland Boundary Fault.

Water transport figured significantly in the success of the Luss group of quarries with slates being taken during the late 18th and early 19th centuries, via Loch Lomond to Greenock, Paisley, Glasgow and the banks of the Leven, and across Loch Lomond to Stirlingshire. It is recorded that 300,000 slates were exported annually.

Slate quarries, mainly for local use, were opened on a smaller scale on the eastern side of Loch Lomond, opposite Luss at Shallachie. Further to the north-east a quarry was used by the local estate at Duchray Castle Burn in the Loch Ard forest. Little is known of this enterprise.

10.2.3 Aberfoyle

The Highland slates continue through a large quarry group on the Duke's Pass north of Aberfoyle, and geologists have used the name Aberfoyle to describe the cleaved slates of the Highland Boundary Fault. These quarries were particularly successful when it is considered that there was no haulage by water, and were well-known before the construction of the branch line to Aberfoyle. Originally transport was by pack-ponies, a process which was considerably improved by the construction of the Duke's Pass in 1820 and the road south to the Balfron area c1810.

It is conjectured that slates were supplied from here to Stirling Castle as early as 1574. In 1724 the quarries were noted for their 'excellent blew sclait'. However, it is recorded that only 3 men were employed in 1820, increasing to 20 men by 1834 and 30 men and four horses in 1837. Things had progressed by 1858 when the quarry was made into a company and the quarry was soon the third largest in Scotland, producing 1,400,000 slates per year. The branch railway line was opened in 1885 and a tramway was constructed between the quarries and Aberfoyle.

NN505028 Aberfoyle Quarry Illus 88 [photo: Bill Richardson]

88

This view of the quarries with a deserted building in the centre gives some idea of the scale of the quarry group. Slates were blue, grey, green and purple, being similar to colours in the Cambrian slate rock of North Wales. The impression given by roofs still serving is of darkish heather blue or blue-grey or grey-green colour individually. In the heyday of the quarry a mottled purple/green slate was sold as 'tartan' in order to successfully market otherwise less saleable slates.

Lots of trial holes were made in a general area, but the main activity took place within the group of quarries known as Burnside, Lockout, Klondyke, Home and Smiddy. Immediately to the south is a large opening called the West Quarry.

10.2.4 Craiglea and Dunkeld

In 1869 the quarries at Craig Lea were said to be more important than the other quarries in the groups previously mentioned, which included Luss, Aberfoyle and Dunkeld. Whilst this may be difficult to appreciate when the relative sizes of the quarries are considered, it does serve to underline the fact that different quarries reached a peak of production at different times. The colour of the slates from Craig Lea may well have been similar to the cottage at Logierait near Aberfeldy shown in illus 96, although the slates themselves are more likely to have come from the group of quarries near Dunkeld, which follow on from the group of quarries north of the River Almond.

The most famous of the Dunkeld group is the Birnam quarry perched on the hill above the road and railway and the River Tay. It is recorded that the local quarries were out of production by the beginning of the 20th century. No doubt the building of roads and railways had not helped the Birnam quarry which, during the 1830s was employing 20 men. During this time some trouble was experienced with overburden dropping onto the slate workings. The Highland road from Perth, 14 miles away, provided a means of distribution, including a change to water transport at Perth which helped these slates reach the shores of Fife and, no doubt, Edinburgh. Murthly Castle received slates from Birnam in 1834.

In 1835 the slates were 30s., at the quarry, with an extra 10s., for carriage to Perth. No distinction in price was made on account of colour, of which the most popular were the deep blue slates, with the dull grey slates the next most popular. Although the usual Aberfoyle type slate colours repeat themselves here, the green variety were more profuse later in the life of the quarry.

Roofing slates were worked at other quarries in the Dunkeld area, the nearest being at Haughend and at Newtyle, where two quarries worked at the foot of the hill, with a further quarry high on Newtyle Hill at Silverside. Other smaller quarries were opened to the north-east at Lunanbank and Greencrook in Forneth.

The local slate with a unique colour variation, pictured at illus 97, is from the small quarries on the banks of the Lunan Burn between Dunkeld and Blairgowrie. Being primarily grey/green, they have received metallic staining down bedding planes running parallel with the slatey cleavage, which gives them a yellowish colour.

10.2.5 Angus

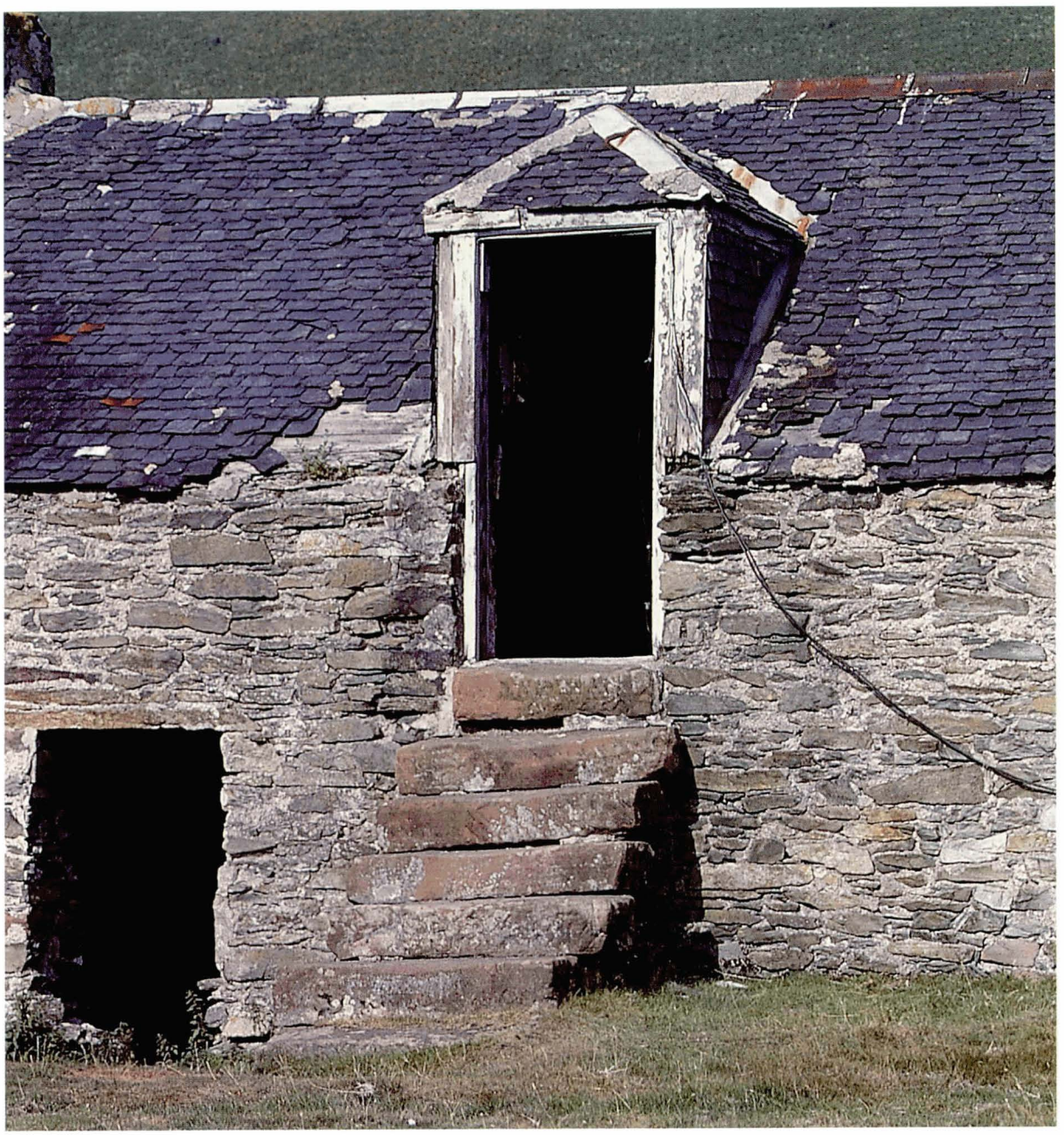
Highland slates have been worked from time to time at small quarries following the Highland Boundary Fault, at both sides of the main road at Rochallie, Bridge of Cally at Glen Prosen and Glen Clova near Cortachienorth, near to Fern on Cruick Water, north of Bridgend on West Water, and, probably, in other trial places.

