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To Norroway, to Norroway, to Norroway o'er the foam:[1] sourcing timber for Scotland's seventeenth century building works.

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INTRODUCTION

For Scotland from the late-medieval period onwards, timber was of great economic importance since practically every activity such as farming, fishing, and transport relied to some degree on its use, and it was fundamental to larger scale projects such as building houses and ships.[2] However, by the early sixteenth century Scotland's timber resources were already decimated partly as a result of James IV's naval ambitions.[3] In 1503 Parliament declared that Scotland's woods were 'utterly destroyed',[4] and Acts were passed to protect the woods from over use with harsh penalties issued to 'destroyers of the green wood'; a third such offence carried the death penalty.[5]

Scotland had to look abroad for new timber sources and many readers will already be familiar with the timber trade that took place between Scottish merchants and Ryfylke farmers during the sixteenth and seventeenth centuries. During this period Scottish vessels arrived in large numbers to collect much needed timber from the numerous sawmills located around the Ryfylke fjords, and a good deal has been written about the topic both by Professor Arnvid Lillehammer[6] here in Norway, and by Professor Christopher Smout[7] in Scotland. Lillehammer focused on the development of sawmills in Ryfylke, the volumes of timber being exported abroad, and the changes it brought to the local economy. Smout presented the first comprehensive examination of Scotland's overseas trade following the restoration of the monarchy in 1660. In this he included the first analysis of the timber trade with Norway, and demonstrated that this trade during the 1660s and 1680s was the main occupation of Scottish shipping at the time. Both Lillehammer and Smout also examined the close ties that developed between Scottish skippers and sawmill owners in Ryfylke.

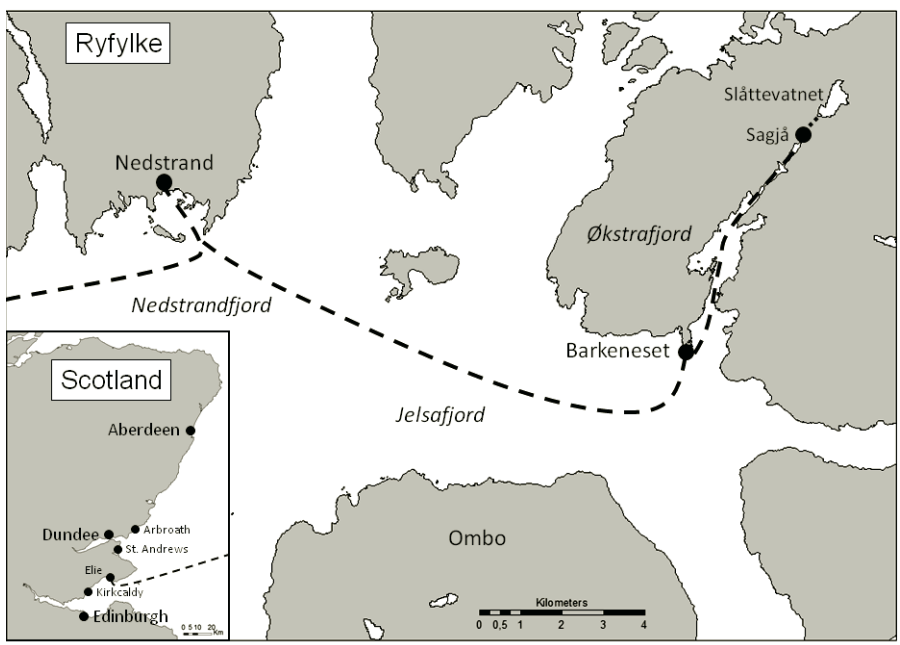
This paper presents new research regarding the use of Norwegian timber for building construction in seventeenth century Scotland. Whilst the importance of imported timbers for building construction in Scotland was acknowledged by Smout in his research, it was not a subject investigated by him; his main interest was the economic history of the timber trade. This paper will examine the types of timber imported to Dundee (Angus and Tayside) and ports on the Fife coast used for building construction. Sources include the Ryfylke toll lists, Dundee shipping lists, building accounts and contracts, letters, a diary, a skipper's log book, and also a number of surviving buildings from the period. Firstly it reconstructs the journey of timber from Ryfylke to Scotland, and considers some of the individuals involved in the timber trade; secondly it looks at the reasons why Scotland required timber for building works, and finally it examines the impact Norwegian timber had on Scottish building construction in the seventeenth century.

COLLECTING TIMBER "AT THE WOODS"

One Scottish vessel that sailed into the Ryfylke fjords on several occasions was the Anna, owned and skippered by Alexander Gillespie from Elie, a small port on the east coast of Scotland in the county of Fife (see Figure 1). Gillespie was a skipper, merchant, and also a minister of the Church; he kept a detailed logbook recording all of his voyages from 10 April 1662 to 31 July 1685.[8] His journal spans 24 years, during which time he sailed to Norway for timber, as well as to the Baltic for iron, flax, hemp and oak knapholt (oak boards),[9] to London and Rotterdam for luxury goods – tobacco, seeds, hoods and bells for hawks, and to Bordeaux for wine.

Gillespie completed a total of nine voyages to Norway, and in the 1660s he favoured the Nedstrand area for collecting timber. In the 1670s and 80s, with his new ship the James (built at Rotterdam and with a capacity of 120 tons), he sailed further north to Eldøyvågen in Sunnhordland. As Gillespie undertook his voyages, he recorded detailed descriptions of the routes he took, demonstrating a familiarity and understanding of the Norwegian waters that he needed to negotiate. Gillespie's voyages were very typical, his skills and knowledge the result of a long history of trading between Scotland and Norway. His logbook allows us to picture quite clearly the practice of purchasing timber 'at the woods',[10] a process that had remained unchanged from the sixteenth century.

On June 3 1662 Gillespie "cam abourd of [within sight] the coast of Norroway [Norway] we forgathring with the land of Jader [Jæren] it being leach [low] land at the sea costes and hey [high] land above it …" The elaborate details recorded in his logbook demonstrate that Gillespie was personally acquainted with both the areas he sailed to, and with the individuals and their families he collected timber from in Ryfylke.



Map showing Skipper Gillespie's voyage in 1662. He arrived at the Nedstrand toll house in Ryfylke on the June 6 and from there continued his journey to Barkeneset. He then sailed further into Økstrafjorden where he collected timber from the sawmill at Sagjå. On the 17 June he returned to Nedstrand to pay duty on the timber before leaving for Scotland.

Upon the 4 of May [recte June] we cam to the Kettell to ane anker it being Wedenesday of the week Upon the 6 of this month of Junieus we cam to our loading marke it being above Birkrenesse [Barkaneset], the bouer [farmer] his name is: Knoyd: Hansone Hanse Stokes his sone, who is now deade the Noraway cales him: Knoayd Loaura…[11]

The details recorded in Gillespie's log book allow us to accurately follow his route from Scotland to the Ryfylke fjords, since all the people mentioned by him have been identified.[12] Johannes Stokka (Hanse Stokes) was a prosperous farmer, timber trader and local

official who lived at the farm Stokka in Vats.[13] He died in 1658, four years before Gillespie visited Knut Johannesen, Stokka's second son. Knut had his own sawmill, and was also known as Knut Lovra because from 1643 he had rented a farm at Lovra (in the parish of Jelsa). Through these individuals it is possible to follow the route taken by Gillespie (see Figure 1). 'Birkrenesse' (Barkaneset) was on the sailing route into Økstrafjorden, a natural place to stop before continuing further into the fjord. Gillespie's use of 'above' signified north of Barkaneset and in Økstrafjorden there is a place called Sagjå (sawmill) where water flows out from Slåttevatnet. On the east of this stood the Lovra sawmill, and on the west stood the Økstra sawmill. The Lovra sawmill stood on ground that belonged to the Romsbotn farm owned by Knut Johannesen Lovra.[14] The Økstra sawmill stood on land that was from 1689 owned by Knut's son Gudmund Lovra.[15] The saw miller who worked at the Lovra sawmill lived at the Romsbotn farm and the water for the mill was channelled along a 418 metre long mill-race. In 1662, the same year that Gillespie visited, Knut Lovra paid tax on the production of 1200 planks.[16]

The remains of the sawmill still exist at Sagjå (see Figure 2), along with those of a small jetty, and nearby there is a loading place suitably named Ladberget.[17] There is also an ancient track from what would originally have been the forested area surrounding Slåttevatnet that provided the water for the sawmills below. The age of the track suggests that timber was first taken from this area much earlier than the sixteenth century,[18] and the forested area of Lovra is mentioned by Bishop Håkon of Stavanger in his founding letter of 1319.[19]

Gillespie used eleven days to select and load his timber cargo before setting sail back to Scotland; his log book recorded important details necessary for navigation,

Upon the 17 of Junieus we cam from our loading marke
Upon the 19 being Theursday we cam out of the Kettell mynded to sea
Upon the twentie of this forsaid month of Junnieus we cam out of the Wheyting [Kvitsøy] to sea the winde being at north with mist, in the morning upon the 22 we cam abord of the shore at 6 a cloke we being the lenth of the Girdellness [Girdle Ness)…

Girdleness is the headland on the south side of Aberdeen harbour and five

days later Gillespie arrived safely home,"We cam from Norraway: 1662 22 of this forsaid we cam to the Elie: praised be God for all his mercies towardes us childrene of men…"

