

Scottish yetts and window-grilles

Alastair M T Maxwell-Irving*

ABSTRACT

More than a century has passed since Christison made his study of Scottish yetts. Since then further yetts have come to light. This paper is a summary of the research carried out by the writer into Scottish yetts and window-grilles: when they first appeared, how they were constructed, and where they are found. After citing some early references to yetts and window-grilles, the paper discusses their distribution, and especially the fact that the same method of construction is also found in Venice and the Tyrol but, with one exception, apparently nowhere else. The question of where this method originated, and how it travelled, is discussed. Three yetts not known to Christison are described. This is followed by details of the various methods of construction, with some comments on the draw-bars used to reinforce yetts in use. Finally, there is a metallurgical analysis of a yett made c 1501 and a schedule of all the yetts described by Christison.

INTRODUCTION

David Christison's two papers on 'The Grated Iron Doors of Scottish Castles and Towers', published by the Society in 1883 (Christison 1883) and 1888 (Christison 1888), are still, after more than a hundred years, the standard works on that subject. He described in great detail the construction of 46 examples of 'grated iron doors', or 'yetts' as they are known in Scotland (Appendix 2), and amplified the descriptions with many fine line-drawings, which are often clearer than modern photographs. He also pointed out that the method of construction used in Scotland is not found across the Border in England, or apparently in France,¹ but it is found – albeit only in window-grilles – in northern Italy and the Tyrol. He did not, however, touch upon the subject of window-grilles as such.

It is not the purpose of this paper to cover the same ground again, but to look further into the historical background, including some details of the window-grilles to be found in northern Italy and the Tyrol; to investigate certain aspects of the subject of yetts and iron grilles in more detail; and to raise some questions for which there do not appear at present to be definitive answers.

EARLY EXAMPLES

The earliest known reference to a yett appears in 1377, when an item for 'iron for the fabricated iron gate' at Edinburgh Castle appears in the Exchequer Rolls (Exch Rolls II, 554). This formed

* Telford House, Blairlogie, Stirling FK9 5PX

part of the defences for David's Tower, a new L-plan tower-house built by David II between c 1368 and 1379 (RCAHMS 1951, 3, 15–18). It was about this time that Archibald 'The Grim', the powerful 3rd Earl of Douglas, built the great tower-castle of Threave in Galloway. Threave was one of the earliest tower-houses, and it is perhaps significant that its windows were still provided with stone mullions and transoms, rather than iron grilles.

It is generally accepted that the yett was introduced as a simpler and more practical alternative to the cumbersome portcullis for the new tower-houses.² There is said to have been a yett at Craigmillar, built by Sir John Preston soon after 1374, while Doune Castle, which was built by the Duke of Albany in 1380, still retains its double-leaved yett at the entrance. Balvenie has a double-leaved yett of similar type, but its date is less certain.

References to yetts at this time are almost exclusively found in Scottish records. An interesting exception is found in an English report of 1416 concerning the defences at Roxburgh Castle, at that time in English hands. Having been commissioned to survey the condition of the castle, Sir John Claveryng and Robert Harbotell recommended that 'the castle should have 2 iron gates, one at the entrance and one at the dungeon called Douglase tower' and also, 'There are 2 posterns on Teviotside which should have iron gates' (Bain V, No 953).

During the 15th century, references to the use of iron for the 'fabric' and yetts of castles and towers become increasingly common. In 1416 'stones, iron and wood' were supplied for 'the fabric of the tower of Invernys' (Exch Rolls IV, 225); in 1438 Spanish iron was supplied 'for the iron gates and other necessities' at Edinburgh Castle (Exch Rolls V, 36); and in 1466 the repair works at Dunbar Castle included 'an iron gate' (Exch Rolls VII, 401). By the latter date, yetts and window-grilles had become standard features of any new tower, as the surviving examples, or the empty rebates and sockets that once held them, amply testify.

When John Dundas of that Ilk was granted the island of Inchgarvie by James IV in 1491, he was also given the power to fortify a castle or fortalice there 'with bars of iron' (Reg Mag Sig II, No 2038). Similarly, when John Chene of Esslemont was granted a licence to build a tower on his lands in 1500, he was also empowered to 'mak thairapon irm zettis' (Reg Sec Sig I, No 552); in 1501 John Murray of Cockpool was granted a licence to build the tower of Comlongon and 'to mak apone the sammyn machcoling, corbalsalze, irnezettis and windois', etc. (Reg Sec Sig I, No 692); and in 1511/12 Robert Bruce of Auchenbowie was granted a licence to build his tower and fortalice of Carnock 'with irm zettis' (Reg Sec Sig I, No 2360).

The yetts at Dunbar again feature in the accounts of the Lord High Treasurer for May 1497 (Treasurer Accts I, 334–5), when 17 waw³ 8 stone and 3 lb of iron were provided for 'the zet of Dunbar' for £24 15s 1d. It is not clear, however, whether this was for 'iron' gates or the reinforced wooden ones, as 660 'zet nalis and dowbil byspikaris' and 100 'seme and ruffis' were supplied for 'the zettis of Dunbar' at the same time.⁴ In 1501 there is a further entry for 'iiij waw of irne to be irne windois to Dunbar' (Treasurer Accts II, 86), and three months later five shillings were paid to 'ane smyth to pas to Dunbar to tak the mesure of certane windois the King commandit to mak thare of irne' (Treasurer Accts II, 107).

DISTRIBUTION

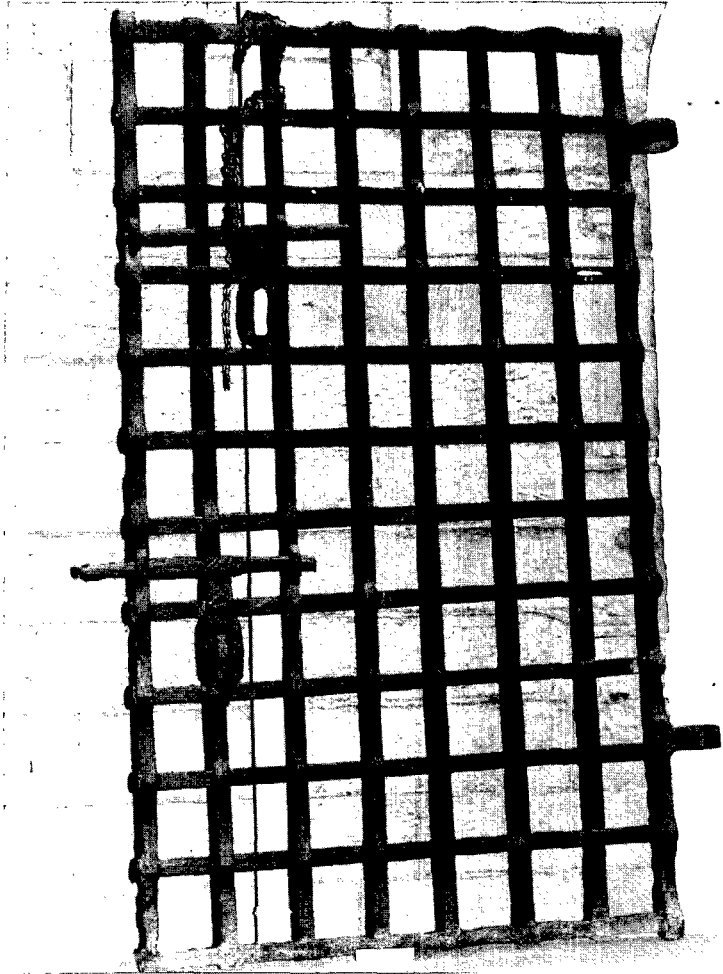
Despite Christison's reference to the fact that 'grilles constructed exactly like our Scottish examples' existed in northern Italy and the Tyrol (Christison 1883, 135), most writers on Scottish castles and tower-houses still perpetuate the belief that the method of construction of the Scottish yett is peculiar to Scotland (RCAHMS 1920, Ixiv; Mackenzie 1927, 99). Certainly, Scotland is the only place where this distinctive method of construction is known to have been used for gates or