10.3 Examples of the Highland Boundary Fault slates

10.3.1 The Cock of Arran

NR939504 Lochranza Illus 89

This old mill building at Loch Ranza on Arran is near to where roofing slates were once obtained from two small quarries which worked in the late 18th century and the slates may be local. It was said that local slates were not particularly durable, but a main reason for lack of exploitation was probably the extreme inaccessibility of the slate outcrop some distance from the Cock of Arran track. Arran subsequently became part of the market for Lorn slates.



89

10.3.2 Luss

NS358929 Luss Illus 90a and 90b

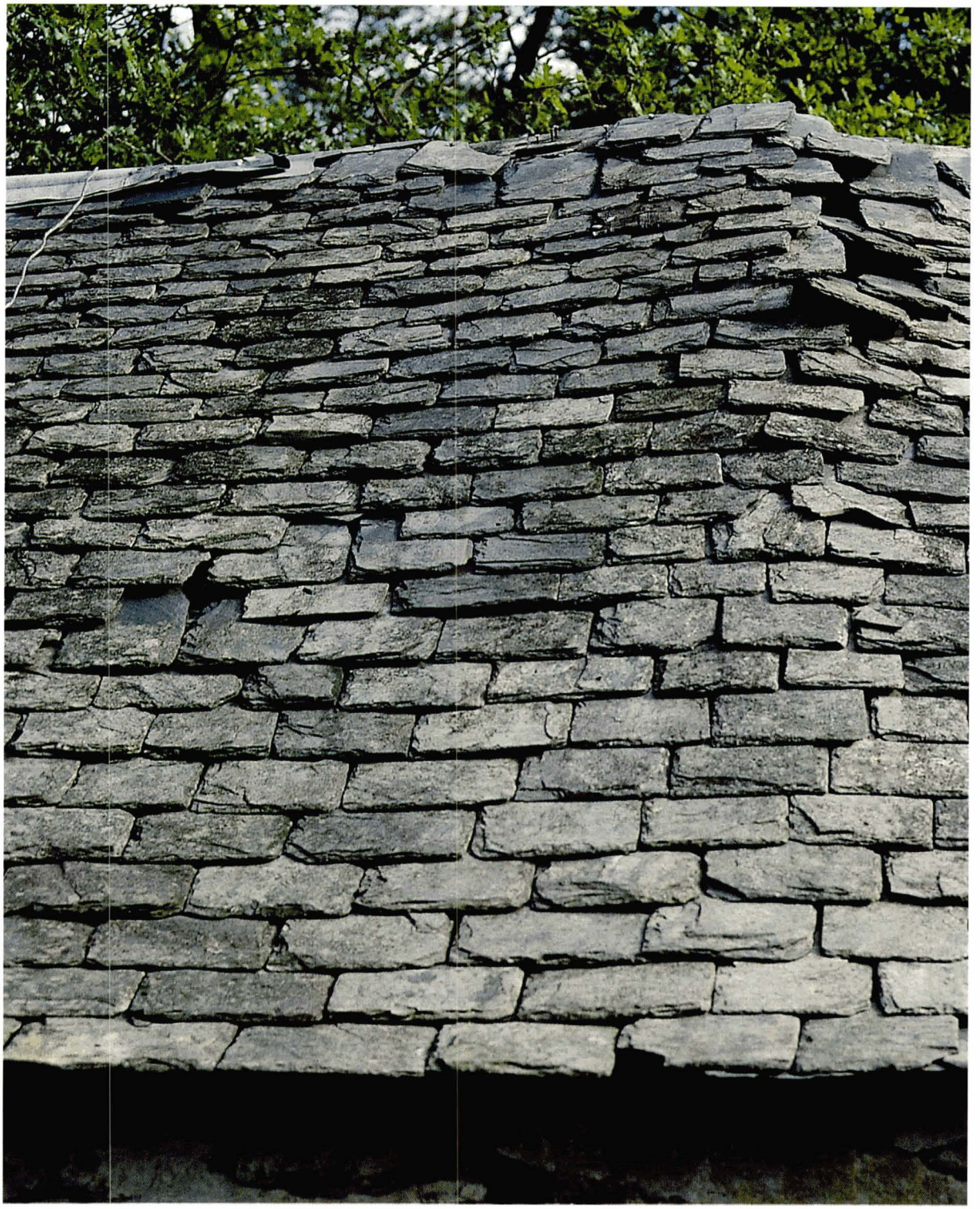
At 32 courses on a modest rafter with slates of generous width and the middle sizes reaching well up the length of the rafter, these blue/grey slates at Luss appear to be perfectly adequate and not at all like the slates described, probably by their competitors, as being decomposed in about 20 years. This time the ridge is covered with sheet lead dressed over a 'mop stick'.

90a

90b

NS355922 Luss Illus 91a and 91b

The Highland slates in this photograph on a ruined quarry building was taken at the Luss quarries in 1983, as with the last, also show generous widths and good sizes in the middle of the roof.



91a

91b

10.3.3 Aberfoyle

NN525010 Aberfoyle Illus 92a and 92b

This fine example of Scottish domestic architecture which was photographed in 1981, shows a typical roof of Aberfoyle slates with 36 courses to a generous rafter length and a half pitch roof which not only sheds the water from the slate laps expeditiously but also provides living accommodation in the roof space.