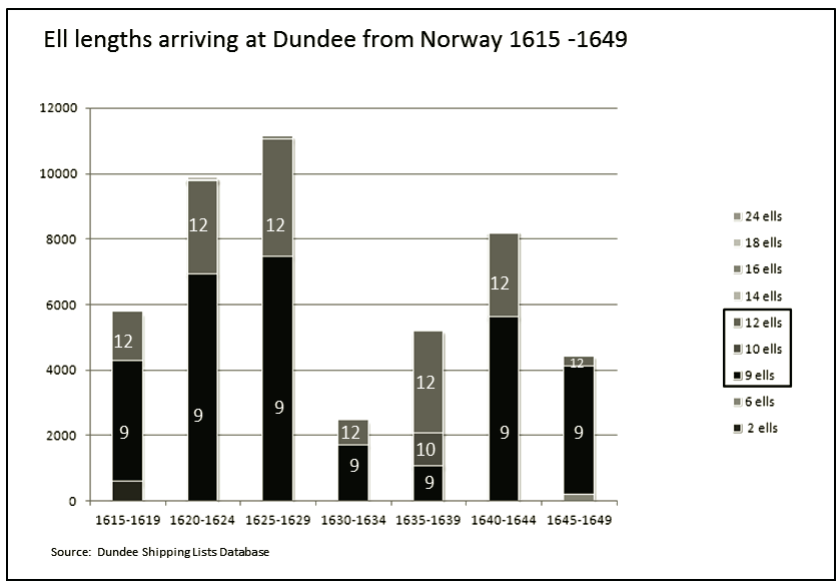
Whilst we can be certain that Gillespie was buying timber, his log book in this instance did not record any details of his cargo; however, there are several contemporary sources which do record the details of cargo either collected in Ryfylke or delivered in Scotland. The Ryfylke toll lists examined by Lillehammer provide many examples of Scottish skippers and their cargoes.[20] For example, Robert Small, also from Fife (and perhaps related to Gillespie's future wife Christian Small) arrived at Barkaneset in July 1611. His cargo consisted of lekter (lathes) from Sevat Sandanger (who owned Romsbotn before Knut Johannesen), barrel hoops from Orm Romsbotn, firewood from Jørgen Økstra, as well as nine and twelve ell beams from Olav Fuglastein. Similarly, in 1620 Thomas Simpson from Pittenweem visited Johannes Stokka from whom he purchased 300 nine ell beams; from Olav Raunes he bought 120 twelve ell beams, and from Olav Eikanes ten fathoms of firewood. At this time a Norwegian ell equalled 63.3 cm, but a Scottish ell was 94 cm.[21] A fathom or *favn* was derived by multiplying 1 ell x 1 fathom (3 ells) x 1 fathom amounting to 2.23 m^3.

Dundee, as Scotland's second most important port after Edinburgh at this time, naturally recorded similar timber cargoes arriving at Dundee from Norway in the early 1600s.[22] The Dundee Shipping Lists from 1612 to 1650 record (DSL) almost 700 ships that had, "laitlie cum from Norroway..."[23] all of which contained timber of one sort or another. In the same period only 94 arrivals originated from Sweden, 49 from Königsberg, 24 from Danzig and nine from Denmark – that is a total of 176 ships from other countries; these ships contained mixed cargoes, often with very little timber.[24]

The cargoes arriving at Dundee in 1614 illustrate a typical year's activity. Twenty-four ships arrived from Norway between April and October, of which two had made three voyages; five took two round-trips, with the remaining eight vessels making the journey only once.[25] Importantly all but four of the 24 cargoes included sawn boards or planks, and all except five carried firewood, usually birch. Pine beams or baulks in nine (5.7m) - and twelve (7.6m) - ell lengths were most commonly imported, with only one cargo listing fourteen and eighteen ells (Figure 3).[26]

2.Clockwise from left to right: A- The approach on the Økstrafjord to the Sagjå sawmill; B-The site of the sawmill today; C-The remains of the stone jetty and D – Ancient track leading up to Slåttevatnet (© Endre Elvestad, Stavanger Maritime Museum).

A comparison with the Ryfylke toll records for 1614 also indicates that pine beams purchased by Scottish skippers were recorded by Norwegian officials as being either nine or twelve ells in length, which implies that those similarly described at Dundee were probably measured in Norwegian ells. Significant quantities of trees and fir timbers were also imported to Dundee, sometimes referred to in the DSL as long, short or small. They arrived in quantities of between one hundred and five hundred pieces, with one cargo of three thousand. "Trees" were probably baulks that had not been processed to any great degree, and are not referred to by dimensions here. At most they may have been roughly squared and the bark removed. Fir timbers were probably similar, but seem to have been specifically described as being of fir, i.e. pine.



3. Graph showing volumes of different ell lengths arriving at Dundee between 1615 and 1649. The most popular lengths imported to Dundee were nine and twelve ells. A Norwegian ell equalled approx 63cm (25ins).

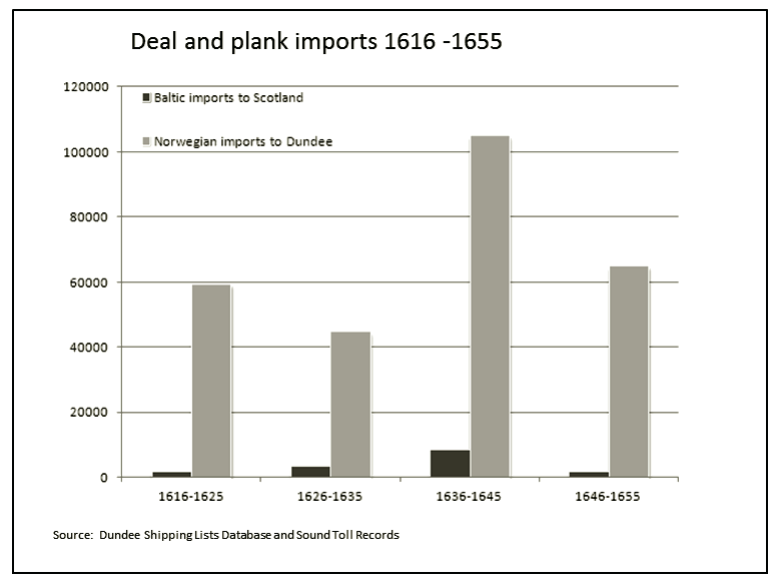
Looking at the volume of Norwegian planks and deals shipped to Dundee between 1616 and 1655 compared with the volumes of deals and planks arriving from the Baltic to Scotland, it is quite apparent that Norwegian deal and plank imports dominated the market.[27] During the peak period from 1636 to 1645, imports from the Baltic to the whole of Scotland amounted to only 7% of the total Norwegian deal imports to Dundee alone.[28](Figure 4)
These timber cargoes, whether leaving the fjords of western Norway or entering Dundee, show quite clearly the types and cuts of timber that were being purchased to meet demands in Scotland. The preferred timber cuts were pine baulks of nine and twelve ells, and large quantities of deals (pine planks).

Oak imports from Norway appear much less frequently in the records examined, probably due to export restrictions that were initially in place from 1562 when Frederick II increased tolls and prohibited the export of oak,[29] and in 1590 it was stipulated that the Scots, English and Dutch were no longer permitted to purchase oak longer than 12 Norwegian ells.[30] Oak trees were recorded only once in the DSL in the period from 1614 to 1650.[31] However, the DSL for 1614 also reveals that one third of the vessels that im-

ported timber from Norway to Dundee contained oak of one sort or another in their manifests, in the form of 'aiken tymer', 'corbillis' and 'crwket tymber'.

THE WATER DRIVEN SAWMILL

The main catalyst for Norway's increasing success as a timber exporter appears to have been the wide uptake of new technology in the form of water-driven sawmills *(oppgangssag)*.[32] These sawmills were very simple to construct and required little capital outlay,[33] but allowed for the mass production of boards (planks), which formed the basis for Norway's growing timber trade with foreign buyers during the sixteenth and seventeenth centuries.[34] In Ryfylke alone, 100 sawmills are mentioned in the period 1600 to 1630.[35] Until the advent of these sawmills, making boards and planks using frame-saws had been slow, inefficient and labour intensive; alternatively, logs had been split in two by hand, using wedges and an axe, to create boards.



4. Graph showing volumes of deals and planks exported from the Baltic to Scotland, compared with the volumes of deals and planks arriving at Dundee from Norway during the same period 1615-1655.

The new technology presented new trading opportunities for many small farm owners along Norway's coast where there were numerous ideal locations for building sawmills at the mouths of small rivers flowing into the fjords, such as those at Økstrafjord in Ryfylke. Perhaps the greatest benefit of the new sawmills was the much more efficient use of wood. Instead of producing only two planks by splitting logs, sawmills could mass produce between eight and ten planks in rapid succession making it simpler to produce standard products in large volumes. Depending on where they were produced, the dimensions of planks and boards varied. Those from the Ryfylke fjords were usually around 8ft (2.4m) long, 8ins (0.2m) wide and 1in (2.5cm) thick.[36] In comparison, those from Drammen in eastern Norway were between 10ft (3m) and 12ft (3.7m) long, 9ins (0.2m) wide and approx 1½ins (4cm) thick.[37]

The technology for water driven sawmills had almost certainly reached Scotland by the seventeenth century, if not earlier, but there does not appear to have been such a widespread adoption of them as tools for processing timber as there had been in Norway. A small number of sawmills (although it is

unclear whether they were wind or water driven) are mentioned in remote areas from the 1630s,[38] with more instances recorded in the 1670s: "single daills and merchand daills" produced on the Balnagown estate in 1672 (from where James Baine His Majesty's Master Wright purchased joists and deals); "sawmilnes" at Loch Rannoch producing deals in 1675; in 1677 at Glenlyon where a dispute led to the sawmill being set on fire; a sawmill at Rothiemurchus in 1680; and a sawmill in Upper Deeside in 1695.[39] However, there is no official mention of a sawmill in a Parliamentary Act until 1695 when William Scott a cabinet-maker and deacon of the wrights 1692-94,[40] in partnership with John Hislop was permitted to erect a wind driven mill at Leith, the port for Edinburgh,

> ...where great oak trees and other great timber may be brought in and landed from abroad for building of ships and other great works in the nation, which cannot now be done through want of skill and art of sawing such great timber as is proper for those works.[42]

This privilege granted them '...the sole and only privilege of erecting and making use of the said sawmill, and enjoying the whole benefit thereof...' within a 15 mile radius of Leith for the following 19 years. Finally, the benefits of sawmills for processing timber, whether powered by water or wind, had finally been appreciated as an asset for Scotland's leading port.