ILLUS 1 Window grilles, Prigioni Nuove, Palazzo Ducale, Venice

doors, and it is here that the earliest known examples of this type of grille would seem to have survived. It is surprising, however, that so few visitors to Venice have apparently noticed that many of the window-grilles of the Palazzo Ducale, or Doge's Palace, one of the foremost attractions of the city, are constructed in exactly the same way (illus 1).⁵ Thus, there is the suggestion of a connection, either direct or indirect, between the grated windows of Scotland and those of the Venetian Republic during the later Middle Ages. This type of grated window was, in fact, already traditional in the Tyrol at least a century earlier, so it seems likely that it was from there that the particular craft spread south to Venice. Not only did the Tyrol adjoin the Venetian Republic, but the Brenner Pass through the Alps was a popular route for German merchants trading with Venice. There was trade between Scotland and the German ports, but the mechanism by which the technology may have spread, and when this might have taken place, are both unclear.⁶

Nearer home, it is surprising how completely the method of construction of iron doors changes at the Border with England. Christison cites the examples of Bywell Castle (Christison 1883, 132–3), in Northumberland, and Naworth Castle (Christison 1883, 134) and Burgh-on-Sands (Christison 1883, 131, 134) in Cumbria. There is, however, one notable exception that has come to



ILLUS 2 Yett from Streatlam Castle, County Durham.
(Copyright: Bowes Museum)

the writer's attention. It is a yett from Streatlam Castle that is preserved in the Bowes Museum at Barnard Castle.

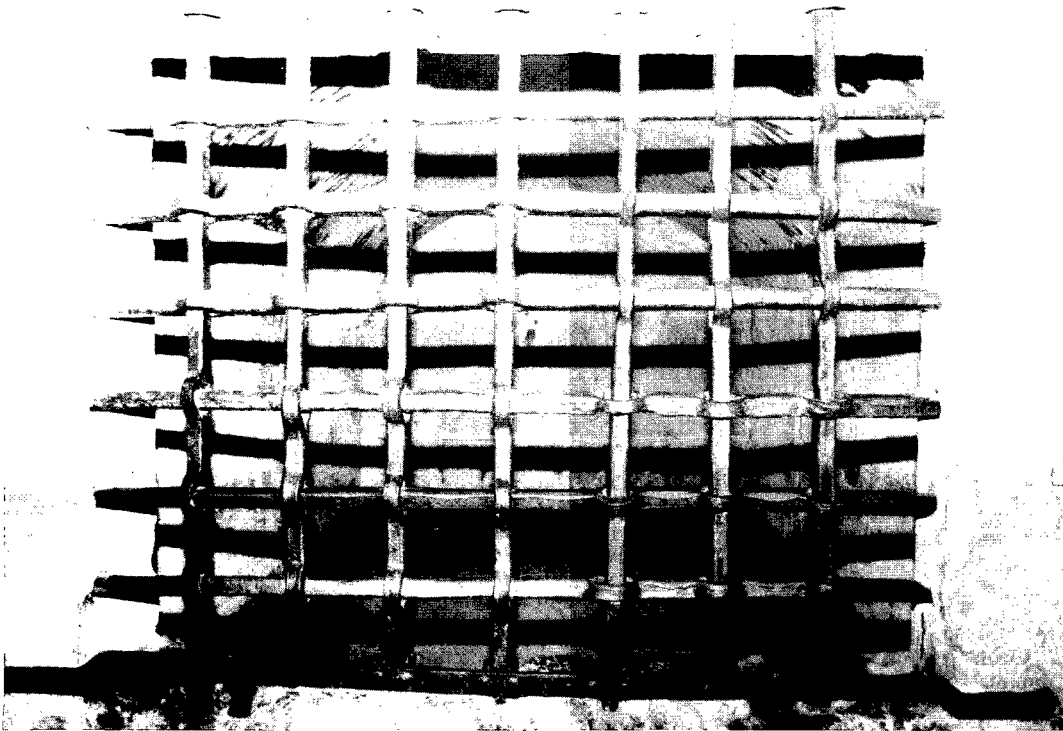
Streatlam, which is three miles north-east of Barnard Castle, in County Durham, came into the possession of the Bowes family, c 1310, by the marriage of Sir Adam Bowes to the heiress of Streatlam, Alice Trayne. Little seems to be known of the original castle, which was rebuilt 'from the ground' in the French style by Sir William Bowes in 1432. In that year Sir William returned from France, where he had been chamberlain to the Duke of Bedford, Regent of France. Streatlam was destroyed again in 1569, when it was besieged by the rebel northern earls, while its owner, Sir George Bowes, was holding Barnard Castle for Queen Elizabeth. It was rebuilt soon afterwards. The yett (illus 2) may well have formed part of this work. It has 10 horizontal and six vertical bars within the outer frame, and measures 1.8 m high by 1.01 m wide overall; it is fitted with two hinges and two

bolts. Several of the family had connections with Scotland at this period, and Sir George had himself seen active service across the Border, as well as having held the post of Marshal of Berwick for a time (Dict Nat Biog, 196). The castle was finally demolished in the mid-1950s.⁷

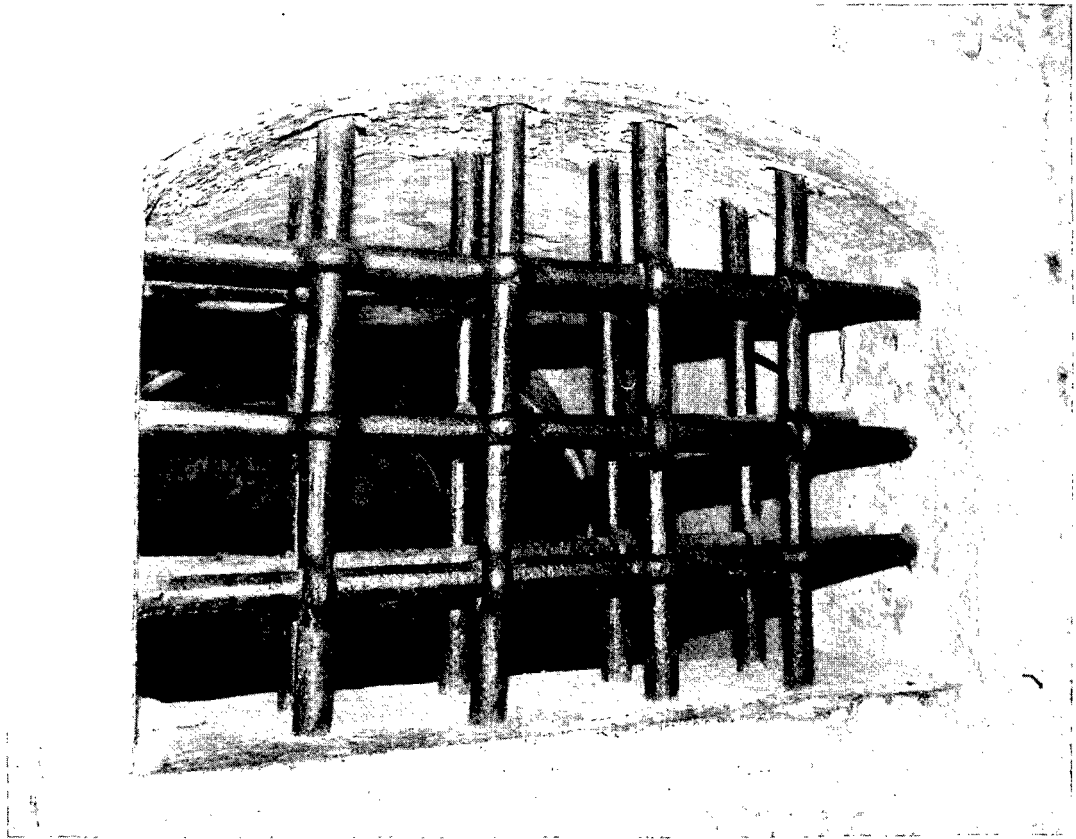
One place where one might have expected to find yetts outside Scotland is Ulster, where, after 1607, James VI was pursuing a policy of settling English and Scots families on lands confiscated from their former Irish owners. These were the 'planters', whose sudden introduction into a potentially hostile environment made the building of 'strong houses' very much a necessity. The Scots families thus settled wasted no time in building themselves tower-houses along a combination of traditional Scottish and Irish lines, with barmkins (or 'bawns', as they are known in Ireland), vaulted basements, gun-loops, corbelled-out turrets and wings.⁸ The only feature that seems to have been missing was the yett, of which no examples are known.