92a

92b

10.3.4 Comrie

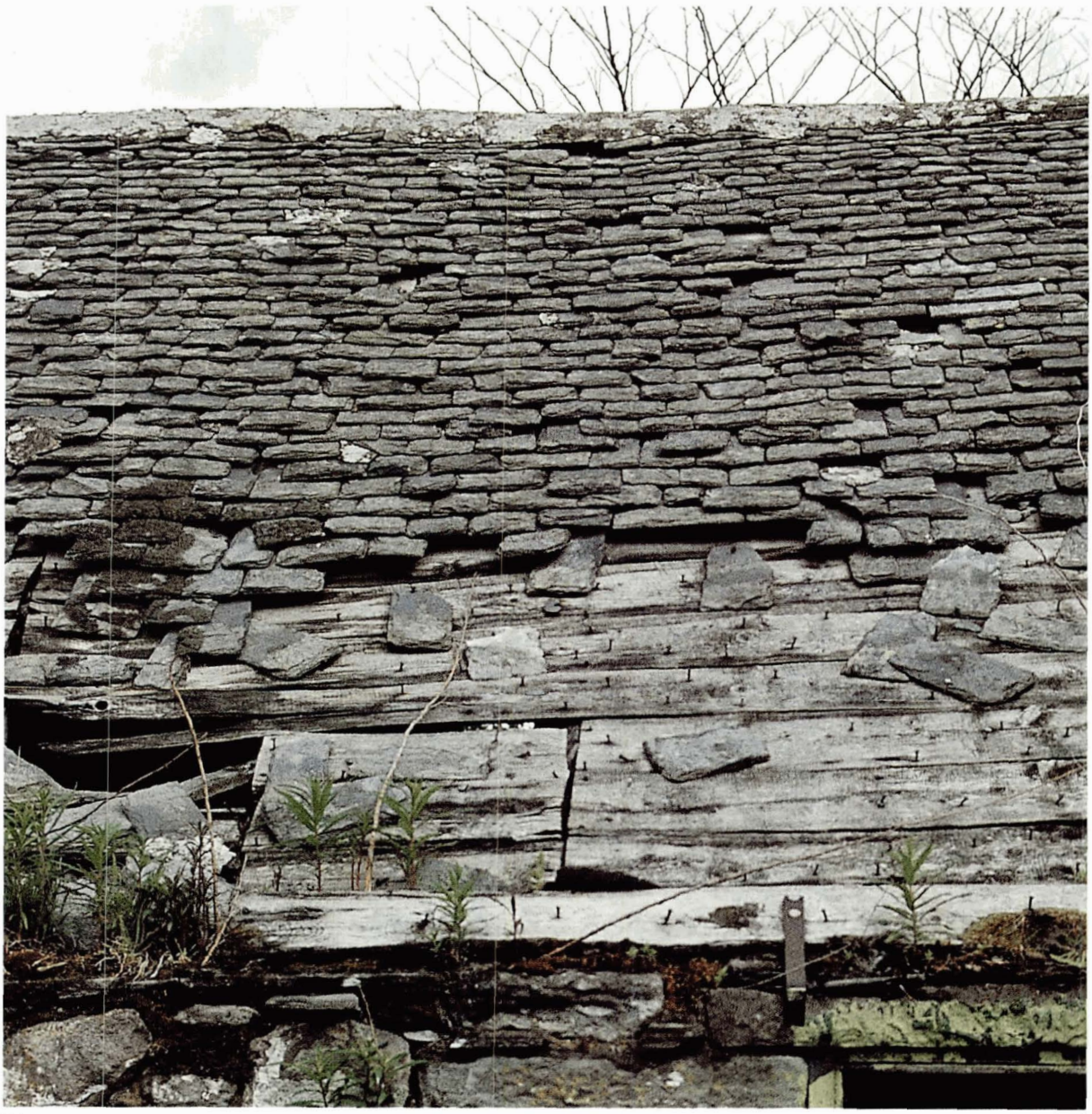
NN885235 Gilmerton Illus 93 and 94

This old cottage at Gilmerton near Crieff photographed in 1981 shows a roof of grey/green slates which possibly came from the quarries at Allt Glas and Ben Halton near Aberuchil Castle near Comrie where Aberfoyle type slates were quarried. Or similarly, they could have come from more local sites now lost, at Dalconzie and Lawers nearby.

93

The slates on this roof are clearly of an undersized grading with 45 courses to a modest rafter length and it is interesting to note that the slates sold at Aberfoyle in 1837 were termed as large blue at 42s.(per 1000), large green at 38s., small blue at 16s, and smaller blue at 10s. All of these represent random gradings and, the greenish blue slate at Comrie was judged to be a good slate, sold by land carriage in Perth and Stirling. No doubt the large blue were the equivalent of 'sizeable' grade and there is likely to have been a similar greenish blue slate from Comrie. The 38s. suggests that the Aberfoyle quarries green was of a less durable type, despite being large in grading.

This cottage roof has been robbed of its larger sized slates but, typical of modern day roofing, there was no interest in taking the small slates on the upper half of the roof. The old system of using iron nails to head-fix the slates to close board sarking can be seen clearly. The heads of the nails are usually the first to give way and this enables these slates to be removed without bursting the nail hole in the slate. Where slates are damaged upon removal, the scope for re-holing is very limited and often leads to the slates being discarded. Sandstone ridges indicate an early roof and the gutter brackets fixed to the first board can also be identified.



94

10.3.5 Friarton, Perth

NO120214 Friarton Illus 95a and 95b

These grey/green slates on this cottage at Friarton undergoing modernisation in 1987 are of a reasonable grading at 33 courses to a normal rafter length. However, at Friarton, these slates may have come from a range of quarries, Comrie being only one of the possibilities. The other quarries, which also follow the Highland Boundary Fault, can be found along a range of hills north of the River Almond at Dunie, Craig Lea, Ruhumman, three at Glen Shee, several near Tullybeagles on Craig Gibbon, and above the River Tay at Birnam.

95a

95b

After you have finished studying the proportions of the slates in the diminishing courses and the sidelaps achieved by the slater, you may care to glance at the next door cottage to the left of the photograph where the modernisation process has moved further ahead. The coursed rubble stonework has been covered with decorated Portland cement render and the roof has been covered with standard 16x12 inch concrete single-lap interlocking tiles, surface coated with a brown sanded colour. The junction between the tiles and the slates has been formed with a small lead sheet trough with the slates having been removed and re-fixed at the junction.

10.3.6 Ballinloan

NN965524 Ballinloan Illus 96a and 96b

At 30 courses this roof is interesting in that there are clearly four courses of large slates followed by four or five courses of the next size length, giving a particular fingerprint to this roof, with the smaller sizes following in quick succession. It is as likely that a given quarry or group of quarries could be identified with the pattern of diminishing courses, as with the colour of the slate rock. The green slates at Gilmerton shown in illus 93 and 94 have obviously had these longer sizes taken in preference to the small upper slates. This pattern of coursing is different to the pattern given by Lorn slates.

It is interesting to note that the slating is taken over the gable wall rather than abutting a skew, the slater having selected wide slates for alternate courses, which would reach back onto the sarking boards for fixing, whilst the outer edges are bedded and pointed and limewashed.

96a

96b

10.3.7 Forneth

NO085457 Forneth Illus 97

It is difficult to distinguish between the colour and the effects of vegetation on the Greencrook slates on this cottage at Forneth. Natural vegetation forms on slates over a period of time according to local climatic conditions, the composition of the surface of the slates, the use of the building, the pitch of the roof and the direction in which it faces.

97

10.3.8 Slated turret near Caputh

NO057403 Caputh Illus 98 and 99

There is simple delight and pleasure to be taken from Scottish rural architecture particularly when softened by surrounding trees and even further enhanced by the gentleness of a parkland setting. Few could deny the part played by natural slates on the one hand and the slater's art on the other in maximising this delight.