The apparent lack of interest to adopt sawmills in Scotland, whether wind- or water-driven, suggests that suitable timber for processing in this way was either very limited or inaccessible. In addition, the arrival of mass-produced planking and standardised timber baulks from Norway, although advantageous for wrights and joiners, must have simplified or even made redundant many of the tasks previously undertaken by sawyers in Scotland. The advent of wind-driven sawmills in the Netherlands in the 1590s had met with massive opposition from sawyers there who realised that mechanisation was a direct threat to their livelihood. The Amsterdam guild of sawyers obstructed the introduction of sawmills for decades, and prevented cheaper imports of sawn timbers entering the city from other regions in the Netherlands;[43] and it seems likely that opposition from local tradesmen and guilds may also have contributed to the delayed establishment of a sawmill at Leith.

DEPLETION OF DOMESTIC TIMBER

Robert Edward, Minister of Murroes in Angus, wrote in 1678 that,

> ...for the houses in towns, and those of gentlemen in the country, timber is brought from Norway; not because Scotland does not afford wood sufficient to supply the whole kingdom, but because rugged and impassable rocks prevent its being transported from those places where it grows…[44]

His observation implies that Scottish timber supplies were not always able to meet the demands of builders, which according to Edward was mainly due to the difficulties encountered transporting timber from Scotland's inaccessible forests. This was not a new phenomenon, as during the sixteenth century Scotland had become increasingly reliant on foreign timber imports as domestic timber supplies, particularly oak, became depleted.[45] Any remaining native timber was often found in remote Highland areas with challenging terrain away from rivers or the sea making it much more costly to transport overland to where it was required. Transportation was not the only difficulty encountered. The long growing seasons in Scotland coupled with a warm and wet climate resulted in fast growth. This produced pine timber with less density and which was considered generally to be of a poorer quality than imported timbers for building construction and shipbuilding.[46] However, where timber was available locally and was of suitable quality it was used for building works.[47] The earliest surviving example of a roof structure built from native pine can be found at Castle Grant in Speyside, dating from the sixteenth century.[48] The roofing beams used at Castle Grant measure 18 feet long, with a diameter of up to fourteen inches.

Oak, due to its strength and resilience, was considered the most valuable timber and used whenever possible for high status buildings and shipbuilding. One of the best surviving examples of domestic oak being used in roof construction is the spectacular hammerbeam roof at Darnaway Castle, constructed in 1387, and which has survived intact. By the sixteenth century, however, native oak trees of sizeable dimensions for building construction became harder to source,[49] and from as early as the fourteenth century Scotland developed a tradition of importing supplementary timber from the Baltic

Sea Region.[50] Progressively Scotland came to rely on foreign imports of timber as domestic timber supplies became depleted.[51]

TRADE RESTRICTIONS

To the Scots of the late 1500s and early 1600s, the conveniently located Norwegian forests were seemingly without end. Trade with Norway (and also the Baltic ports) was seen as vital to Scotland's economy, with Norway the "storekeeper of her [Scotland's] naval supplies," essential for the building industry and "for the well being of the state." Its significance was also illustrated by the exemption of those trading with Norway for timber from the 1573 statute banning the export of salt from Scotland. The trade's continued relevance is demonstrated again when ninety years later, in 1663, a ban on the export of bullion once more exempted those purchasing Norwegian timber.[53]

Unfortunately for the Scots, the Norwegian forests were also viewed as being of the utmost importance for the Danish-Norwegian navy, and restrictions were placed on the export of oak first in 1562, and then again in 1590.[54] Further trading constraints were imposed in the 1600s when the Danish-Norwegian authorities reinstated a policy of only allowing the export of wares by foreigners in exchange for goods such as flour, malt and other foodstuffs, for example bread.[55] Originally this policy applied to the export of fish, but was later extended to include the export of timber.

By the seventeenth century grain had become the commodity commonly traded by Scots for Norwegian timber. However, during the 1630s following poor harvests in Scotland, the export of grain was restricted unless it was in exchange for timber for building purposes. A number of dispensations were granted to those who required timber for their building works in Scotland. In 1631 Andrew Fraser of Stanywode was building his great house at Muchalls (later Castle Fraser), but his own lands had insufficient timber for the roof (Figure 5). He needed to import timber from Norway, but knew that in Norway at that time it was strictly forbidden to export timber without importing victuals as payment for the timber goods. He requested permission to send his factor and servants with ten chalders[56] of wheat to Norway.[57] Also in 1631, Sir Thomas Urquhart of Cromarty sent a similar request for timber for building work, probably undertaken at either Craigston or Cromarty.[58] Both of

these dispensations were granted on the basis that neither Fraser nor Urquhart's own lands were able to supply suitable quantities or types of timber. At the same time, a further dispensation was made to David, Lord Carnegie (created 1st Earl of Southesk in 1633) who requested timber from Norway for repairs and building work (for either Kinnaird or Leuchars Castle) also in exchange for 'ten chalders of beir, meal and malt'.[59]

5. Castle Fraser, Aberdeenshire. The west range is seen here on the right, its roof was constructed using Norwegian timber bought in 1631 by Andrew Stanywode (© Kate Newland, Stavanger Maritime Museum).

SCOTTISH BUILDING WORKS

This practice of exchanging grain for timber continued throughout the later seventeenth century. Whilst implementing extensive building modifications and additions at Glamis Castle, his family's ancient seat in Angus, the earl of Strathmore imported timber from Norway to Dundee in exchange for grain on several occasions. This was a more practical solution given Strathmore's impecunious state at the time, and particularly since his Angus estates could provide the necessary grain to export in direct exchange for Norwegian timber.[60]

The Strathmore Muniments and Strathmore's Book of Record[61] show that

KATE NEWLAND *TO NORROWAY, TO NORROWAY, TO NORROWAY O'ER THE FOAM*: SOURCING TIMBER FOR SCOTLAND'S SEVENTEENTH CENTURY BUILDING WORKS.

6. Glamis Castle in Angus was modified extensively by the earl of Strathmore from the 1660s onwards and he sent his ship the Lyon to Norway for timber on several voyages for his building works at Glamis. (© Kate Newland, Stavanger Maritime Museum).

Strathmore's ship the Lyon, in which the earl had an eighth share, sailed to Norway from Dundee for timber on a regular basis, providing timber for the building works at Glamis (and also Castle Lyon) when required. Several accounts relate to the voyages of the Lyon, with one of the earliest accounts covering the period from 1672 to 1675[62] and coinciding with the purchase of thick timber deals from Trondheim.[63] Further shipping records concern the Lyon's voyages to Norway and Holland 1679-1686, with accounts and receipts for timber in 1681-1682[64] and 1681-85.[65] In 1679 there is an account for victual sold and timber purchased at Dram[men] in Norway.[66] An account of John Lyon (factor) pertaining to Strathmore's rents in the parishes of Glamis, Airlie and Kirriemuir records victual sold of the crops from 1681 and 1682 to merchants and sent abroad, 'on the good ship called the Lyon of Dundee.'[67] (Figure.6)

In the case of Strathmore, it has been possible to identify the skippers and merchants from Dundee that the earl employed for carrying out his trading transactions. Two skippers, Thomas Bower and John Fraser, are mentioned in the Mariners of Angus, in connection with the Lyon.[68] In 1669, before becoming skipper of the Lyon, Bower was skipper of the Gift of God regularly sailing to Norway for timber and in 1680 he became the box-master of the Dundee Mariners Fraternity. As skipper of the Lyon of Dundee he sailed to Königsberg in 1683. He was probably related to Bailie Bower who was instructed by Strathmore in a memo dated 10 December 1681 to purchase "five painted brods wt Millers" (painted boards with frames) from Holland, which he required to hang above some doors at Glamis.[69] The Bower family also appear in Strathmore's Book of Record on 18 April 1684, when Strathmore sold 100 bolls of meal to a James Bower, who also had a share of the Lyon. The earl referred to their imminent joint "venture to Norway" with the Lyon, no doubt for the acquisition of timber.[70] John Fraser, who sailed to Norway as master of the Lyon five times between 1684 and 1689, was probably skipper when Strathmore and his partners embarked on their "venture" to Norway.[71] On 25 September 1684, Strathmore bought a consignment of 1,260 deals from Bailie Duncan in Dundee, which were to be carried to Glamis, together with "...two other parsells of dales which came home in the Lyon...."[72] This was a significant year at Glamis in relation to the use of timber in building works, for that is when the Dutch woodcarver Jan Van Santvoort was working there and these voyages to Norway would have sourced some of the timber necessary for his work.[73]

In addition to sourcing timber directly from Norway, Strathmore also obtained timber from Dundee merchants. One was James Burgh, a successful timber merchant and burgess. On 16 April 1684 Burgh purchased 60 bolls[74] of meal in preparation for his next voyage to Norway, a transaction that allowed Strathmore to clear accounts of £200 with him. Earlier in 1673 the earl of Panmure had also bought timber from Burgh.[75] Burgh's regular voyages to Norway for timber are recorded in the Mariners of Angus from 1664 to 1686; firstly as master of the James in 1664 and then with the James and Margaret from 1681 to 1686. Between April 1681 and September 1686, Burgh sailed to Norway 23 times, clearly demonstrating that his main trading interest was timber. In comparison, skipper Gillespie made only nine voyages to Norway over a twenty four year period, in which he also sailed to the Baltic, Rotterdam and Bordeaux. On average Burgh made three voyages annually, with five being the most in any one year. In 1684 he returned to Dundee on 1 May from Norway, followed by two more trips. He returned again by 23 June and the final cargo of that year landed at Dundee 9 August. The speed of these three journeys suggests that he sailed to the Stavanger or Bergen areas, and had good sailing weather as would be expected during the summer months when he made the majority of his trips. The earliest voyage back to Dundee was dated 17 February 1685, which suggests that the ship over wintered in Norway. The latest voyage was completed in November 1685 when the crossing would have been more dangerous and unpredictable, perhaps indicating an urgency to supply timber for the town.[76] The frequency of Burgh's voyages certainly gives some indication of the general demand for building timber in Dundee and her environs. Other merchants from Dundee who supplied timber to Strathmore included James Yeaman from the family of merchant venturers who provided deals from Trondheim in 1677[77] and James Brough (1678 and 1682); both these merchants and Bailie Duncan belonged to the established elite of Dundee's seafaring merchant families.[78]

Also in Angus, the Earl of Panmure (Strathmore's uncle) was building his "new house" at Panmure, where he employed His Majesty's Master Wright James Baine.[79] Baine was not only a wright, he was also a timber merchant who maintained a large stockpile of timber at his yard in the timber bush at Leith. However, in the contracts signed with Baine, Panmure himself was responsible for providing timber for the building works. Although Baine did supply some of the timber, this was a more expensive option, and so Panmure bought from other merchants in Dundee, and also sent directly to

Norway for timbers too.