PALAZZO DUCALE, VENICE

The most obvious examples of grilles constructed in the Scottish manner at the Palazzo Ducale are to be found in the Prigioni Nuove, or 'new prisons', built during the second half of the 16th century. The Prigioni Vecchie, or 'old prisons', were situated in the old palazzo; they comprised the 'pozzi' (literally 'wells'), a group of 18 windowless cells just above water level, and the more civilized 'piombi', which were housed just beneath the roof. When these became inadequate for

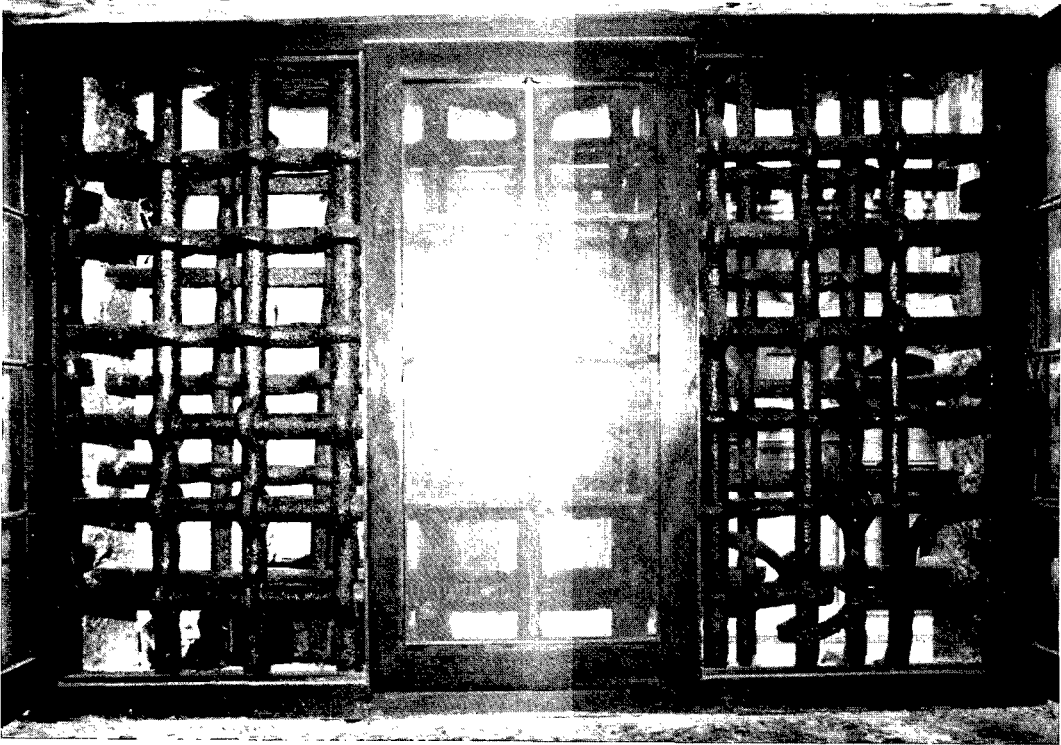


ILLUS 3 Grille of vaulted cell, Prigioni Nuove, Palazzo Ducale, Venice



ILLUS 4 Window grille, Prigioni Nuove, Palazzo Ducale, Venice

the needs of the rapidly expanding state, a new building, the Prigione della Paglia, or Palazzo delle Prigioni, was built to the east, across the Rio della Canonica and fronting the Riva degli Schiavoni. Begun by Giovanni Antonio Rusconi (d.1599) in 1566, it was continued by Antonio da Ponte (1512–97) and Antonio Contin (1566–1600), and completed by Tomaso Contin just before his death in 1614 (Franzoi 1990; Hibbert 1988, 372). It was connected to the Palazzo Ducale by the famous Bridge of Sighs, built c 1602. Within this building were the Prigioni Nuove, a whole series of vaulted cells with small wooden doors, each strongly built with two large strap-hinges and two substantial bolts, and heavily gridded windows (illus 3). The latter were constructed in the Scottish manner, the only difference being the unusually massive size of the bars used for some of them (illus 4). Whereas the average section of the bars is about 43 mm square, some measure as much as 88 mm in diameter and are forged in the same way. In addition, all the windows fronting the canal and certain other ones that were considered vulnerable for escape were backed up by a second grille, often arranged so that its bars fell midway between those of the first grille (illus 5). Despite these precautions there must have been a number of attempts at escape, as shown by the rather crude attempts at repair (illus 1, 5).⁹



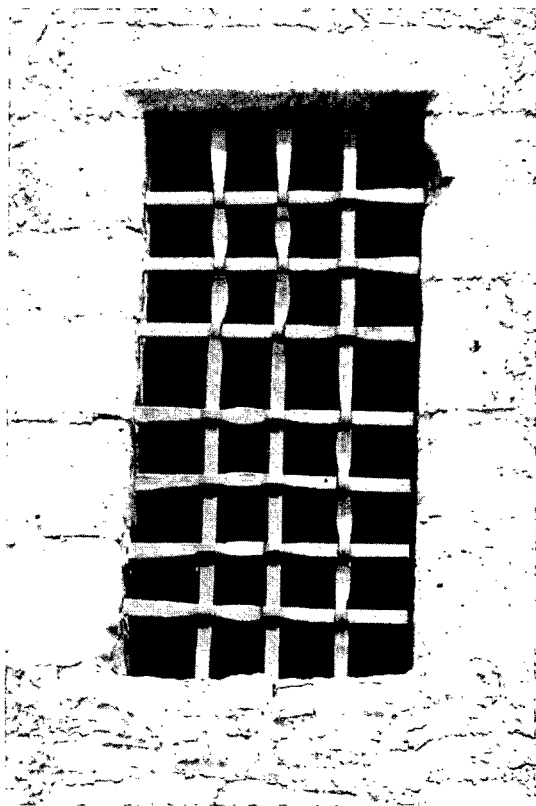
ILLUS 5 Window grille, Prigioni Nuove, Palazzo Ducale, Venice

The south range of the main palazzo was originally completed by 1404; it has been altered, extended, and in part rebuilt – after disastrous fires in 1574 and 1577 – at various times since then, making it very difficult to be precise about the dates of some of the features.¹⁰ The offices on the first floor are of particular interest for the grilles that adorn their large windows. Some of these are of the conventional type built into the window frames, while others are of the cage variety that project beyond the wall-face, like those at Elcho in Perthshire and Tolquhon in Aberdeenshire. The majority are constructed about a central point in the usual Scottish manner, with the bars horizontal and vertical. Some of the inserted ones, however, are quite different, in that the bars are arranged diagonally, with all the ‘eyes’ in the bars that slope one way and nothing but plain bars running the other way. The dates of these grilles have not been ascertained, but it is assumed, from their condition and method of fitting, that the latter are relatively modern.¹¹ The method of construction is discussed below.

Although the window-grilles are clearly related to those found in Scotland throughout the later Middle Ages, there are no known examples of iron yetts in Venice.¹²

THE TYROL

Window-grilles constructed in the Scottish manner have long been traditional in the Tyrol, where wrought ironwork has been a local craft since the Tyrol was part of the Holy Roman



ILLUS 6 A typical Scottish window grille, at Comlongon Castle, Dumfriesshire

Empire. Indeed, although there are no examples of iron yetts as such in the Tyrol,¹³ it could have been here that this method of construction for iron grilles was originally conceived, though no tangible evidence has so far come to light to substantiate such a theory. The only significant difference between the grilles found in the Tyrol and those found in the prisons of the Palazzo Ducale in Venice is that the latter are very much more massive, and thus would have been very much harder to forge. A peculiarity of some of the Tyrolean grilles, usually those of later date, is that the bars are pierced diagonally across the section (illus 7), instead of squarely through the middle.