This lodge gate cottage near Caputh is built in the grand style with general slating of local blue/grey/heather slates of fine thickness and a better sizeable grade and yet another of the intriguing slated turrets which, in their style, link Scotland to France more than do any past political aspirations. The high quality of the general slates, at 27 courses, with full middle sizes, must have been influenced by financial considerations, either on the part of the architect or his client.

A closer look at this undamaged piece of special slating work serves to repeat the comments already made regarding turrets at Oban and Castle Douglas (see illus 63 and 71).

Were this a complete cone, there would be the same number of slates around the base as around the top course. The large lead sheet cap reaches down to prevent the slates from being narrower and the pitch of the roof speeds the rainwater run-off, helping to compensate for the lack of sidelap in the upper courses. The strong lime mortar bedding is relied upon to hold the upper slates in position and prevent wind-driven rain, which will occur despite the sheltered position.

The slates follow vertical lines from eave to top edge and the bottom course does not need to be ornamental. The curved diagonals result from the diminishing lengths of what started as a set of local random slates. The slater would have selected the slates for the turret from the larger consignment for the whole roof. The appearance of the spade-shaped slates confuses the eye so that a close-fitting symmetry is achieved. Had these slates not been dressed to the spade shape, the finished slating would not appear to be as close-fitting as the general slating.

98

99

10.3.9 Farnell, Montrose

NO643553 Farnell Illus 100

When discussing Forfar sandstone slates at West Water (see illus 14 and 15), the point is made that in earlier times blue slates were not favoured where stone slate was available. However, here is a roof of Highland slates at Farnell near Montrose, close to the area where so many sandstone slates were quarried. There is no evidence as to where they came from. It can, however, be assumed that it is more likely that they were brought down the Tay from Perth than that they were transported from the hills and any of the quarries mentioned above.

The grading of these slates sets them apart from later Lorn slates brought into nearby areas as sandstone slates lost their popularity. Like the slates at Ballinloan, at 32 courses and a similar rafter length, the fingerprint (regime of diminishing courses) is similar, with what appears to be 5 courses of the first size and 5 or 6 courses of the next size down. It would be interesting to carry out a survey of likely Dunkeld roofs to see how widespread this fingerprint still is.

This photograph was taken in 1987.

100

10.3.10 Culross

NS987860 Culross Illus 101a and 101b

From a roofing point of view Culross is associated with pantiles, but it shares the distinction with Edinburgh and other older towns hereabouts of being in receipt of all three older forms of roofing, namely sandstone slates, blue slates and pantiles. Here we see neat harled cottages with neat stone trims, stone-capped ridges and skews, once limewashed abutments with tilted slating, and sets of slates brought from the Highland quarries to Perth and then from Perth by water.

101a

With 43 courses on this length of rafter, these blue slates are of an undersized grade. The extra labour by the slater in fixing the slates will have been partly compensated for by the cheapness of the slates, perhaps 10s per 1000 plus carriage, probably a return trip on a coal boat. To save you counting, there are approximately 1800 slates on this one roof slope. As a comparison it would take less than 1400 plain tiles which are usually 10.5 x 6.5 inches. Given the chance, today's roofers will discard such time-wasting materials, but with them is discarded the fingerprint of generations of Scottish slates and the work of Scottish slaters.

101b

102 Map showing the distribution of the examples illustrated in chapter 11

11 PANTILES

11.1 Introduction

Historically, pantiles have worked their way inland from the sea, Berwick and the Lothians, Forth and Tay and at Banff. A reasonable days work with a horse and cart over rough roads from the place where the small coasting boats would venture. Probably a ton or slightly more although it should be remembered that pantiles would break more easily than slates when packed in a wagon and, once broken, they were waste. Damaged slates could be re-trimmed. Whilst on the water in a boat pantiles would be safe but, in a small boat, not too far by sea. It is interesting to speculate; were they sailing gabbarts or scows that took the Lothian pantiles around the river coast lines. The last part of the journey would be by horse, as would the trip from the inland tileries south east of Edinburgh or in Fife.

When the slate maker has finished working the quarry, the evidence of his work will remain, sometimes for generations, and sometimes will be difficult to remove. Most slate-making enterprises have left their scars across Scotland. With pantiles, hardly any trace will remain of what may well have been a large and thriving industry, to remind us of the work of the pantile maker. However, we do have the pantile roofs to look at and, from these may be taken an understanding of the part to be played by the humble pantile with its unforgiving burnt earthen red in Scottish vernacular architecture.

11.2 The development of pantiles in Scotland

Handmade pantiles have soft rounded edges and are unmistakable on the roof. The design must have evolved from an attempt by a tile maker to combine the lower and upper tiles of the Mediterranean under and over tiles. It is not recorded where this invention took place and we inherited the design from the Low Countries long after the style had become traditional.

There is no reason to believe that the common pantile came to Scotland any later than it made its appearance further south. Much play has been made of the pantile having been first manufactured in Britain at Tilbury in 1700 by Daniel Defoe. However, there is plenty of evidence to suggest that pantiles were being made, this side of the North Sea, much earlier in the 17th century. The old story of boats taking wool to the Flemish weavers and pantiles on the return loads is quite reasonable. So is the suggestion that the pantile makers soon followed and set up their kilns wherever a suitable light clay could be found.

Each tile maker would attempt to produce tiles of a similar size and shape, but this was difficult to control. The type of clay, the variable heat of the kiln and the process of hand-making all provided variation which gave, and still gives, the tiler some problems in aligning the tiles and making them fit close together.

After the clay was prepared, the tile maker would form the tile over a wooden horse with a curved back to create the pan of the tile in inverted form. A small lipped edge would be formed to fit over the edge of the next tile when laid. The tile maker would have to beat the tile hard with a specially shaped mallet to force out the memory from the clay. A piece of clay formed flat and then bent to a curve or angle will retain a memory of its former shape which will tend to reassert itself during the process of burning in a kiln.

The problem of four thicknesses occurs at the junction of four tiles, In handmade tiles a gently rounded head to the lipped edge and a notch in the bottom corner of the opposite tile solved this problem. It should be remembered that a clay earthenware product is best produced with an even thickness so that there is even burning and less waste in the kiln. Making the tiles thinner at this junction would not be an option.

Many farm buildings in the Lothians have been covered with pantiles which had the advantage of lightness and speed of construction, but, wherever a pantile roof has to be cut 'out of square', difficulties arise. Where there is a reliance on bedding mortar, the slightest movement of a large unit such as a pantile, as opposed to small slates, gives rise to instability. The problem of trimming a pantile so that no nib remains leads to a reliance on mortar; there having been no easy way in the past to drill holes in pantiles. In fact, most pantiles were not made with holes

and to drill them is not advisable since this results in erosion. Hips were often covered originally with carefully dressed lead sheet cappings, but these are vulnerable to becoming loose over the years and the 20th century's magic mastic called Portland cement is often used as a substitute.

Pantiles were made at Musselburgh and possibly at Portobello, Prestonpans and Cousland, although all trace has now disappeared of the tileries. A great deal of searching through written records will be necessary before it can be established where pantiles were made. Even the word 'tiles' does not always mean pantiles, having been used to describe both floor tiles and drain tiles.

Pantiles in Berwickshire may have been made in Northumberland or may have been carried coastwise from Lothian. Tileworks are known to have existed near Berwick and Coldstream but, as yet none have been recorded in the Borders.