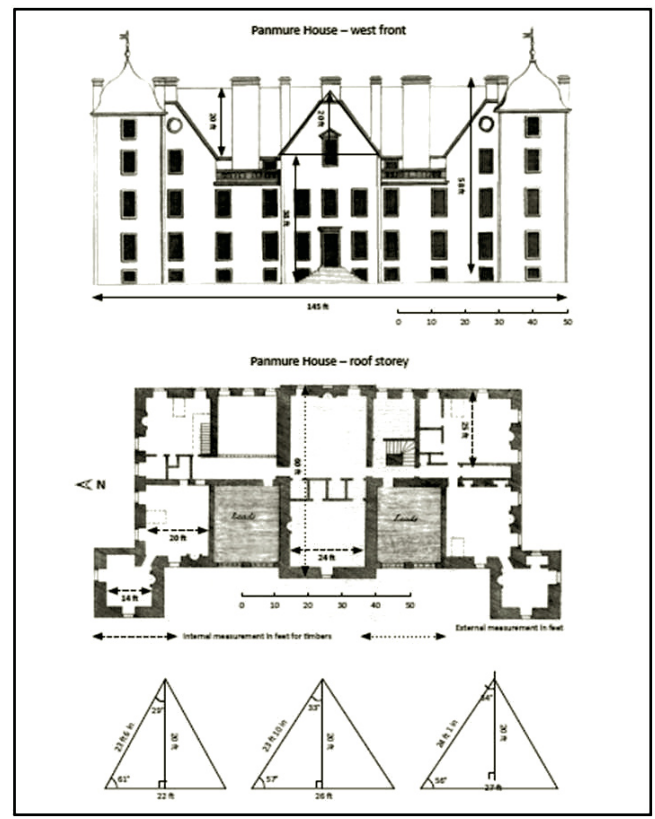
Baine and his men "...entered to worke at panmure the 16 of June 1668..." and this naturally coincided with an increase in the purchase of timber for the building works at Panmure, together with shipments from Norway delivered to Dundee.[80] This timber included approximately 3,500 deals at a cost of £1,460, probably for sarking and flooring or panelling and partitions. The largest quantity of timber was purchased by John Maule, the earl's chamberlain, but some also came from Baine and David Johnston.[81] There were also quantities of knapholt and wainscot purchased, probably to have been used for the doors, windows and shutters. Baine supplied a wide variety of timber types and cuts, as would be expected of a timber merchant, and he was able to supply oak wainscot and knapholt, both oak and pine deals, plus fine and thick deals in large quantities.

The specification for the roof structure at Panmure, written in February 1668, stated that the roof was to be "double baulked with sarking" and that the roofing couples were to be placed "sixteen or eighteen inches asunder".[82] This description tells us that the roof was to be a coupled (rafter) roof, one in which the rafters are connected by collar beams, requiring different lengths of timber baulks and also planking. It stipulated that the wrights should be in attendance during May of the same year to carry out the works. An examination of the Volume of Charges that records some of the costs for building materials at Panmure shows a corresponding increase in the purchase of timber from March onwards.[83] Most significantly, it included the import of two cargoes of timber direct from Norway for Panmure - perhaps a reference to the roof timbers arriving?

The dates of the two cargoes' arrival at Dundee correspond closely with the start of Baine's activities at Panmure. The first cargo arrived on board the Good Hope of Fraserburgh on 17 March 1668; approximately five weeks after the first contract had been agreed. Allowing three days travelling from Scotland to Norway, at least ten days if not more for collecting the cargo and two to three days sailing from Norway to Dundee, this means that the ship must have left port by the 1 March at the latest. This would have been a relatively fast turn around, but is consistent with the time spent by Walter Angus from Aberdeen, who collected timber from Ryflke in 1621.[84] Skipper Gillespie's voyages, on the other hand, tended to be longer; he spent between two and

three weeks collecting timber at the Ryfylke fjords in the 1660s, plus three to four days (and sometimes more) for the outward and return voyages. Gillespie's logbook shows that he spent more time when sailing to different sawmill owners, which also implies that for such a fast turn around, the timber for Panmure was probably collected from a single sawmill or forest-farm.[85] What seems certain is that a ship was sent to collect a cargo of timber, almost immediately, once the contracts for wright work had been signed.

The second cargo arrived at Dundee in the Rising Sun of Leith on 27 June 1668; eleven days after Baine's men had started work. By the same reckoning, this vessel had probably left for Norway at the end of May or beginning of June. In total, the two ships delivered to Dundee 160 trees 27ft (8.24m) in length, 259 trees 22ft (6.72m) in length and 340 sawn planks 15ft (4.58m) in length. The cargoes also included cuts of timbers '...whereof sixteen cuted shorter to severall lenths...' and '...of trees twentie seven foot of lenth wt their cuts which make out thirtie foot...'. This suggests that some of these timbers were trimmed to specific sizes at source in Norway, raising the possibility that the roof timbers were initially framed and built in Norway, before being dismantled and sent to Scotland.[87] The use of feet rather than the customary 'Norwegian ell' certainly suggests that a degree of accuracy was required for this timber bought for Panmure



7. Approximate internal and external measurements of Panmure House built 1666-1670, adapted by the author from William Adam's drawings c.1726. Estimated dimensions for the main roof timbers. (Elevation and plan © University of Strathclyde. Licensor www.scran.ac.uk)

Without physical evidence (Panmure was demolished in 1955), is there any way to confirm the likelihood that these timbers were for roofing, based on the documentary sources? William Adam's drawings and elevation of Panmure in Vitruvius Scoticus give us a rough indication of the overall dimensions of the house.[88] From these it is possible to estimate approximate sizes of the roof span, the height of the house and the internal flooring areas. These dimensions can then give an approximate idea of the dimensions and quantities of timber needed for the roof structure. If the dimensions shown in Figure 7 are used, plus one foot overlap required at each end,[89] the various spans needed for the different roof joists would have measured from 17 to 27 feet in length. Thus "trees" of 27 and 22 feet were certainly of adequate lengths and quantities for some of the roof structure. The ships' timber

cargoes were listed in feet, which may indicate that when specific timbers were required, as in this case for a roof structure, then feet were used in preference to ells. Both Norwegians and Scots were familiar with feet and inches which would have provided more accuracy for these components. The purchase of timbers that had been trimmed to specific sizes at source also indicates that an exact specification had been sent with the skipper to Norway.

Although these cargoes would have provided all the necessary timbers for the main roof, in June 1668 there were also substantial quantities of "double trees" purchased by David Johnston from merchants in Arbroath. Single and double trees are often referred to in accounts and contracts, such descriptions imply beams or baulks of different thickness, however exact dimensions remain unknown. In total 178 double trees were purchased (with no lengths noted) at a cost of £168 08 08 (approximately 19 shillings each).[90] These were cheaper than the first cargo of Norwegian timbers where each 27 foot tree cost £5 per piece and the 22 foot trees cost £1 10 each. The price suggests that the timber purchased from Arbroath (but probably imported from Norway) may have been the shorter length of 22 feet. Such short lengths would not have been sufficient on their own for the longer roof joists, but may have been suitable as rafters, collar beams, and joists for the roofs and flooring of the two pavilions or bastions. The planks from the two cargoes delivered in 1668 would have been used as sarking for the roof, an important function during this phase of the building process.[91]

The transportation of the timber (and most other building materials) to the building site was undertaken by Panmure's tenants, who transported the timber fifteen miles (24 kilometres) from Dundee to Panmure on several occasions. Thirty-four tenants from Monikie brought a total of 509 deals from Dundee on 18 July 1670; and 22 tenants from Monifieth carried deals from Dundee to Panmure on 20 May 1673, carrying an average load of four deals, the largest quantity attributed to one individual being eight. On 25 June 1673, a total of 3,100 deals, together with three nine ell trees were carried from Dundee by 48 tenants.[92] Most timbers were probably transported by horse, cart, or sledge, or manually pulled on sledges.[93]