In the entrance hall of the Tiroler Volkskunstmuseum in Innsbruck, there is an iron grille of this form on display as a typical example of the ancient craft (illus 8).¹⁴ It came from somewhere in the south Tyrol, now part of Italy, and is believed to date from the latter half of the 15th century.¹⁵ It is one of the museum's treasured possessions, though, regrettably, the museum does not know from what building it came. Grilles of this kind have, however, survived in the upper windows of the Kaiserturm, the massive central tower of the Festung, or fortress, at Kufstein in the Inn valley (illus 9), and there are other examples surviving at other castles and towers in the Tyrol.¹⁶ Some of the grilles at Kufstein are also doubled up (ie there is an inner and an outer grille), as in Venice, for extra security. Kufstein was captured from the Bavarians by the Emperor

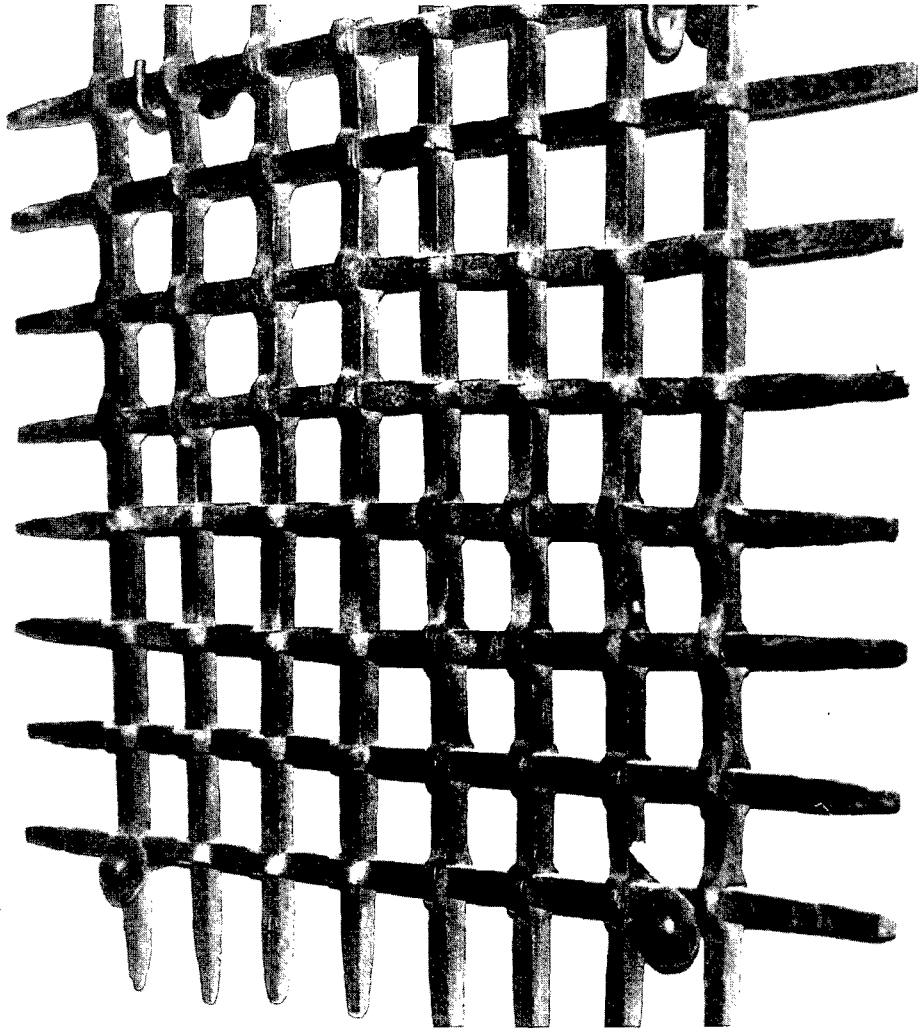


ILLUS 7 Window grille, Residenz, Salzburg, the bars pierced diagonally across the section

Maximilian I in 1504, and annexed to Tyrol. He started building the Kaiserturm in 1518, the year before his death, and it was completed in 1522.

The writer has seen another example in the village of Söll, on the road from Innsbruck to Salzburg. It is in one of the basement windows of the Postwirt Hotel, the oldest hostelry in the village. There has been an inn on the site at least since the 13th century, and the present building is said to date from the end of the 15th century; but it is doubtful whether the present window is that old.¹⁷ Similar grilles are also to be found inside the ancient chapel on top of Hohe Salve (1827 m), the mountain immediately to the south.¹⁸

Another place where this type of grille may be seen is Salzburg, just east of the Tyrol, where it is found in the Festung (fortress) and the Residenz (bishop's palace). At the former, the grilles are incorporated in work undertaken by the Prince-Archbishop Leonhard von Keutshach between 1495 and 1519, contemporary with the fortress at Kufstein. The Residenz, however, is a very different building. Begun in 1595 by the Prince-Archbishop Wolf Dietrich von Raitenau, this palatial building exhibits the same Italian influence that dominated his whole, ambitious building programme in the city. The grilles, however, which are in the lower floor windows (illus 7), are not Italian, but are clearly the work of craftsmen who were either from, or influenced by, the metalworking traditions of the neighbouring Tyrol.



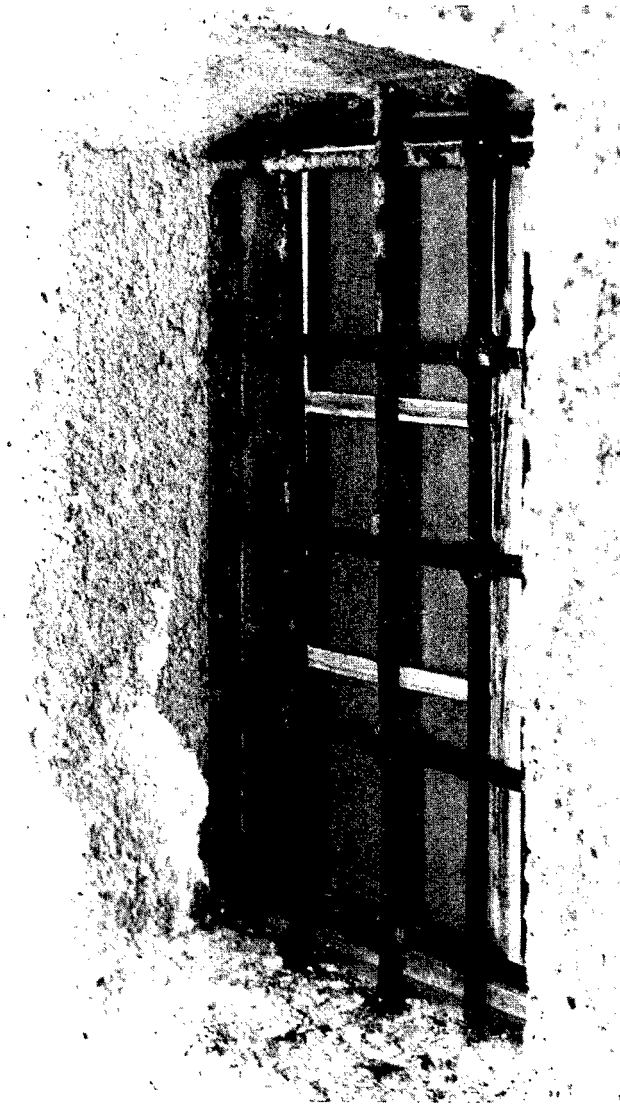
ILLUS 8 Grille from southern Tyrol (*Tyroler Volkskunstmuseum, Innsbruck*)

ADDITIONAL EXAMPLES

The writer is aware of three yetts in Scotland not mentioned by Christison; there may well be more. One of these, at Lochwood Castle, Dumfriesshire, was discovered only in 1986, when the site was excavated and all the fallen rubble removed. Beneath this, the yett was found still *in situ*.