It is interesting to note that a major change took place in the design of the common pantile in or around 1870, when a machine was invented from which pantiles could be extruded. Designed at Louth in Lincolnshire, this machine made pantile making much easier. No more bashing over a horse, the tile was extruded to shape and the ends and straight corner mitres were produced by a system of cheese wires. The result was a tile with sharp edges, a much bolder and easier to produce roll with a narrower pan, and a diagonal mitre where the notch and shoulder used to be. The advantage of cheap mass production soon put paid to the traditional pantile works. It also put paid to the traditional appearance of pantiling except for the older tiles remaining.

Today, the new clay pantiles used in Scotland are manufactured on Humberside and the majority used in the last 100 years have been of the extruded type. Various moulded mass-produced variations are available from a variety of sources in England and on the Continent. None of these tiles give a satisfactory traditional pantile appearance. However, there could be considerable improvement if modern moulded and mass-produced clay pantiles were made in the traditional shape (or shapes) with rounded edges and notched mitres, made from, say, four slightly varied moulds with the emphasis placed once more on the width of the pan rather than the boldness of the roll.

There has been a long gap in the history of Scottish roofing since traditional handmade pantiles were last made and used, but they are so much part of the vernacular pattern that a serious appraisal of their value should be made. We should have a clear understanding of what authentic pan-tiling looks like and the dreaded festooning with cement mortar should be avoided.

There are plenty of inadequate looking substitutes available and the manufacture of clay single-lap tiles is cost effective and competitive. On the Continent clay single-lap tiles hold their own with concrete single-lap tiles. Dominance by the concrete tile is more pronounced in Britain. Pantiles with a more authentic appearance could be made economically and could be used on both old and new property alike without any cost penalty to the property owner.

11.3 Examples of pantiles

11.3.1 Culross

NS986860 Culross Illus 103

A distinction may be drawn between the harshness of the east coast where a less interesting scenery and North Sea wind and rain, gloom and mist, tend to be uninspiring, just as the native pantile's straight up and down appearance and awkward and rather simplistic shape leave very little to the imagination, and the deeply Celtic west where the coast and the islands, the mountains and the sea lochs all play their part in what for many becomes a great romanticism. This may be said to be reflected in the myriad sizes and intriguing random nature of the old slating, blue and retiring.

The pantiles in Culross are a never-ending mixture. This is because of water transport enabled pantiles to be delivered from many places. When viewed on a sunny day, they make a cheerful contribution to the scene.

103

NS987860 Culross Palace Illus 104a and 104b

The pantiles on this roof at Culross Palace can be seen to be of a variety of types which has caused difficulty in keeping the lines of tiles straight in places. Tiles from a different hand and from a different time in the kiln and even from a different place, are no doubt the cause. This variation can be contrasted with modern machine-made pantiles which give a mechanical and synthetic appearance (see Gifford, illus 110).

104a

104b

11.3.2 Cupar

NO376141 Cupar Illus 105a and 105b

It can be seen from these pantiles in Cupar that the emphasis of the traditional design is in the generous pan shape and the lipped edge or side roll is kept to a minimum, unlike more modern tiles, where, unfortunately, emphasis is placed on the roll, giving a different appearance which detracts from a traditional building.

105a

This photograph illustrates the difficulty that can be experienced in forming an eave over masonry where the first course of tiles is bedded onto the stonework. Later settlement of the rafters causes the second course to move, with awkward results. Also, pantiles concentrate water into channels down the roof and each channel has to be drained. The joint between these two houses, made up with cement mortar, makes inadequate provision for two of the channels formed in the tiling.

Pantiles are likely to have been made in local tile works in this area. Later, the need for drain tiles in agriculture would have provided a similar market to the need for pantiles for roofing.

105b

11.3.3 Elie

NO492001 Elie Illus 106a and 106b

This roof at Elie lies nicely and is almost original except for a few extruded pantiles that have been trimmed to fit as repairs to the roof. You will see that they are lighter and have been bedded in cement mortar. The skirt to this roof is of sandstone slates from Forfar and will have made the journey by boat some considerable time before these pantiles were fitted. The fact that the skew abutment is shallow suggests that it was designed for a roof of stone slates rather than for the greater depth required for pantiles. The darker shades on the original pantiles are the result of vegetation and not of mottled colouring. Modern manufacturers are inclined to produce tiles which are either a bland single colour or have a contrived mottled appearance. The traditional pantile can be accused of neither of these things.

106a

106b

11.3.4 Kincardine

NS91 84 (map reference uncertain) *Bellsdyke* *Illus 107a and 107b*

The tiles on this horse gang near Kincardine Bridge may well have been the original covering, judging by the pitch of the roof, although it may have been thatch covered in the first instance. The tiles themselves appear to be close-fitting and only the piend junctions are ugly and a source of trouble.

107a

107b

11.3.5 Pittenweem

NO552026 Pittenweem Illus 108a, 108b and 108c

It would have been a short trip across the Firth of Forth by boat for these pantiles in Pittenweem. The blue tiles to the left of this picture are probably coloured with a manganese wash applied before firing. The pantiles to the right are laid on a skirt of Highland slates of a small grading which may have formed the original roof covering, it having been more convenient to leave the slates bedded on the wall, when the roof was re-covered.

108a

108b

However, the main reason for a skirt is the fixed gauge of the tiles which should be measured, course by course, down the roof from the ridge. This often means that the margin left at the bottom of the roof will be either too long or too short for a course of pantiles. In other pantile areas (in England) it was common practice to lay the first course of pantiles bedded on an undercourse of plain (flat) tiles. This did not apply in Scotland, where bedding onto masonry or, if the eave was formed of timber rafters and a tilting piece, a course of slates was used for this purpose.

108c

11.3.6 Saline

NS997865 (map reference uncertain) *Culross* *Illus 109*

These pantiles photographed in 1987 suggest that they have not travelled far from the place of making. Such rough and distorted tiles are likely to have been rejected as unsuitable for general sale, resulting in their use on this farm building at Saline not far from Culross. It is even unlikely that they would have been loaded on a boat.

However, this picture, looking against the side lipped rolls, clearly shows that distorted pantiles leave considerable gaps which, for the most part, do not leak unless wind-driven rain becomes a factor. The collected water concentrates in the centre of the pan. Rainfall on the two flanks tends to be deflected away from the side rolls.

In practice, pantiles require considerable preparation and are usually laid on battens. Before the introduction of underlays pantiles were torched with sand lime hair mortar from beneath. This torching holds the pantile in a level position and helps to exclude draughts. Once the torching fails, the tiling becomes vulnerable. Some roofs have been formed by bedding the pantiles in mortar onto sarking boards. Other roofs have been formed by laying reeds across the rafters between the battens and under the tiles, to support bedding mortar.

109

11.3.7 Gifford

NT534680 Gifford Illus 110a and 110b

These modern machine-made pantiles laid over a skirt of Bangor slates on a roof in Gifford provide a neat and workmanlike roof which will satisfy the person requiring accuracy and precision. No doubt the Victorians would have been delighted that pantiles could be made with such reassuring accuracy, a feature which had been denied generations of hand-workers.