PHYSICAL EVIDENCE

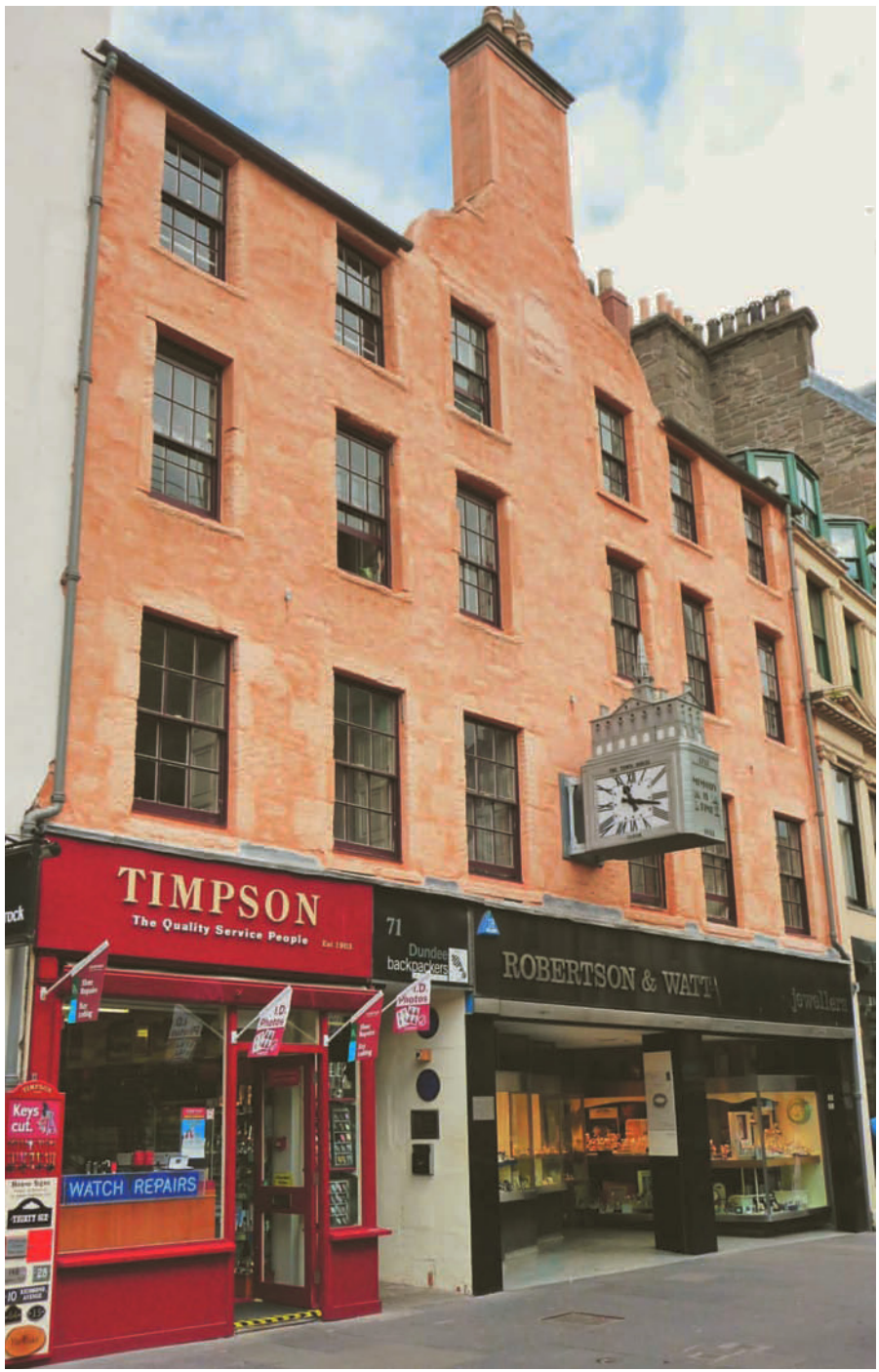
Recent research on the timbers of the Great Hall at Edinburgh Castle has for the first time positively identified Norwegian oak timbers in Scotland; these have been dated to c.1509.[94] The dendro-chronology results reinforce the argument that trade with Norway was probably important much earlier than documented sources have previously been able to demonstrate. Until

8. Sailors' Walk, Kirkcaldy. An examination of the roofing timbers in the central attic range indicated that the majority of joists corresponded closely to nine Norwegian ells (© Kate Newland, Stavanger Maritime Museum).

recently, it has been difficult to identify Norwegian oak timber because there was a lack of dendrological-data for Norwegian native chronologies. This find at Edinburgh contributes to the known Scottish import chronology and confirms that timbers tested earlier at Fenton Tower and Duntarvie Castle are also probably Norwegian, dating to the mid-sixteenth century.[95] More recent dendro-analysis of oak beams and pine boards belonging to a painted ceiling from Abbey Strand at Holyrood, Edinburgh has confirmed that Norwegian oak dated to c.1564 was used for the ceiling beams. The results for the pine boards were less conclusive, but this timber is also likely to originate from Norway. At present, the quality of pine chronologies in Norway makes it impossible to pinpoint specific localities using the available regional data.[396]

Since Norwegian timber was one of the main imports to several east coast towns during the seventeenth century, it is likely that surviving buildings in eastern Scotland dating from the late-sixteenth or the seventeenth century would also contain some evidence of Norwegian timber. Sailor's Walk (443-449 High Street) in Kirkcaldy is believed to date from, or was substantially enlarged, in the seventeenth century (Figure 8). It was the former Customs House of the burgh.[97] An historic building survey undertaken for the owners, the National Trust for Scotland, by Addyman Archaeology in June 2006,[98] included an investigation of original timbers in the attic areas. It concluded that they might be of Baltic origin dating from the late sixteenth century to the mid-seventeenth century. However, Kirkcaldy's trading links make it more likely that the roof timbers were of Norwegian rather than a Baltic provenance. In the absence of any documentary evidence, only dendro-analysis could confirm this. Nonetheless, a closer look at the length of the rafter couples and tiebeams in the central roof structure revealed some interesting figures. On average, rafter couples in the central attic range equalled approximately 5m (8 Norwegian ells, 16ft 5ins), and tiebeams resting on the wall head were 5.9m (9 Norwegian ells, 18ft).

The thirteen rafter couples of the central range are all marked with Roman numerals on the upper face of each couple collar. This was a common practice in Scotland and also in many other areas of Europe. In the Netherlands roof structures were often constructed off-site by carpenters at framing workshops. Perhaps a similar practice existed between carpenters in Norway and Scotland? At Sailor's Walk the couples are placed in sequence. There are fifty-three in total. Originally they all would have had collar beams and some would have had secondary collars. Some of the collar beams are now missing. In addition there were forty common joists. In total this amounts to approximately two hundred structural components, giving a crude indication of the volume of timbers required for a roof structure similar to Sailors' Walk. A comparison with the cargoes carried by Scottish skippers from Ryfylke indicates that a ship of between fifteen and twenty lasts (forty tons) was capable of carrying the required structural timbers for such a roof structure. This implies that for buildings with similar roof dimensions found in the burghs a single cargo from Norway could have provided the timbers required for an individual roof.[99]



9. The south front of Gardyne's Land, Dundee, the only surviving example of a merchant's house in the city. The dimensions of the timbers indicate that the roof was probably built c.1630 (© Kate Newland, Stavanger Maritime Museum).

10. Methven Castle in Perthshire, the roofing timbers imported from Norway in the seventeenth century are still in situ. (© Kate Newland, Stavanger Maritime Museum).

A similar urban building is Gardyne's Land in Dundee (Fig. 9), the only surviving example of a merchant's house in the city. A dendro-analysis of the structural timbers was undertaken in 2001; the analysis of pine timbers was inconclusive.[100] An examination of the main roof at the south of the property known as Building B revealed that the timber beams spanning the full width of the building are approximately 7.5m (24ft 7ins) or just less than twelve Norwegian ells. In total there are twenty-two roof trusses, with rafters of approximately 6.2m (20ft 4ins) in length, i.e. approximately ten Norwegian ells. The collar beams are approximately 3m (10ft), i.e. approximately five Norwegian ells. All the component parts of the trusses were marked with Roman numerals, which generally corresponded with one another, although the numbering of the trusses is not always in sequence.

Since the Dundee Shipping Lists have already shown that the majority of timber delivered to the town in the seventeenth century originated from Norway, it is reasonable to assume that the timbers at Gardyne's Land probably came from the same source. The dimensions of the surviving timbers certainly seem to support this. As ten-ell beams were recorded arriving from Norway in the Dundee Shipping Lists only during the 1630s, it is possible that this was when the south roof of Gardyne's Land was constructed.[101] (Figure 9)

Methven Castle in Perthshire was fully restored during the 1980s by the current owners. The original seventeenth-century roof on the southern elevation of the building is still intact, whilst the timbers on the south pitch of that roof were replaced.[102] Today there are thirty-seven trusses in total (two are new) and the original beams are numbered from west to east with Roman numerals from II to XXXV. Both the upper and lower collar beams are numbered in series as well, and although some appear to have been placed upside down they are still in sequence.[103] The upper collar beams are approximately 2.2m (3-4 Norwegian ells, 4ft 3ins), the lower collar beams approximately 5.1m (8 Norwegian ells, 16ft), the north pitch rafters 5m (8 Norwegian ells, 16ft) and the replacement rafters 5.6m (9 Norwegian ells, 18ft). (See Figure 10)

Importantly, the original roof timbers at Methven can be linked directly to correspondence describing structural components purchased directly from Norway. This evidence raises the possibility that pre-shaped timbers were

purchased at their source since the required dimensions were specified in the order,[104]

> ...David has given bried and lenth to a merchant that is gone to Norway to be roofing for my loves bonny strong house..., they are now working upon the south wall and middle wall to make them gest hight....[105]

To strengthen and prepare the roof for slating, sarking boards or deals would also have been required. The deals for Methven were to be collected from Dundee by the same ship coming from Norway with roofing timbers. Patrick Smyth, the owner and builder of Methven Castle, was a successful seventeenth-century Scottish merchant and businessman.[106] As a merchant his knowledge of trade, together with his Orcadian background, meant that he probably had excellent contact with timber merchants and suppliers in Norway (whether with fellow Orcadians, Scots or Norwegians) for ordering the required roofing components for Methven.