BARJARG TOWER (DUMFRIESSHIRE)

Barjarg is an L-plan tower that is believed to have been built by Thomas Grierson in, or soon after, 1587 (Maxwell-Irving forthcoming). Its yett was originally situated inside the entrance doorway in the more usual manner, but when the tower was modernized and extended in more recent times, the yett was moved to the outside (illus 10). At the same time the bottom bar was cut off, presumably to

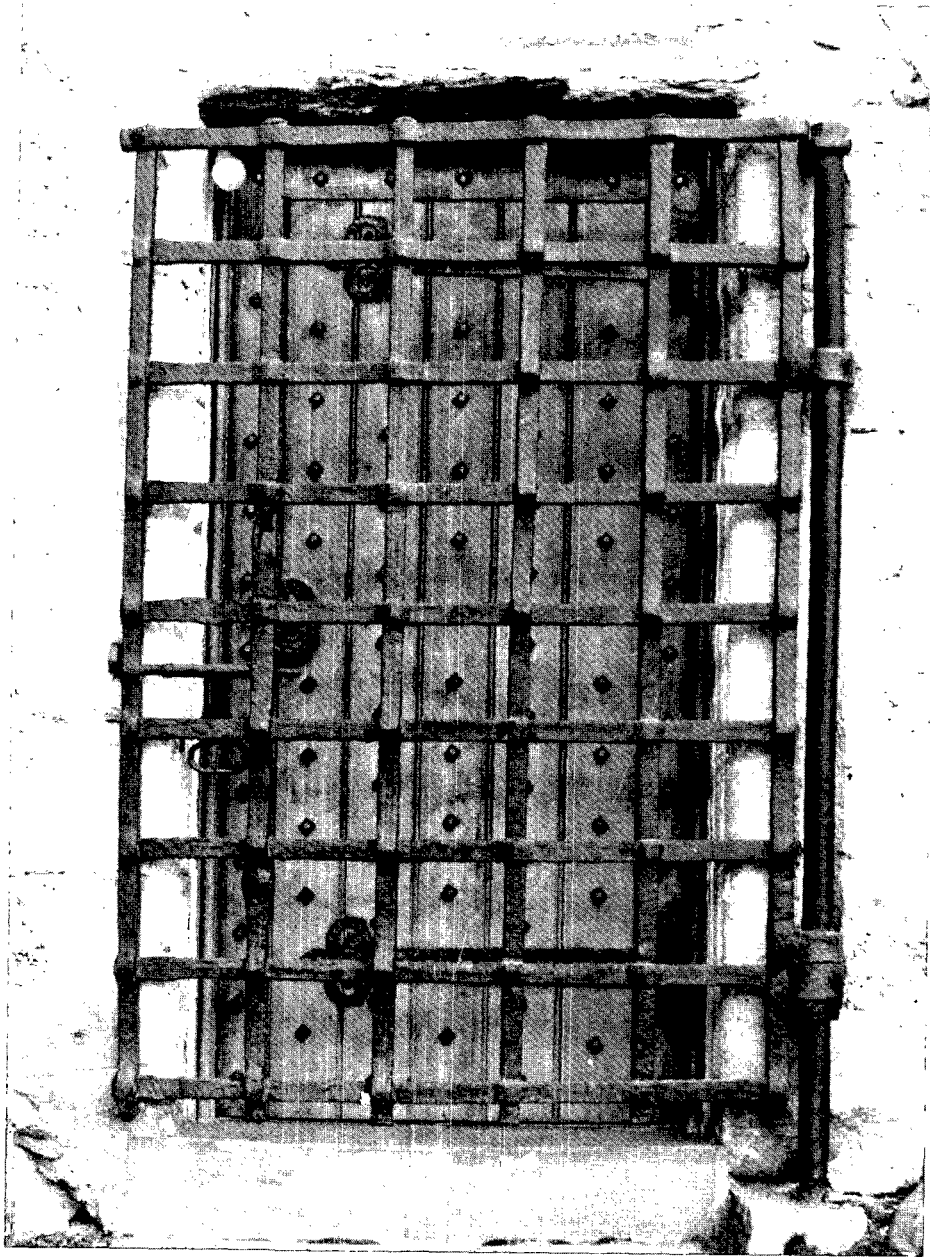


ILLUS 9 Grille from the Kaiserturm, Festung Kufstein, Tyrol

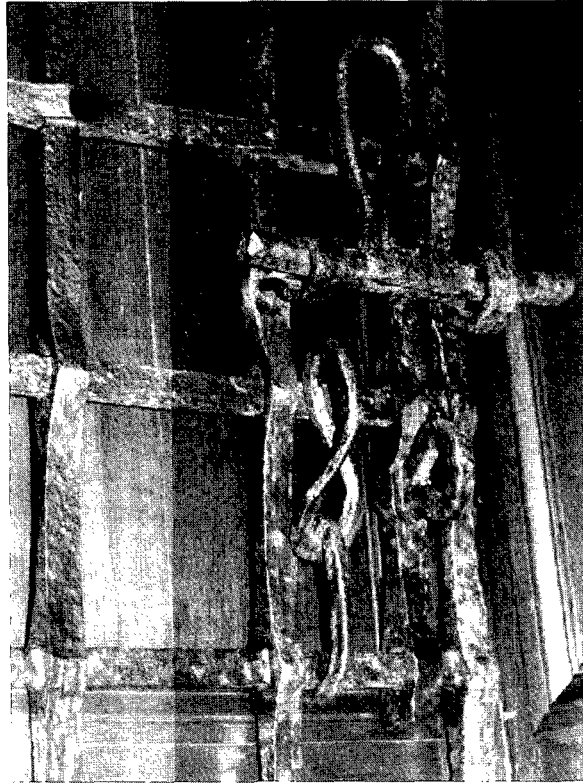
facilitate its removal. It originally had eight horizontal and four vertical bars within the outer frame, and measured 1.17 m wide by about 1.85 m high overall. It has two hinges. The original bolts are missing, and have been replaced by a modern one. Because the entrance hall has been completely modernized, there is no visible evidence of either the old hinges or provision for a draw-bar.

LOCHWOOD CASTLE (DUMFRIESSHIRE)

When the castle ruins were excavated in 1986, the old yett was found still on its original hinges beneath the rubble, although the whole of the lower part had corroded away and part of the



ILLUS 10 Yett, Barjarg Tower, Dumfriesshire



ILLUS 11 Detail of bolt of yett from Lochwood Castle, Dumfriesshire

doorway itself had fallen. The yett guarded the entrance to the L-plan tower at the south-east corner of the site, and was situated immediately behind the outer, wooden door, itself missing. It has five vertical bars and appears originally to have had seven horizontal bars within the outer frame.¹⁹ It was provided with the usual two hinges, but there appears to have been only one bolt, which has survived complete (illus 11). In addition, there are two links of chain fastened immediately below, which may have provided an additional fastening over the staple before the padlock was put on.²⁰ When complete, the yett measured 1.3 m wide and about 2.01 m high. According to photographs taken at the time of the excavation, the S, or hinge, jamb had neither slot nor landing place for a draw-bar.²¹

The date of the tower at Lochwood is not certain, as the whole site had been in continuous occupation since the 12th century. It is known from a datestone and the initials of Sir James Johnston and his spouse, Dame Sara Maxwell, that the upper part of the tower was either repaired or modified in 1603, but the basement at least belongs to the late 15th or early 16th century (Maxwell-Irving 1974, 26–9; Maxwell-Irving 1990, 94–5). There is a detailed account of the capture of the castle by the English in 1547, which makes specific reference to the yett. The following is an excerpt:

We came there about an hour before day ... about a dozen of the men got over the barnekin wall, and stole close into the house within the barnekin. ... At sunrising, two men and a woman being in the

tower, one of the men rising ... and going to the tower head, and seeing nothing stir about, he called on the wench that lay in the tower, and bade her rise and open the tower door ... She so doing and opening the iron door, and a wood door without it, our men within the barnekin brake a little too soon to the door; for the wench, perceiving them, leaped back into the tower, and had gotten almost the wood door to, but one got hold of it that she could not get it close to; so the skirmish rose, and we over the barnekin and broke open the wood door, and she being troubled with the wood door left the iron door open, and so we entered and won the Loughwood.²²

OLD LECKIE HOUSE (STIRLINGSHIRE)

The oldest part of Old Leckie is an L-plan building dating from the second half of the 16th century.²³ It comprised a main block with a vaulted basement and kitchen, and a wing with a stair connecting the ground and first floors. Above this level the wing contained additional accommodation, while a corbelled-out stair turret in the re-entrant angle rose to serve the upper floors. This much is conventional: the entrance, however, is not. Situated in the re-entrant angle of the wing, it is not flush with the outer wall face in the usual manner, but is set back 0.9 m, while a massive segmental arch, 3.05 m wide, carries the wall above. Penetrating this arch above the door are two machicolations, now blocked, which were operated from a small guard chamber in the wing above. Further protection was provided by a splayed gun-loop in the sill of a window adjacent to the door and a spy-hole that overlooks the door from the wall of the main block.