110a

110b

11.3.8 Haddington

NT513739 Haddington Illus 111a and 111b

This photograph taken in 1981 shows normal red terra cotta coloured tiles together with rows of buff coloured tiles made from seat earth or fireclay found in the coal measures. Neither will have travelled far to reach this roof in Haddington.

Handmade traditional pantiles are laid to a fixed gauge, the single-lap tiles being checked for cover width and gauge by laying out a panel on the floor before setting out the roof. After he has had the opportunity to sort and measure the consignment of tiles, the tiler needs to prepare the roof. He will look first for dark shaded tiles as opposed to light shaded tiles, knowing that the darker tiles are likely to be slightly smaller, having shrunk to a greater degree in the kiln. Tiles of a similar width must therefore be laid in columns down the roof. In this photograph the buff tiles have been used in this manner, although it is not normally possible from ground level to see the difference between the light and dark tiles in a particular consignment.

111a

111b

11.3.9 Dunshelt

NO249104 Dunshelt Illus 112

These pantiles with a skirt of Highland slates are next to a roof of Bangor slates. It is probable that both coverings are substitutes for former Highland slates although the Welsh slates are likely to be the later in date.

The bottom course of pantiles will have been laid originally on a well concealed bed of lime mortar or perhaps the beam-filling will have reached to the underside of the tiles. In any event, the lime mortar will have been kept clear of the run-off water to prevent dampness and frost from eroding the mortar. Clearly, some trouble with water ingress has occurred and several generations of well-meaning trowel men with cement mortar have attempted a quick fix by cementing the side lipped rolls of the pantiles. This cementing has been carried out on many roofs and usually with the same self-defeating effect. When the mortar is applied the left-hand side of the pantile is pressed down and held in a lower position by the mortar, thereby opening the side rolls and allowing more wind-driven rain to penetrate over the side of the pantile, resulting in more cement mortar being applied and so on. Where pantiles become disturbed, they should be carefully relaid and bedding mortar under the tiles should be considered rather than external applications as a last resort.

112

NO249104 Dunshelt Illus 113a and 113b

Pantiles are said to have been made in the Dunshelt area near Falkland Palace. These tiles, however, although still of the single-lap design of the pantile, represent two of the major advances in clay single-lap tile development. On the left is a roof of Double Roman tiles (see illus 113a), brought to prominence by the Bridgewater clay tile industry where pantiles gave way to a multiplicity of single-lap designs over a period of three centuries, ending in 1968. On the right is a roof of CDN tiles (see illus 113b), probably imported from Belgium early in the 20th century. Both types of tile are moulded, each by a different method. Whilst many examples of these and other variations are to be found in Scotland, they are not part of the story of Scottish vernacular roofing materials.

113a

113b

NO249106 Dunshelt Illus 114

This roof of slightly orange pantiles at Dunshelt shows clearly how the traditional pantile was made with the emphasis on the pan rather than the roll, and, if you imagine attempting a similar detail at the opposite end of the roof, a narrow roll, rather than a bold roll, would be best covered with the skew capping. These pantiles are laid on battens on sarking. In the middle of the roof can be seen two glass pantiles acting as a skylight.

No doubt the intention was to cover the left-hand side of the pan of the end course of pantiles with the stone capping of the skew, thus forming a better than average weatherproofing at the abutment. Pantiles, however, are unforgiving when it comes to setting out the roof and the whole would have to be worked out in advance. This leads in this case to the suggestion that the masonry of the gable has at some time slightly moved out at the top, causing someone to insert narrow pieces of pantile roll to cover the gap.

Ridges with pantiles are difficult to cover and shallow pantiles with narrow rounded rolls are much more easily covered by a common ridge tile. The ridges for use with pantiles are usually wider than average. The large gap between the ridge and the pan has always been a difficulty and original practice was to bed the ridges in a strong lime mortar and, after a good set had taken place, preferably before the next winter frosts, a pointing of strong putty lime would be applied. As on masonry, this would have to be repointed after a number of years' exposure.

114

11.3.10 Carse of Gowrie

NO238234 Errol Illus 115

This photograph shows pantiles at the Pitfour brickworks but they are unlikely to have been made there. There have been more recent attempts to make modern pantiles here, but the old handmade pantiles may have been made at other places nearby.

115

11.3.11 Sandhaven

NJ960676 Sandhaven Illus 116a and 116b

However, pantiles are to be found in odd places on the Aberdeenshire coast and sea carriage may well apply. This roof is in Sandhaven and has its back to the sea. Although the building is shown in a poor state and unoccupied, the roof has received its fair share of attention with the sidelaps of the tiles pointed in cement mortar. The existing hand-made pantiles have been repaired using extruded pantiles, part of their roll having been cut away and bedded in cement mortar.

116a

116b

11.3.12 Portsoy

NJ595662 Portsoy Illus 117

This old warehouse on the seafront at Portsoy has a set of traditional pantiles that have suffered wind damage and subsequent neglect. The picture was taken in 1986. Some mortar torching can be detected where the tiles are broken. The tiles have been laid on battens rather than sarking boards. Torching can only be applied with open battens. The batten nails appear to have rusted away, leaving the roof vulnerable.

These pantiles may have been made locally. There is a possibility that tiles were made at Whitehills nearby, although there is little evidence in the locality. A close inspection of the pantiles reveals that certain tail shadows are greater than others, indicating that some tiles have less curvature in the pan. This somewhat ill-fitting appearance further reinforces a local origin. It is questionable whether a manufacturer in Fife or the Lothians would have attempted to send poor quality pantiles for a long journey coastwise.

117

118 Map showing the distribution of the examples illustrated in chapter 12

12 TWENTIETH CENTURY ROOF COVERINGS

12.1 Introduction

The roofing materials included in this chapter have been brought by railway from England to the markets in Scotland, plain tiles, asbestos cement slates, and large quantities of Welsh slates. Then followed the oil engined lorry, capable of distributing anything anywhere, door to door – slates from Spain in the time that it took to unload a timber scow in the old days.

12.2 Examples of twentieth century roof coverings

12.2.1 Limestone slates, Kintyre

NR821487 Cour Ilus 119

To conclude this Report reference should be made to a number of roof covering materials that have been introduced relatively recently to Scottish slating and tiling. This reference should help to avoid confusion between modern and traditional materials. However, where do we draw the line? On the one hand, Bangor slates have been used extensively during the Victorian period and continue to be used, whereas Westmorland green slates have been used over a similar period but only on special projects where they were desired for aesthetic reasons and where the expense of these relatively small green random slates could be justified. There is no vernacular pattern to either of these slates and that may be the first test.

The second test, however, will be to differentiate between Bangor ton and queen random slates used specifically in Galloway and the regular sized Bangor tally slates which have been used in all districts. Likewise, the Kirkby roundhead slates used specifically in Galloway should not be confused with Westmorland green slates.

Nor should we confuse any of them with these limestone slates to be found on several properties in the Cour district of Kintyre. These are likely to be Purbeck slates from the south coast of England, no doubt brought in as part of the arts and crafts revival movement.

119

12.2.2 Asbestos Diamonds

NX412650 Newton Stewart Illus 120

When looking at sandstone slates reference was made to diamond-shaped slates used near Thornhill in Nithsdale (see illus 18) and on a small roof at Guthrie near Forfar (see illus 10). These latter slates are particularly like stone slates used by the Romans in Britain nearly 2000 years ago.