However, it would be quite remarkable if the roof had been a bespoke structure, made to order in Norway, dismantled and then shipped to Scotland. Thorsten Hanke's research has demonstrated that in the first half of the seventeenth century, Scotland's wrights required large amounts of processed timbers for roof construction, and that these were likely to have been pre-fabricated or shaped at their source.[107] His study focused on roofs in south-east Scotland. The results identified a uniformity in their construction. They also showed that the quantities of timber and the sizes required could not have been processed efficiently by carpenters/sawyers preparing the timber by hand. Hanke concluded that it was quite likely that wrights in south-east Scotland relied on a selection of imported timbers and primarily used pre-fabricated elements. His study found single-rafter roofs that contained softwood timbers of almost uniform dimensions, usually inscribed with Roman numerals. Research carried out in the Netherlands into timber markings used for framing roofs has also demonstrated that carpenters' marks were used as a matter of course for roof structures there, as was the case in most European countries including Norway. Carpenters in the Netherlands generally travelled less than stonemasons and it was normal practice for roof structures to be pre-fabricated some distance from the building site at a framing workshop.[108]

By analogy, if the timbers at Sailor's Walk, Gardyne's Land and Methven were prefabricated or pre-shaped in Norway then the carpenters' marks could have been made before these cargoes left for Scotland. The documentary evidence for Methven Castle certainly could imply that this was the case although it can be interpreted in two ways. It could have simply meant that specific quantities of standardised dimensions were ordered through a merchant or skipper that were then collected from Norway and afterwards set together by carpenters on site in Scotland. A more speculative interpretation is that the order for timber may have required the precise shaping of timbers and prefabrication of the individual component parts of the trusses with the necessary positioning marks for re-assembly. The required carpentry skills certainly existed in Norway, where from at least the 1570s onwards there was a tradition of exporting small prefabricated rowing boats from the fjords around Bergen in western Norway to Scotland.[109] More importantly, there is evidence that Shetlanders from Unst purchased 'timber for houses ready framed' from Bergen in the 1630s,[110] and that complete buildings were also exported to the Faroe Islands and Iceland.[111] Timbers ready-framed for buildings, however, may have been a less welcome commodity for craftsmen on the Scottish mainland, since such imports would have reduced demand for the services of carpenters, sawyers and wrights. The examples examined here, however, do not conclusively demonstrate that roof structures were generally prefabricated to order in Norway before being shipped to Scotland. It is perhaps more likely that a quantity of standardised dimensions were bought, and then trimmed as necessary on site. However, it is a feasible hypothesis and further research is required in this area.

IMPACT ON SCOTTISH BUILDING TRADITIONS

Scotland's Renaissance houses had been traditionally constructed with substantial stone walls, stone vaults, and a few small windows on the ground floor with larger ones on the upper storeys.[112] A fundamental factor that had dictated the overall dimensions of this type of building was the maximum span of a stone barrel vault of approximately 20ft (6m) customarily used in Scotland.[113] However, during the seventeenth century many structural elements were remodelled. Significantly, wall thicknesses were reduced in order to widen rooms; vaults were removed and replaced with timber joisting to carry the floors above; plaster ceilings were introduced; and more numerous

11. Gillespie House, Elie: the surviving doorpiece from Gillespie's merchant house showing his family crest, his initials with those of his wife Christian Small and the date 1682. (© Kate Newland, Stavanger Maritime Museum).

and larger windows with shutters were inserted. Interiors required panelling, partitions and furniture.[114] All these building developments demanded greater quantities of timber components, which could be sourced efficiently from Norway.

The shipping records from both Dundee and Ryfylke indicate that the greatest demand was for nine- and twelve-ell lengths of timber beams, which correspond convincingly with the dimensions of timbers found in situ at two rare surviving examples of seventeenth-century urban buildings - namely Gardyne's Land in Dundee and Sailor's Walk in Kirkcaldy. There is a strong likelihood that all the necessary constituent parts required for a roof's construction could be purchased directly from Norway, and that the timber needed for a roof such as that of Gardyne's Land or Sailor's Walk could have been shipped in one or two cargoes depending on the size of the vessel. The evidence also raises the possibility that ready-framed roof structures may have been commissioned directly from Norway for Methven and Panmure.

Perhaps of greater significance for Scottish buildings was that Norwegian timber provided builders with longer spans for structural work, allowing buildings to be constructed beyond the traditional limitations of earlier stone-vaulted buildings. At Gardyne's Land, this resulted in a building span of almost twenty-four feet, and at Panmure House twenty-seven feet. The adoption of wider spans and/or a greater application of timber was apparent in all the houses examined here. At these buildings, original walls were often cut back by several feet to create wider and larger rooms, stone vaults were removed and replaced with flooring joists, and numerous windows were inserted, usually with the intention of creating a balanced and regular facade. Roofing required not only structural timbers (rafters, collar beams and ashlar posts), but also sarking and lathes to support slates, tiles, and plaster ceilings, each process requiring different techniques, other structural developments that relied on Norwegian timber included flooring and windows.[115]

Skipper Gillespie undertook his last two voyages to Norway in 1682 and 1683, by this time he had become a successful merchant and wealthy country gentleman having inherited the country estate of Newton Rires in 1677 from his wife's family. He may have had personal reasons for these last trips to Norway, as he was building his own impressive merchant's house looking out to sea over Elie harbour. Gillespie would certainly have had all the necessary

knowledge and contacts in Norway for obtaining the best timber that he required for his building works. The house had a stone door piece incorporating both his and his wife's initials, their family crest and the date 1682. As was the case with many urban dwellings built in the seventeenth century, Gillespie's townhouse was demolished in the nineteenth century, and all that remains today is the elaborate carved stone doorway. Fortunately it was re-used in the new building which was suitably named "Gillespie House". (See Figure 11)

CONCLUSION

It is clear that Norway supplied most of Scotland's building timber in the seventeenth century and that this successful trade was based on a combination of new technology in the form of the water-driven sawmill, of mass production, and of standardised products such as nine- and twelve-ell beams. By first establishing what the preferred timber cuts from Norway were, it has been possible to identify a significant change in Scottish building design brought about by the emergence of this new timber source. Essentially, Norwegian timber provided Scottish builders with longer spans for structural work; this presented the opportunity to construct buildings beyond the 20 foot limitations of earlier stone vaulted buildings.

For the Scottish skippers and merchants participating in the timber trade, collecting timber from the fjords and forest-farms of western Norway was a relatively straightforward process. Skippers took advantage of the close proximity of the Norwegian coast, making several voyages annually to meet the ever growing demands for building materials in Scotland. The timber trade with Norway relied on Scottish skippers like Gillespie and the Bowers in Dundee having not only a sound knowledge and understanding of Norwegian waters, but also having widespread personal networks for carrying out their business transactions with Norwegian forest-farmers and sawmill owners. An enduring legacy of the timber trade of this period is that it continues to be known in Norway as skottehandelen - the Scottish Trade - a distinct reminder of the Scots' significance to the local economy in south-western Norway.