The yett itself is mounted on two massive hinges immediately behind the outer, wooden door (illus 12). It measures 1.2 m wide by 2.05 m high, and is made up of 11 horizontal and seven vertical bars. It was secured by two bolts, each of which fastened over a staple. There was no drawbar: instead, there is evidence in the side walls of provision for two reinforcing bars of wood or iron, which must have been secured in a similar manner to those at Isle Tower in Dumfriesshire (see below).

METHOD OF CONSTRUCTION

How the Scottish form of iron grille first came to be made, either as a yett or a window-grille, and who conceived the idea, and where, remains a mystery. Whilst swords and daggers were evolved over several thousand years of progressive development, the iron yett seems to have arrived almost overnight. It is also likely that the iron yett was the inspiration of a particular blacksmith, as it is hard to envisage that anyone other than a skilled smith could have conceived such an idea as a practical proposition. As the iron yett seems to have been confined to Scotland, it is reasonable to assume that, at least in that form, it was also devised here.

The earliest yetts and window-grilles were forged from wrought-iron bars, using two bars beaten together in a forge to form each finished bar.²⁴ This is how the eyes were achieved, not by punching a hole through the bar on a swage block and then opening it out, as was done for many of the later grilles²⁵ and more recently for reproduction yetts. Christison illustrates one method of construction, where the bars were pre-formed with eyes one end and a straight bar the other. With this arrangement, the bars were then slid together, clamped within an outer frame, and were then closed up by beating the heated eyes until they fitted snugly around the adjacent bars (Christison 1883, 119). This is also how reproduction yetts are normally assembled. But some could not have been made in this manner, as the bars are crooked and uneven, which is unlikely to have been the case if they had all been pre-formed (eg Christison 1883, 112). In these cases the bars would appear to have been forged onto the grille, one at a time, working outwards from the symmetrical



ILLUS 12 Yett, Old Leckie House, Stirlingshire

centre; and this method of construction may have been the more usual for grilles made before the late 16th century.²⁶ It is also the only way in which the outer frame, hinges and bolts could have been fitted. Many of the old grilles in Venice were made the same way, forging two bars together, regardless of the massive size of some of the bars or whether the finished bar was round or square in section.

Many years ago the writer was given a piece of bar that had corroded off the yett at Comlongon. This dates from c 1501, when the licence to build the great tower-castle of Comlongon was granted (Reg Sec Sig I, No 692). This was recently subjected to close examination

by a metallurgist, whose findings are given in Appendix 1. The sample clearly demonstrates how the bar was forged from two individual bars, and, despite the erratic consistency of the raw material, how effective the finished bond was.

The weight of each yett would seem to preclude the possibility that they were transported any great distance. Although the weight of the yett found at Lochwood was not recorded, it is said to have taken five men to move it into its present position in Raehills House, despite its incomplete state! It is also noted that, like the towers in which they were housed, each yett, whilst conforming to the same general principles, was nevertheless unique in size and layout. There is, thus, no evidence to suggest a market for prefabricated parts. The yetts must, therefore, all have been made locally, though whether by local blacksmiths or itinerant specialists remains an open question. The difficulty in handling a complete yett in a furnace can be imagined.

DRAW-BARS

In the case of almost every yett, there was either a draw-bar, or a similar arrangement, for reinforcing the yett, usually from behind. These were discussed by Christison at some length. In a few instances, such as Isle Tower in Dumfriesshire, iron bars slotted into place behind the yetts (Christison 1883, 107); in the majority of cases, however, there was one or more substantial slots, or 'tunnels', in the wall immediately behind, into which the reinforcing bar could be pushed for storage when not in use. These bars were either built into the slots, or inserted before the opposite jamb was built; once the doorway was complete they could not be removed.

Some of these slots appear to have been very crudely finished, surprisingly so if the wooden or iron bars were to slide smoothly. The answer may well lie in something that is now missing, apart from the bars themselves. When the remains of Borthwick Castle, near Duns, were excavated in 1979, fragments of a wooden lining held together by iron nails were found at the innermost end of one of the drawbar slots. The wood was worm-eaten, and the nails had almost rusted away, but there was no doubt at all that the slot had originally been lined with wood (Maxwell-Irving 1982, 434). How many others, one wonders, were similarly lined? Christison remarked that at both Doune and Castle Menzies the slots are much larger than would appear necessary for the (surviving) iron drawbars (Christison 1888, 293),²⁷ although at Tilquhillie the slot is just large enough (c 50 mm square) to accommodate the (surviving) iron bar (Christison 1888, 303). Perhaps the long-held belief that most draw-bars were of wood – which could burn – is incorrect, and the relatively large size of many of the slots was necessary to accommodate a wooden lining.²⁸

APPENDIX 1

ANALYSIS OF THE YETT AT COMLONGON

The fragment of yett from Comlongon Castle was sectioned and analysed by Kevin Evans, Chief Metallurgist at Weir Pumps Ltd. The following is a précis of his report:

Chemical composition (average): Iron 99.19% (approx.); Carbon 0.37%; Silicon 0.20%; Manganese 0.11%; Phosphorus 0.06%; Sulphur 0.02%; Others 0.05% (approx.)

A section through the sample is shown in *illus 13*, in which the forged join between the two bars is clearly visible.

Structure: Photomicrographs, taken progressively across the sample at x150 magnification, are shown in