The diamond pattern slates shown in this photograph are made of asbestos fibres captured in a cement fabric, a material used far and wide as corrugated sheets on factory and farm buildings. These diamond pattern slates in Newton Stewart are of a variation known as 'Honeycomb slates', and were photographed in 1996. They were introduced early in the 20th century but lost favour during the 1930s, very few being used after the World War II.

However, the use of asbestos cement for slates continued, with several manufacturers making large double-lap slates of 24 x 12 inches (later 600 x 300 mm) surface coated with a smooth blue colouring, being light of weight. These slates have captured a significant part of the traditional roofing market for new buildings and are often used in domestic re-roofing. During the last 20 years the industry has turned its face away from asbestos fibres which are now banned. The slates are still popular, however, and are made with alternative mixtures of fibre avoiding asbestos.

120

12.2.3 Red Tiles in Strathpeffer

NH484585 Strathpeffer Illus 121a and 121b

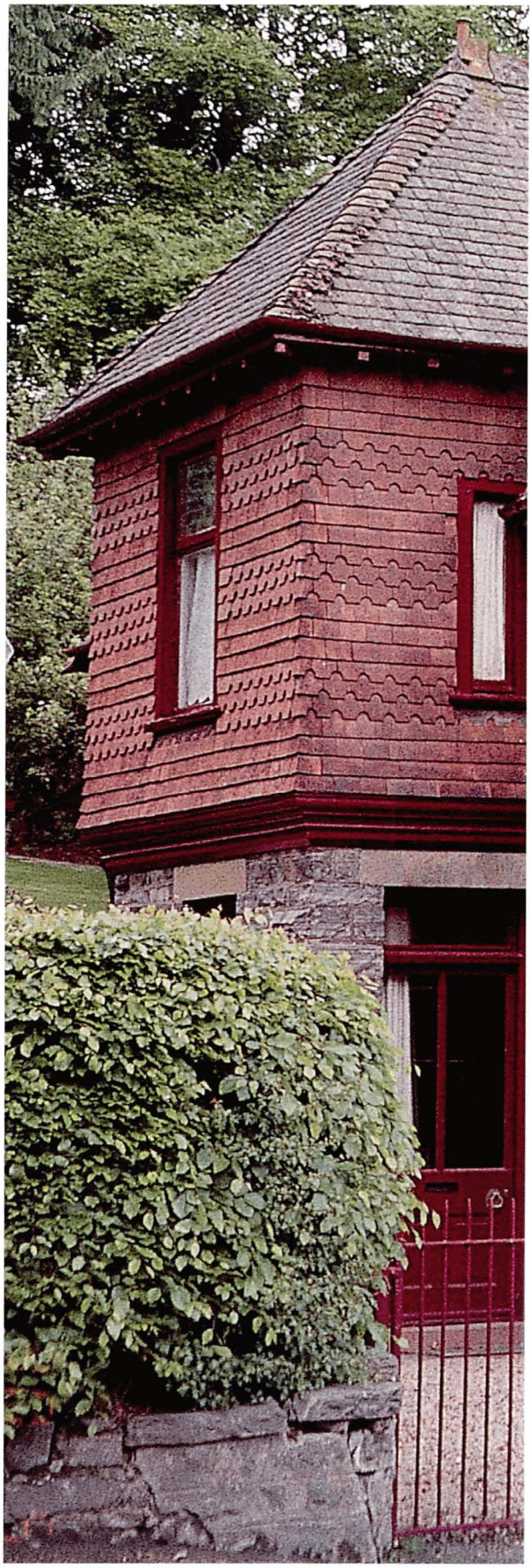
The house shown in this photograph, taken in Strathpeffer, has small Bangor tally slates on the roof but has a well kept first-floor cladding of clay plain tiles with alternating scalloped ornamental tiles. The neat painted detailing over squared rubble masonry gives a most convincing effect. These tiles, probably dating from the turn of the century, are of the 'Rosemary' type, the name being used in Scotland to describe this type of tile. There were a number of manufacturers in the Cannock area of Staffordshire making this type of tile, using the very strong Etruria Marl. Similar plain tiles were made in other areas where this clay could be worked. The main influx of plain tiles occurred just after the World War I when tileries were keen to find markets for the tiles being made in large quantities by men returning from the war.

121a

The fashion for red plain tiles commenced towards the end of the 19th century, replacing a previous passion for things 'blew'. This meant that tiles were not taken to such a high temperature in the kiln, so allowing the iron in the clay to remain red rather than vitrify to the blue that had been such an important part of blue brick manufacture associated with the construction of the railways.

Plain tiles are not a traditional roofing material in Scotland. Importing them was made possible by the railway network. Early plain tiles were hand made, then a tile bat system of hand pressing increased productivity. The tiles shown in this photograph may be of this latter type. Later tiles were completely machine-made. Both the pressed and the machine-made tiles have a sharp precise appearance.

All kinds of special 'fittings' could be made for plain tiles. On this roof there are vertical angle tiles, both plain and scalloped and, on the slated roof, most unusually, plain tile hips have been used to cover the piend junctions. They would normally be used one to each course of plain tiles and do not match the courses of slates.



121b

12.2.4 Red tiles in Peebles

NT252402 Peebles Illus 122a and 122b

This roof in Peebles represents late Victorian modernisation with the use of machine-made red tiles and ornamental ridges from Staffordshire. Similar tiles were used on hotels and golf clubs, etc, and later used on local authority housing, thus confirming their popularity on the Scottish roofing scene. Like the Bangor tally slates which they to a degree replaced, these tiles cannot be considered as a vernacular roof covering. The red single-lap tiles, mainly from the Continent, such as the CDN tiles (see illus 113b) which became popular during the 1920s and 30s cannot be considered as a vernacular roof covering either.

122a

122b

12.2.5 Red tiles in Oban

NM858303 Oban Illus 123

As if to rub the nose of the Lorn slate industry in the mud, this splash of red colour on the water side at Oban is about as out of place as any material could be. It says much for the strength of fashion that overtook building during the Victorian period that tiles from Staffordshire could be considered attractive on this domed-shaped turret.

From a practical point of view, red clay tiles are not easy to cut or hole and the amount of work involved in achieving this result must have been prodigious. The tiles are also cut to inadequate sidelaps and must rely on other measures to make the turret weatherproof. The ugly patch of green moss on the face of the stonework indicates that all is not well with the cast-iron box gutter.

123

12.2.6 Red tiles in Banchory

NO717965 Banchory Illus 124a and 124b

There remains a residual fashion for red tiles. Today, concrete tiles are manufactured with a variety of colour pigments or coloured surface coatings. On this pleasant group of buildings near Banchory these tiles are concrete bold roll, single-lap tiles which tend to give a faintly Mediterranean feel despite the attractive Scottish setting and well-manicured gardens. They make little or no attempt to replicate the handmade pantiles of the Lothians and Fife. In any event, they will change colour in a different way from handmade clay tiles

124a

Concrete tiles were made in Scotland by the Lowland Tile Company in the early twentieth century and a number of works continue with the manufacture of a variety of shapes of both single-lap tiles and plain (double-lap) tiles. Perhaps the most popular concrete single-lap tile has a flat face and is coloured to replicate slate in a dark grey colour when new. There can be no doubt that the cost of a roof covering of concrete tiles is significantly lower than other forms of slate and tile roofing, with the possible exception of single-lap clay tiles in modern machine-made shapes.