Notes

[1] Taken from the ballad of Sir Patrick Spens (anonymous) in Arthur Quiller-Couch, ed., The Oxford Book of English Verse: 1250–1900(1919) 403-405.
[2] T.C. Smout, Scottish Trade on the Eve of the Union 1660-1707(Oliver & Boyd Ltd, 1963).
[3] Norman MacDougall, James IV (Edinburgh: John Donald, 1989).
[4] T. C. Smout, Alan R. MacDonald and Fiona Watson, A History of the Native Woodlands of Scotland, 1500-1920 (Edinburgh: Edinburgh University Press, 2005), 45-47.
[5] RPS 1535/17. Records of the Parliaments of Scotland to 1707, K.M. Brown et al eds (St Andrews, 2007-2011) http://www.rps.ac.uk date accessed: 17 May 2009.
[6]A. Lillehammer, 'Ryfylke Farmers and Scottish Skippers', in D. J. Starkey and M. Hahn-Pedersen (eds.), Concentration and Dependency: the role of maritime activities in North Sea communities, 1299-1999, 6th North Sea History Conference: Hull; Esbjerg Fiskeri –og sjøfartsmuseets studieserie; 14 (Esbjerg, 1999) ; 'Sagskurd og trelast i Ryfylke først på 1600-talet', Frå bygd og by i Rogaland Årbok Rogaland Folkemuseum XXI, ed. by Jone Johnsen, (Stavanger: Stavanger Museum, 1977) ; 'The Scottish-Norwegian Timber Trade in the Stavanger area in the sixteenth and seventeenth centuries', in T.C. Smout (ed.), Scotland and Europe 1200-1850 (Edinburgh, 1986) ; 'Skottehandelen og Rogaland', in Ætt og Heim Lokalhistorisk årbok for Rogaland (Stavanger,1987) ; 'Boards, Beams and Barrel-hoops: contacts between Scotland and the Stavanger Area in the Seventeenth Century', in G. Simpson(ed.), Scotland and Scandinavia 800-1800 (Edinburgh, 1990) ; 'Trelastutførsel til Holland, Skottland og Danmark', in Bjørn Slettan(ed.), Skogsbrukpolitikk og trelasthandel, Skriftserien/Høgskolen i Agder, (Kristiansand, 1997) ; 'The Timber Trade and the Ryfylke Farmers c.1500-1700', in Timber and Trade: Articles on the timber export from the Ryfylke area to Scotland and Holland in the 16th and 17th centuries', (Fagrapport, nr 1: Lokalhistorisk Stiftelse,1999); 'Skottar og hollendarar på Agder- og Rogalandskysten', in Kontakten mellom Agder og Holland på 1600- og 1700-tallet (Flekkefjord, 2001).
[7] T.C. Smout, Scottish Trade on the Eve of the Union 1660-1707(Oliver & Boyd Ltd, 1963); 'Scottish Commercial Factors in the Baltic at the end of the Seventeenth Century', in Scottish Historical Review 120 (Edinburgh, 1960); 'Some problems of timber supply in later seventeenth century Scotland', Scottish Forestry 15 (1960); Scotland and Europe 1200-1850 (Edinburgh, 1986) and 'The Norwegian Timber Trade from the Scottish Perspective', in Timber and Trade: Articles on the timber export from the Ryfylke area to Scotland and Holland in the 16th and 17th centuries', (Fagrapport, nr 1: Lokalhistorisk Stiftelse, 1999).
[8] Special Collections, St Andrews University: ms38352. See also Paula Martin, "Journal of A. Gillespie, skipper in Elie, for the years 1662 to 1685" (transcription). St.Andrews University Archives.
[9] Martin, "Journal of A. Gillespie, skipper in Elie, for the years 1662 to 1685", 23.
[10] Smout, Scottish Trade on the Eve of Union, 155.
[11] Martin, "Journal of A. Gillespie, skipper in Elie, for the years 1662 to 1685", 4.
[12] With thanks to Endre Elvestad - marine archæologist- Stavanger Maritime Museum.
[13] Ernst Berge Drange, Erfjord: Gardar og folk I, Sand 2004,409
[14] Ola Foldøy, Jelsa I Gards og Ættesoga, Stavanger 1967, 638.
[15] Foldøy, 639
[16] Drange, Erfjord, 456.
[17] 213501 Ladberget, Jelsa, Rogaland, Heradsregisteret, Oslo; http://www.edd.uio.no/perl/search/search.cgi
[18] Pers .comm. Endre Elvestad.
[19] Regesta Norvegica, Bd. 3, Nr. 1151.
[20] In 2011 Lillehammer gave his research notes and papers to the Stavanger Maritime Museum and these are being used as the basis for developing a database of the Ryfylke toll lists.
[21] The origins of a Norwegian ell stemmed from the practice of taking a measurement of the forearm from elbow to fingertips. Prior to 1541 there were many different local variants. It was not standardised until the Sjellanske Alen was introduced, used from 1541 to 1683 for all trade goods in Denmark-Norway, which measured 63.3 cm. The local town halls each had their own version of the Sjellanske Alen, on the reverse of which was the equivalent local measurement. On 1 May 1683 a new ell was introduced in Norway, which was the equivalent of two Rhineland feet and equalled 62.8cm. This continued with a minute change in 1884, until the adoption of the metric system in 1887. The ell had other definitions elsewhere and a Scots ell (37 inches) was much larger at 94cm. This became the national standard in 1661, although it was first recognised as the Edinburgh standard in 1624.
[22] Four burgh registers of shipping known as the Dundee Shipping Lists 1580-1713: Dundee City Archives; A.H.Millar, (ed.), The Compt Buik of David Wedderburne, Merchant of Dundee 1587-1630, Scottish History Society 28 (Edinburgh, 1898), and Friends of Dundee City Archives, Dundee Shipping List Database (a combination of the two aforementioned sources), 2005.
[23] A.H.Millar, (ed.), The Compt Buik of David Wedderburne, 238.
[24] Friends of Dundee City Archives, Dundee Shipping List Database, 2005.
[25] Dundee Shipping List: Database.
[26] Since the standard Scottish ell was not officially accepted until 1661 it is possible that Scottish skippers would have used Norwegian units of measurement. A comparison with the Ryfylke toll books seems to confirm this. It would seem logical then to deduce that the timber being landed at Dundee was calculated using the Norwegian ell, i.e. nine ells equalled 5.7 metres and twelve ells equalled 7.6 metres.
[27] The period from 1616 to 1655 is examined here since it is the earliest comparable data available from both the Øresund Toll and the Dundee Shipping Lists. Earlier data for imports to Dundee are recorded in The compt buik of David Wedderburne, however the data is inconsistent and not all vessels arriving at Dundee have their cargoes listed. The number of vessels arriving in the period from 1580 to 1618 can be calculated. Fifty-two ships arrived from Norway, twenty-six from Baltic ports, and there were six additional vessels that delivered timber where no mention of the source country was recorded. This indicates that by the end of sixteenth century Norway was already an important source of timber for Dundee, although we do not know the extent or value of the volumes imported.
[28] This aspect of Scotland's timber trade is covered more extensively in Katharyne Clare Newland, 'The acquisition and use of Norwegian timber in

seventeenth century Scotland, with reference to the principal building works of James Baine, His Majesty's Master Wright', (unpublished doctoral thesis, University of Dundee, 2010) Chapter 1 , 30-50.
[29] Norges Rigsregistranter I, 356 f. cited in A. Bugge, Den norske trælasthandels historie 219 -220.
[30] Norges Rigsregistranter III, 148 cited in A. Bugge, Den norske trælasthandels historie 221.
[31] See 1639 in the Dundee Shipping List: Database.
[32] Oppgangsag – gate saw or sash saw, in Einar Haugen, Norsk-Engelsk Ordbok, Norwegian-English Dictionary, 4th edn (Oslo: Universitetsforlaget, 1996), 297.
[33] Lillehammer,'Sagskurd og trelast i Ryfylke... først på 1600-talet', 30-31 and 'The Timber Trade and the Ryfylke Farmers,'13.
[34] Alexander Bugge, Den norske trælastshandels historie (Skien: Fremskridts boktrykkeri, 1925), 344-355.
[35] Lillehammer, 'Sagskurd og trelast i Ryfylke først på 1600-talet', Frå bygd og by i Rogaland, 31.
[36] Trygve Brandal,'Skog, sager og trelasthandel', Hjelmeland bygdesoge I: Tida før 1800 (Hjelmeland: Hjelmeland Kommune, 1997), 84 -88.
[37] Johan Schreiner: 'Det nye sagbruk', in den Norske Kulturhistorie Anders Bugge and Sverre Steen (eds.), Norsk kulturhistorie (Oslo, 1938)115 – 138.
[38] Newland, 'The acquisition and use of Norwegian timber ..., 63.
[39] Louden Anderson, A History of Scottish Forestry, Vol. I, (Thomas Nelson Ltd, 1967) pp 315-332.
[40] Edinburgh City Archives SL34/1/1/1-3, Incorporation of Wrights and Masons of Edinburgh (Mary's Chapel) 1669-1709.
[41] John Hislop was an apprentice to James Baine c.1675, see Francis Bamford, The Dictionary of Edinburgh Wrights and Furniture makers, 1660-1840 (London: Furniture History Society, 1983), 41.
[42] RPS 1695/5/234, NAS PA2/36, f.163 v. Records of the Parliaments of Scotland to 1707, K.M. Brown et al eds (St Andrews, 2007-2011) http://www.rps.ac.uk date accessed: 16 May 2008.
[43] J. de Vries, and Ad van der Woude, First Modern Economy: success, failure and perseverance of the Dutch economy, 1500-1815 (Cambridge, 1997) 301.
[44] Robert Edward, A Description of the County of Angus in the year 1678 (Privately printed from second edition, 1880) 6.
[45] Anne Crone and Fiona Watson, 'Sufficiency to Scarcity: Medieval Scotland, 500-1600' in People and Woods in Scotland: A History, ed. by T. C. Smout (Edinburgh: Edinburgh University Press, 2003), 75-78.
[46] Smout, 'The Norwegian Timber Trade from the Scottish Perspective,' 40.
[47] Ibid., p.84-85.
[48] Smout, MacDonald and Watson, 80-82.
[49] Smout, MacDonald and Watson, History of the Native Woodlands of Scotland, p.80-82.
[50] C. Mills, 'Dendrochronology of oak timbers from historic buildings in St. Andrews, Fife', Tayside and Fife Archaeol. J. 6 (2000), 200-210; Crone and Watson, 75.
[51] Crone and Watson, 'Sufficiency to Scarcity: Medieval Scotland, 500-1600', 75-78.
[52] Smout, The Norwegian Timber Trade from the Scottish Perspective, 37-55.
[53] Smout, MacDonald and Watson, A History of the Native Woodlands of Scotland, pp 124-125, and A. Thomson, 'The Scottish Timber Trade, 1680-1800.' PhD. Diss., University of St. Andrews, 1990, p1.
[54] Norges Rigsregistranter I, 356 f. and III, 148 cited in A. Bugge, Den norske trælasthandels historie 219 -221.
[55] Ibid., 221.
[56] "Chalder" comprised of sixteen bolls (from the French chaudron, meaning a 'kettle').See note 70 for definition of "boll".
[57] Bugge, Den norske trælasthandels historie, p.205-221, and Register of the Privy Council, Fol.180,a;Fol. 186, b; Fol.187,a. H.Slade, "Craigston Castle, Aberdeenshire" in Proceedings of the Society of Antiquaries of Scotland, Vol.108 (Edinburgh, 1977), p.273.
[58] Pers. Comm. Matt Davis re: building of Fraser and Craigston.
[59] Register of the Privy Council, Fol. 186, b.
[60] The nobility were also able to claim certain privileges that required no payment of import duties on some goods. This privilege was similar to one which relieved import duties on materials required for fishing and shipbuilding and mariners paid nothing on goods imported for their own use and at their own risk. See T.C.Smout, Scottish Trade on the Eve of the Union 1660-1707, 38.
[61] Strathmore Muniments NRAS 885; Patrick Lyon, 1st Earl of Strathmore 1642-1695. The Book of Record: a diary written by Patrick first Earl of Strathmore and other documents relating to Glamis Castle, 1684-1689, A.H. Millar (ed.) Scottish History Society 9, (1890)
[62] NRAS 855/108/4
[63] NRAS 855/148/1/44
[64] NRAS 855/62/6
[65] NRAS 855/108/13
[66]NRAS 855/ 190/2/13; further accounts of the Earl of Strathmore trading with Holland and Norway 1681-1687 and his share in the Lyon [a volume of 12 pages] are contained in NRAS 855/ 1/20.
[67] NRAS 855/ 51/3/1 - [11 folio leaves]
[68] David Dobson, Mariners of Angus 1600-1700, (St.Andrews, 1992)
[69] NRAS 855/ 198/5/1
[70] Strathmore, Book of Record, 60.
[71] Dobson, Mariners of Angus 1600-1700.
[72] Strathmore, Book of Record, 68.
[73] NRAS 855/ 256/1
[74] "boll" – basic unit of dry capacity, the amount depended on what was being measured i.e. wheat, peas, beans and meal, were considered separately from barley, oats and malt. According to the standard measure of Linlithgow adopted in 1661 one boll of meal was equal to approximately 145 litres, whereas one boll of oats or malt was equal to approximately 212 litres. Sixteen bolls made a "chalder" or chaldron (from the French chaudron, meaning a 'kettle').See Scottish Archive Network (SCAN) , Scottish Weights and Measures, www.scan.org.uk/measures/capacity.asp
[75] NAS GD45/18/602
[76] Dobson, Mariners of Angus 1600-1700.