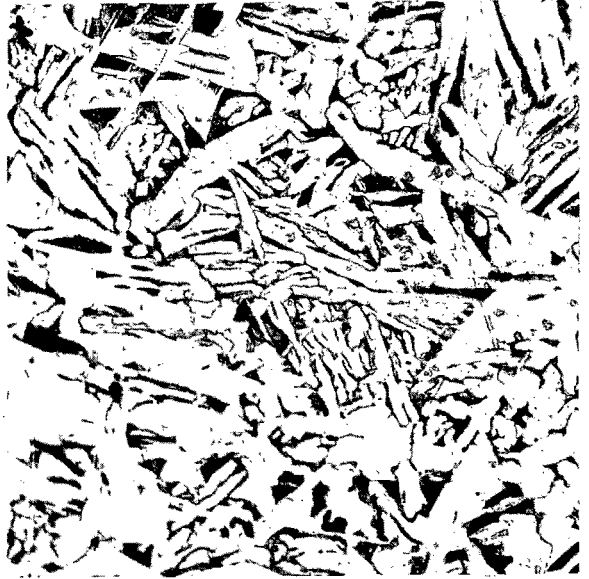
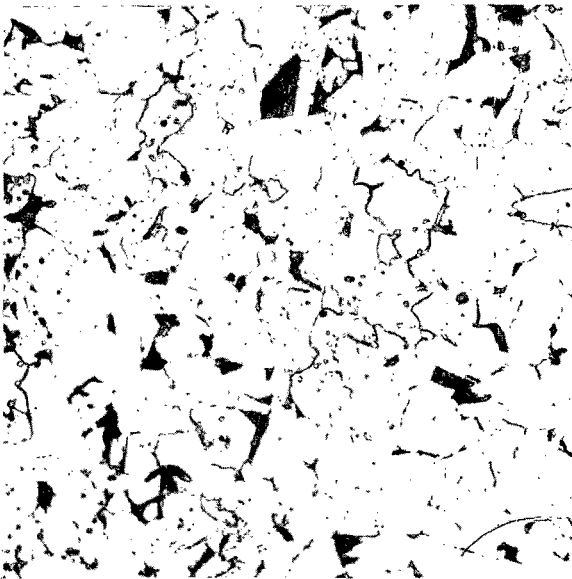
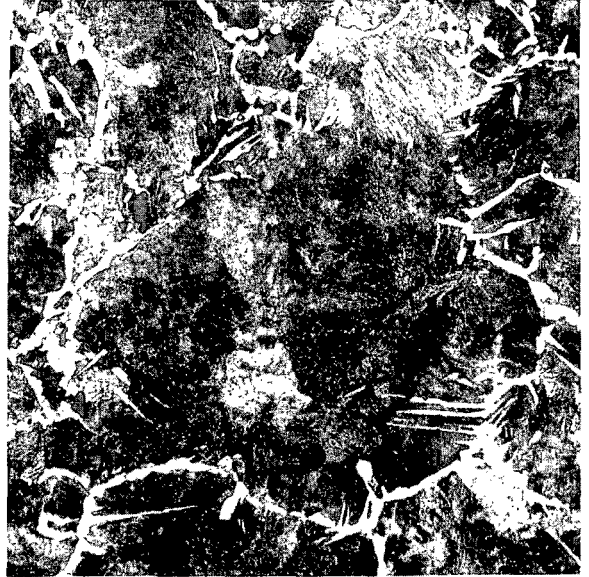
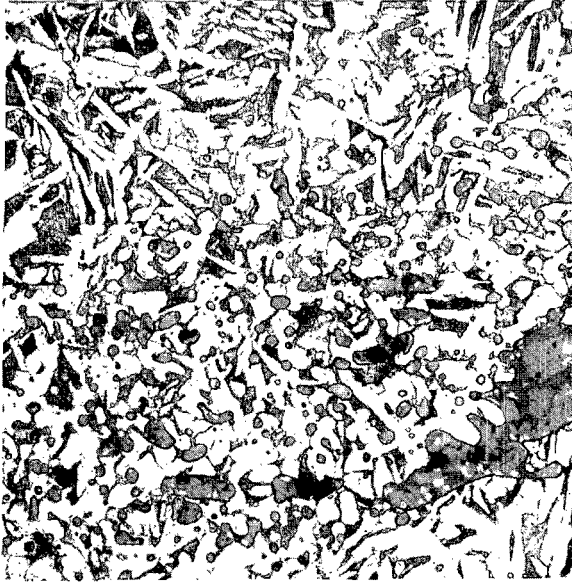
ILLUS 13 Section of bar from Comlongon Castle, Dumfriesshire. The forged join is clearly visible down the middle

illus 14. These show how the structure changes across the sample, partly due to the lack of homogeneity of the raw iron and partly due to the forging process itself:

(a) Outer edge of bar: A hypoeutectoid iron with a Widmanstatten ferrite structure (white) and a coarse pearlite (dark) phase. Also present is iron oxide (grey) that appears to overlap the matrix structure.

(b) $\frac{1}{2}$ of the way from edge: An increase in carbon and/or manganese due to segregation has altered the eutectoid composition such that the proportion of pearlite to ferrite is higher than would be anticipated from the Fe-C equilibrium diagram. The structure shown consists of Widmanstatten ferrite (white) precipitating at the prior austenite grain boundaries with the remaining austenite transforming to eutectoid pearlite.

(c) $\frac{2}{3}$ of the way from edge: Due to segregation causing a depletion of the carbon and/or manganese, the composition has reduced the proportion of pearlite (dark) present in the previous microstructures, leaving the main phase predominantly ferrite.



ILLUS 14 Photomicrographs of section of bar from Comlongon yett; from left to right, and top to bottom, the structures shown are described in a-d of Appendix 1

(d) Centre of bar: An increase in carbon and/or manganese due to segregation has altered the previous microstructure such that the proportion of pearlite to ferrite is similar to that anticipated from the Fe-C equilibrium diagram for the carbon and manganese contents analysed. The structure shown consists of Widmanstätten ferrite (white) precipitating at the prior austenite grain boundaries with the remaining austenite transforming to eutectoid pearlite.

APPENDIX 2

YETTS RECORDED BY CHRISTISON

Balvenie Castle, Banff	Dunrobin Castle, Sutherland
Barcaldine Castle, Argyll	Edinburgh Castle, Edinburgh
Barns Tower, Peebles	Eilean Donan Castle, Ross
Braikie Castle, Angus	Fingask Castle, Perth
Castlecary, Stirling	Fordell Castle, Fife
Cawdor Castle, Nairn (2 off)	Forres Tolbooth, Moray
Closeburn Castle, Dumfries	Fyvie Castle, Aberdeen
Comlongon Castle, Dumfries	Glamis Castle, Angus
Coxton Tower, Moray	Greenknowe (Gordon) Tower, Berwick
Craig Castle, Aberdeen	'Haddo's Hole', St Giles, Edinburgh
Craigievar Castle, Aberdeen	Invermark Castle, Angus
Crathes Castle, Aberdeen	Inverquharity Castle, Angus
Darnick Tower, Roxburgh (ex Doune Castle, Perthshire)	Isle Tower, Dumfries
Dingwall Castle, Ross	Kinnaird Castle, Perth
Doune Castle, Perthshire	Lennoxlove Castle, East Lothian
Drum Castle, Aberdeen	Castle Menzies, Perth
Drumlanrig Castle, Dumfries (3 off)	Mingary Castle, Argyll
Dumbarton Castle, Dunbarton	Moy Castle, Argyll
Dunbeath Castle, Caithness	Pitfirrane House, Fife
Dundas Castle, West Lothian	Pitreavie Castle, Fife
Dunlop Castle, Ayr	Smailholm Tower, Roxburgh
	Tilquhillie Castle, Kincardine

ACKNOWLEDGEMENTS

I am indebted to Mrs Elizabeth Conran, Curator of the Bowes Museum, and to her former colleague John Picken, for information about the history of Streatlam Castle and its owners; to Dr Deborah Howard, Librarian of the Faculty of Architecture, University of Cambridge, and one of the Commissioners of the RCAHMS, for additional information about Venice; to Dr Hans Gschntzer, Director of the Tiroler Volkskunstmuseum, Innsbruck, for additional information about the iron grille in his museum and other iron grilles in the Tyrol; and to Mr Archie Davidson of Barjarg, the Earl of Annandale and the Hon Robert Younger for letting me have access to the yetts at Barjarg, Lochwood and Old Leckie, respectively. I am also most grateful to the Earl of Mansfield for the fragment of yett from Comlongon, and to Mr Kevin Evans, Chief Metallurgist at Weir Pumps Ltd, for its analysis. Dr Michael Dareau, Chairman of the Scottish Section of the Antiquarian Horological Society, kindly drew my attention to the early Scottish clock from Earlshall (Note 12).

I am also indebted to a number of other antiquarian friends, not mentioned individually, whose enthusiasm and support for my researches has kept the work alive for much longer than this short paper might suggest.

Illus 2 is reproduced by kind permission of the Bowes Museum, and illus 9 by kind permission of the Tiroler Volkskunstmuseum, Innsbruck. Illus 11 was kindly provided by Mr Evans. Illus 9 and all other photographs are by the writer.

Finally, I would like to thank Mr Geoffrey Stell, Head of Architecture at the RCAHMS, for kindly reading the draft, and making a number of most helpful observations and suggestions.