At the present time there is a discernible recognition of the value of roofs of natural slates. Greater quantities of slates are being imported from Spain, Brazil, China, Canada and the USA, but, at best, these roofs only imitate Welsh tally slates and rarely have the thickness and texture of native Scottish slates. Presumably, it is too much to expect new slate roofs to have diminishing courses and random widths, the real fingerprint of Scottish vernacular roofing.

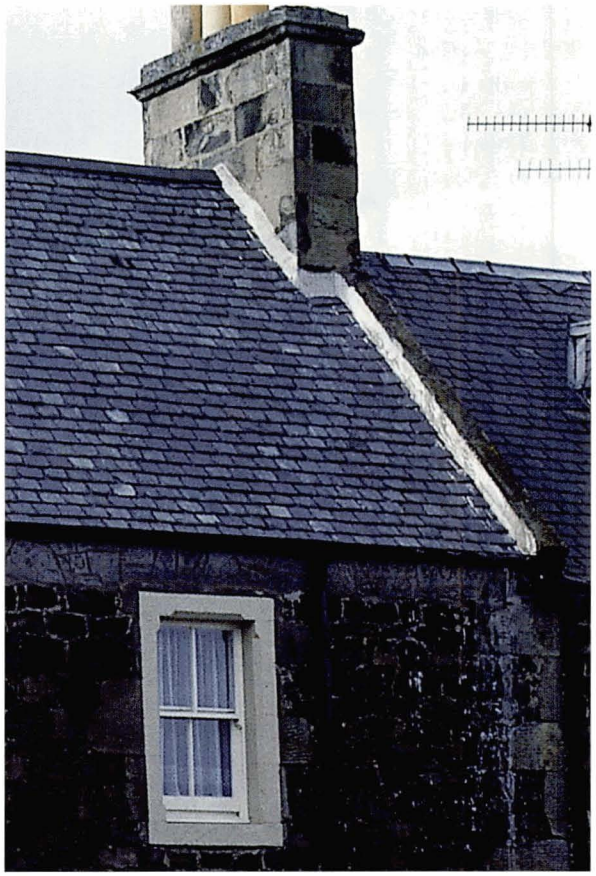
124b

12.2.7 Postscript on thatching

NO240116 Auchtermuchty Illus 125a and 125b

Aware of the long tradition of thatching in Fife with reeds from the Tay, the author visited Auchtermuchty and Newburgh and photographed a Victorian house with an old thatched roof. Later he stood on the banks of the river, looking across at the gold line of reed beds and thought of the scene, of men rowing a boat piled high with reed bales to satisfy the thatcher whose roof covering could only have been justified from a strong sense of tradition.

Some weeks later and 300 miles away, the developed slide film was returned, only to display that the thatched roof had been at the end of the reel, was half cut away and perforated with a series of holes. The author made a mental note to retake the photo when next in Auchtermuchty. Several years slipped by. It was 1987 before the opportunity arose to revisit and there in full view was a slate roof looking for all the world, except for the new cement, as though it was the original roof of the building. The only tell-tale was the roughly made up masonry under the eave, together with one rather disappointed photographer. However, a slater should have no complaint.



125a

125b

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GLOSSARY

Backer or Bachelor
A roofing slate which provides side lap in combination with a double width slate (Widebutt) enabling the number of slates in a course to be increased by one.

Blue (blew) slates
Roofing slates made from metamorphosed clay rock with slatey cleavage or where the low grade metamorphism is confused with original bedding planes.

Caber
A rafter or spar.

Centre nailing
A system of fixing roofing slates at their side edges which imparts mechanical advantage against uplift.

Couple
A pair of rafters connected by a collar in the shape of an A-frame.

Diagonal lap
A system of lapping roofing slates which combines head and side laps.

Diamond pattern slating
Where the visible edges of slating form a diagonal pattern.

Diminishing courses
Roofing slates of random sizes, sorted into lengths and arranged into groups of courses on the roof, where the visible length (margin) of each slate in each group of courses reduces upwards.

Double lap
A system of lapping roofing slates where the third slate course overlaps the first.

Eave
The bottom edge of a roof slope.

Fixed gauge
The interval between courses of slates or tiles, being predetermined, cannot be varied by the slater or tiler.

Flashing
An arrangement to weatherproof the change of direction or termination of a roof slope, usually using a sheet metal such as lead.

Folding
A term used by geologists to describe a reshaping of the deposition of rock formations due to techtonic or other pressures.

Gauge
The measured distance for each course of slates or tiles.

Grey slates
Random roofing slates made from thin sandstone flags.

Head fixed
A system of holding slates in position on the roof with a wooden peg or clout nail inserted through a hole in the top edge of the slate.

Head lap
Horizontal lapping of one course of slates over another (see Double lap)

Margin
The exposed area of a slate or tile when laid, particularly the distance between the bottom edges of adjacent courses.

Metamorphic rock
Sedimentary or igneous rock which has undergone change by heat or pressure such as slate, schist or gneiss.

Open slating
Regular sized roofing slates laid with vertical joints which are widened for economy and ventilation.

Pantile
A traditional design of clay tile which has an S-shaped profile.

Plain tile
A traditional design of clay tile which is basically flat.

Random slates
Semi-rectangular slates made without uniformity of size (see Diminishing courses)

Ridge
The top edge intersection of two roof slopes.

Sandstone
A sedimentary rock composed of cemented sand grains.

Sarking boards
Timber boards closely laid over rafters to form a sloping roof deck.

Schist
A metamorphosed rock composed of aligned micaceous minerals which can be split into thin layers, the recrystallised minerals being larger than in slate.

Sedimentary rock
A rock formed from an accumulation of mineral and organic fragments deposited by water, ice or wind.

Shale
A fine grained laminated sedimentary rock formed of compressed layers of clay.

Sheet lead
The metal lead in sheet form.

Sidelap
The overlap caused by the staggering of successive courses of roofing slates when laid.

Single lap
A system of lapping the courses of tiles where the second overlaps the first.

Sizeables
A traditional expression used to describe medium to small random Scottish slates.

Skew
The junction between a roof slope and a gable parapet wall or the edge of slating at a verge.

Slate
(i) A metamorphosed argillaceous or clay rock which can be parted along planes of slatey cleavage.

(ii) A flat piece of natural or manufactured material used in combination to cover roofs.

Slatey cleavage
A close basal cleavage present in compressed minerals which produces an ability to be split regardless of bedding planes and resulting mainly from techtonic metamorphism.

Tally slates and slating
Slates and slating of one specific size (not random) – a traditional term taken from tallage which, in this sense means; slates sold by count rather than weight.

Ton or Tun slates
Large thick random slates (usually Welsh) sold by weight rather than by count.

Undersized
A traditional expression used to describe the smallest grading of random Scottish slates.

Variable gauge
The gauge and head lap of slates or tiles which may be altered at will by the slater or tiler when setting out the courses of a roof.

Vaulting
(i) A system of continuous arched stonework formed within a building.

(ii) A lapping system using thick ashlar slabs of stone to create a roof covering for solid masonry.