[77] NRAS 855/ 148/1/44; 198/6/41 and 56/2
[78] Charles McKean (ed), Bob Harris and Christopher Whatley, Dundee 1500-1800: Renaissance Burgh to Enlightenment Town (Dundee, 2009).
[79] Kate Newland, "James Baine, His Majesty's Master Wright, c.1630-1704: 'an honest and ingenuous spirit…'" in Review of Scottish Culture 24 (2012) 50-69.
[80] NAS GD45/27/128
[81] NAS GD45/27/128 and NAS GD45/18/576/5
[82] NAS GD45/18/571/3
[83] NAS GD45/18/566-1
[84] Brandal, "Skog, sager og trelasthandel", p84.
[85] Martin, "Journal of A. Gillespie, skipper in Elie,for the years 1662 to 1685".
[86] NAS GD45/27/128
[87] NAS GD45/27/128
[88] William Adam, Vitruvius Scoticus, James Simpson (ed), (Edinburgh, 1980) see Plates 129, 130 and 131.
[89] R.T. Gunther, (ed.) Sir Roger Pratt: Charles II's Commissioner for the Re-building of London after the Great Fire, (Oxford, 1928) 240.
[90] NAS GD45/18/27/128
[91] In Scotland roofs were completely covered with sarking boards to which slates were nailed without timber battens. This makes for strong wind resistant roofs, often with a steeper pitch than those found in England for example.
[92] NAS GD45/18/719
[93] A complete description of the building works and analysis of the timber used at Panmure can be found in Kate Newland: 'The construction chronology and significance of timber for building Panmure House, Angus', in Proceedings of the Society of Antiquaries of Scotland, 141 (2011) 293-326.
[94] Crone, A. and D. Gallagher, 'The Late-medieval Roof over the Great Hall in Edinburgh Castle', in Medieval Archaeology Vol.52, (2008) 231-260.
[95] Ibid.,.250-251.
[96] Anne Crone, Dendrochronological Assessment of the Historic Scotland Collection of Painted Ceiling Timbers, unpublished report by AOC Archaeology 2002.
[97] G. M. Lendrum, Kirkcaldy's Oldest House: a plea for its preservation, (Kirkcaldy: 1935).The earliest date associated with the building is 1459, and a coat of arms of Charles II dated 1663 or 1682 can also be found in the building.
[98] Addyman Archaeology, Sailor's Walk, 443-449 High Street, Kirkcaldy, Fife: Analytical assessment and historic building survey for the National Trust for Scotland, (interim draft: 12 June 2006).
[99] Lillehammer, 'Sagskurd og trelast…" translation of text.27 and Brandal, "Skog, sager og trelasthandel", 84.
[100] Anne Crone, Gardyne's Land Dundee: dendrochronological analysis of the structural timbers, (unpublished report, AOC Archaeology, 2002).
[101] A separate roof in another area of this complex of buildings was known to have had a painted ceiling (now missing) dated to c.1654.
[102] David Murdoch, 'Methven Castle', (unpublished B.Arch dissertation,Duncan of Jordanstone College of Art and Design, 1985 (now part of Dundee University).
[103] Herman Janse, Houten Kappen in Nederland 1000-1940 [Wooden Roofs in the Netherlands 1000-1940], (Delft: Delftse Universitaire Pers, 1989).
[104] Charles Wemyss, 'Some aspects of Scottish country house construction in the post-restoration period: Patrick Smyth and the building of Methven Castle 1678-1681', (unpublished master's thesis, University of Dundee, 2002), 37.
[105] Perth Museum and Gallery Archive 873 (BOX 449): Letter from Anne Keith to her husband Patrick Smythe 1681.
[106] Charles Wemyss, 'A Study of Aspiration and Ambition: the Scottish Treasury Commission and its impact upon the development of Scottish Country House Architecture 1667-1682', (unpublished doctoral thesis, University of Dundee, 2009), 112.
[107] Thorsten Hanke, 'The Development of Roof Carpentry in south east Scotland until 1647', (unpublished master's dissertation, University of Edinburgh, 2005).
[108] Janse, Houten in Nederland, 389.
[109] Atle Thowsen, 'The Norwegian Export of Boats to Shetland, and its influence upon Shetland boat building and usage', in Sjøfarts Historisk Årbok (1969), 145-207; Anton Espeland, Skottene i Hordaland og Rogaland fra aar 1500-1800 (Norheimsund: Historielaget i Hardanger Tillagsskrift, 1921), 23.
[110] Thowsen, 'Norwegian Export of Boats to Shetland', 150.
[111] Bjarne Stoklund, Det Færøske hus i kultur-historisk belysning, Færoensia: textus & investigationes / auspiciis Societatis Litterarum Færoensium Hafniensis 14, (Copenhagen: Reitzel, 1996).
[112] Deborah Howard, Scottish Architecture from the Reformation to the Restoration, 1560-1660 (Edinburgh: Edinburgh University Press, 1995), 53.
[113]Howard, 68; Charles McKean, The Scottish Chateau: The Country House of Renaissance Scotland, (Stroud: Sutton, 2001), 66.
[114] McKean, 35-36, 136, 197-199, 205. According to McKean wall thicknesses altered from 6ft plus in the fifteenth century to 4½ft minus in the sixteenth century and to 3-3½ft by the seventeenth century.
[115] At the same time, this increased prominence in the use of timber as a key building material contributed to a rise in the status and influence of wrights in late-seventeenth-century Scotland. See Newland, 'The acquisition and use of Norwegian timber in seventeenth century Scotland…", (unpublished doctoral thesis, University of Dundee, 2010) Part 2 : Chapters 4-8 , 103-156.

SAMMENDRAG

Denne artikkelen drøfter norsk trelasts betydning for byggevirksomheten i Skottland på 1600-tallet. Skottland hadde blitt mer og mer avhengig av tømmerimport ettersom skogene hadde blitt uthogd. Det som fantes igjen, sto gjerne i utilgjengelige strøk, langt fra elver eller sjø, slik at tømmeret eventuelt måtte transporteres over land, noe som var svært kostbart. Da var det enklere og rimeligere å importere fra Sørvest-Norge, ikke minst fra Ryfylke.

De skotske skipperne som seilte over Nordsjøen for å kjøpe tømmer, har etterlatt seg mange spor i skriftlige kilder. Disse kildene gjør det mulig å følge tømmeret fra lasteplassene i Norge til byggeplassene i Skottland. I denne artikkelen har jeg utnyttet tollregnskapene for Ryfylke, skipslister fra Dundee, bygningskontrakter, bygningsregnskaper, brev, en dagbok og en skippers journal. I tillegg har jeg studert mange skotske bygninger og bygningskonstruksjoner fra perioden.

Målsettingen har vært å følge tømmeret fra Ryfylke til Skottland og bli kjent med noen av de skippere og kjøpmenn som var involvert, deretter å diskutere årsakene til at Skottland trengte bygningstømmer utenfra, og til slutt å vurdere det norske tømmerets betydning for bygningsvirksomheten i Skottland på 1600-tallet.

Skipslistene både fra Dundee og Ryfylke viser at det var størst etterspørsel etter stokker av ni og tolv alens lengde. Dette samsvarer svært godt med dimensjonene som finnes i taket til to sjeldne 1600-talls urbane bygninger, Gardyne's Land i Dundee og Sailor's Walk i Kirkcaldy. Det er sannsynlig at alt tømmeret som trengtes til slike takkonstruksjoner kunne kjøpes direkte i Norge, og at det kunne fraktes i en eller to skipslaster, avhengig av skipenes størrelse.

Kanskje enda viktigere var det at skogsbøndene i Ryfylke også kunne levere større dimensjoner, stokker som kunne brukes som bærebjelker. Dermed ble det mulig å bygge tak og etasjeskiller som var mye større enn tønnehvelvene av stein, de hadde tradisjonelt hatt en maksimal spennvidde på 20 fot, eller 6 meter. Alle bygninger som er undersøkt her, hadde et større spenn, Gardyne's Land nesten 24 fot og Panmure House 27. Det at man tok i bruk trebjelker, fikk også andre bygningsmessige konsekvenser. Tykkelsen på veggene kunne reduseres, slik at rommene ble større. Mange tønnehvelv ble også erstattet av lettere trekonstruksjoner.

Den viktigste forutsetningen for den suksessrike trelasteksporten fra Norge på 1600-tallet, var oppgangssagene. Denne nye teknologien ga helt nye handelsmuligheter for skogsbøndene langs kysten hvor sagene ble bygget ved elvemunningene, slik som i Økstrafjorden i Ryfylke. Lokalbefolkningen ble godt kjent med de skotske skipperne som gjerne kom tilbake år etter år. Skottene måtte ikke bare ha god kunnskap om å navigere på Norskekysten, de måtte også etablere personlige nettverk med norske bønder og sageiere. Bare slik kunne de utøve sin virksomhet på en lønnsom måte.

Et varig minne om trelasthandelen på 1600-tallet er at perioden fortsatt kalles skottetida i Ryfylke, en tydelig påminnelse om skottenes betydning for den lokale økonomien.