NOTES

- 1 Christison does refer to records of a type of grille found in France in the 14th–16th centuries, where ‘the alternations in the penetrations take place at every intersection of the bars’ (Christison 1883, 135).
- 2 The early 15th-century gateway of Spynie Palace was apparently provided with an ‘iron portcullis’ (Grose II, 113).
- 3 A ‘waw’, or ‘wall’, was a measure of weight comprising 12 stones of 16 pounds each.
- 4 ‘Double byspikars’ and ‘seme’ were types of clencher nail, commonly used in shipbuilding; ‘ruffis’ were rivets. See Treasurer Accts I: Glossary.
- 5 Dr Howard has pointed out that the nearby mint, or Zecca, built by Jacopo Sansovino in 1536 also had iron window-grilles, now removed, on the first-floor windows. Canaletto’s paintings show that these were arranged diagonally, but it is not clear whether they were made in the Scottish manner, nor, indeed, whether they were original, as the attic floor, which was not completed until c 1566, had similar grilles.
- 6 It is statistically inconceivable that such a complex method of construction could have been invented independently, and at around the same time, in two places nearly 900 miles apart. There must have been a common ancestry. Dr Gschnitzer tells the writer that ‘locksmiths’ still stop in front of the iron grille on display in his museum in Innsbruck, and rack their brains as to how it was made and put together.
- 7 The Bowes family sold Streatlam in 1922, but there is no record of when the yett was removed to the museum, nor what part of the castle it came from.
- 8 Monea Castle in County Fermanagh is a fine example (Hist Mon NI, No 97). See also Jope 1951.
- 9 As part of the strength of the grilles lay in the fact that they were built into the masonry from the outset, they could not be removed for repair or replacement, and the technology for welding *in situ* was as yet unknown.
- 10 The writer has been unable to obtain further details from the authorities in Venice, despite the much-appreciated assistance of Lord Norwich (Chairman: Venice in Peril Fund).
- 11 But see Note 5 above.
- 12 There is another interesting connection between Scotland and Venice at this period. One of the earliest surviving clocks in Scotland (a chamber clock originally from Earls Hall Castle in Fife) has a very rare affinity with the public clock in St Mark’s Square, Venice. Like the clock in Venice, it too has a mechanism whereby two ‘jacks’, now missing, struck the hours on a single bell. The clock in Venice was built in 1496–9: the Scottish clock appears to date from about 50 years later.
- 13 Although no ‘grated’ iron doors are known, examples of solid iron doors, fabricated from iron plates riveted together and reinforced with wrought-iron straps, may still be found. A fine example is found at Schloss Hasegg at Hall in Tyrol, and there are later examples among the outbuildings at the Festung, or castle, in Kufstein.
- 14 It is worth noting that the window-grilles in the early 14th-century Stadtturm in Innsbruck are not made in the manner of later grilles, but from horizontal and vertical bars riveted together at each crossing.
- 15 Information from Dr Hans Schnitzer, Tiroler Volkskunstmuseum, Innsbruck. The grille was bought from an antiques dealer in Bruneck, South Tyrol, in 1907. It measures 0.65 m by 0.65 m overall (Inventory No: 3.145).
- 16 The cage-grilles over the windows of the Schloss Tratzberg (c 1500), near Schwaz, would appear, from photographs, to be of the Scottish type.
- 17 All the basement windows in the old building have iron grilles, but only one is fabricated in the Scottish manner, ie with the bars and eyes interwoven symmetrically about a central point.
- 18 Although the chapel has been burnt down and rebuilt on a number of occasions, the masonry itself, including the 0.9 m thick wall that divides the chapel from its porch, and in which the grilles are situated, is undoubtedly of considerable age.
- 19 Based on the position of the hinges and the symmetry of the interlacing. One of the vertical bars continues past the seventh, surviving bar to the rusted joint where the eighth bar was, and then on for a further 0.15 m.
- 20 The arrangement of the short chain is quite different from the arrangements found at Comlongon and Barns (Peeblesshire).

- 21 Photographs by the writer, 1986.
- 22 Memoirs of Sir Thomas Carleton, formerly at Carleton Hall, cited in Irving 1907, 33–4, and Mackenzie 1927, 94.
- 23 It has been suggested that the main block may be older than the wing, but this seems unlikely.
- 24 Many, if not all, of the basic bars seem to have been imported from the Continent, especially from France and Spain.
- 25 In the yett at Fingask Castle, in Perthshire, one can clearly see where the holes have been punched out of the bars. This yett probably dates from 1594, when the L-plan tower was built.
- 26 This is how the French grilles described in the *Dictionnaire de l'Architecture*, and quoted by Christison, were made (Christison 1883, 135). Because the eyes of the bars alternated at each intersection, 'the grille had to be forged all together, which occasioned a considerable work. The workman had to put each bar of the grille into the fire a certain number of times. But the men seemed to make light work of such difficulties, which today would appear insurmountable'.
- 27 Part of the heavy timber guide for the drawbar does in fact still exist at Doune.
- 28 Geoffrey Stell has pointed out that wooden linings were also used with wooden drawbars, especially in later work. An example is to be found in the back door of Hilton House (1732), near Perth, and there is another from Allanbank House (a.1745) in Dunblane Museum.

REFERENCES

- Bain, J *et al* (eds) 1881–1970 *Calendar of Documents relating to Scotland, 1108–1516*. Edinburgh.
- Christison, D 1883 'On the Grated Iron Doors of Scottish Castles and Towers', *Proc Soc Antiq Scot*, 17 (1882–3), 98–135.
- Christison, D 1888 'Additional Notices of Yetts, or Grated Iron Doors, of Scottish Castles and Towers', *Proc Soc Antiq Scot*, 22 (1887–8), 286–320.
- Cruden, S 1960 *The Scottish Castle*. Edinburgh.
- Dict Nat Biog 1975 *The Compact Edition of the Dictionary of National Biography*. Oxford.
- Exch Rolls 1878– *The Exchequer Rolls of Scotland, 1264–1594*. Stuart, J, Burnett, G, *et al* (eds). Edinburgh.
- Franzoi, U 1990 *Il Palazzo Ducale di Venezia*. Treviso. (also *Piazza San Marco: l'architettura la storia le funzioni*. Padua, 1970.)
- Grose, F 1797 *The Antiquities of Scotland*. London.
- Hibbert, C 1988 *Venice: The Biography of a City*. London.
- Hist Mon NI 1987 *Historic Monuments of Northern Ireland*. Belfast.
- Irving, J B 1907 *The Irvings, Irwins, Irvines, or Erinveines: or any other spelling of the name: an Old Scots Border Clan*. Aberdeen.
- Jope, E M 1951 'Scottish Influences in the North of Ireland: Castles with Scottish Features, 1580–1640', *Ulster J Archaeol*, 14 (1951), 31–47.
- Mackenzie, W M 1927 *The Mediaeval Castle in Scotland*. London.
- Maxwell-Irving, A M T 1974 'Lochwood Castle II: Exploratory Excavations & Further Observations on Lochwood and its Lairds'. (National Monuments Record of Scotland.)
- Maxwell-Irving, A M T 1982 'Borthwick Castle, near Duns: Excavations, 1979', *Proc Soc Antiq Scot*, 111 (1981), 430–44.
- Maxwell-Irving, A M T 1990 'Lochwood Castle – A Résumé', *Trans Dumfries Galloway Nat Hist Antiq Soc*, 3 Ser, 65 (1990), 93–9.
- Maxwell-Irving, A M T forthcoming *The Border Towers of Scotland: Their History and Architecture. The West March*.
- RCAHMS 1920 The Royal Commission on the Ancient and Historical Monuments and Constructions of Scotland. *Seventh Report with Inventory of Monuments and Constructions in the County of Dumfries*. Edinburgh.
- RCAHMS 1951 The Royal Commission on the Ancient Monuments of Scotland. *An Inventory of the Ancient and Historical Monuments of the City of Edinburgh*. Edinburgh.

- RCAHMS 1963 The Royal Commission on the Ancient and Historical Monuments of Scotland. *Stirlingshire: An Inventory of the Ancient Monuments*. Edinburgh.
- Reg Mag Sig 1984 *Registrum Magni Sigilli Regum Scotorum: The Register of the Great Seal of Scotland, 1306–1668*. Edinburgh.
- Reg Sec Sig 1908– *Registrum Secreti Sigilli Regum Scotorum: The Register of the Privy Seal of Scotland, 1488–1584*. Edinburgh.
- Treasurer Accts 1877– *Accounts of the Lord High Treasurer of Scotland, 1473–1580*. Dickson, T *et al* (eds). Edinburgh.