



## SCOTTISH WOODLAND HISTORY CONFERENCE NOTES XVII

### ***Woods, Trade and Boats***



SEVENTEENTH MEETING

THURSDAY 25<sup>th</sup> OCTOBER 2012  
A K BELL LIBRARY, PERTH

## A C K N O W L E D G E M E N T S

The Native Woodlands Discussion Group is indebted to the undernoted for their sponsorship and help in making the 17th meeting of the Scottish Woodland History Conference a success:



In 2012, the NWDG Scottish Woodland History Conference (*formerly the Scottish Woodland History Discussion Group Conference*) was organised by Mairi Stewart, Chris Smout, Coralie Mills & Jonathan Wordsworth with the administrative support of Alison Averis. We are grateful to all those who helped to make the conference a success including our sponsors, chairpersons, speakers, helpers and delegates.

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**Front cover illustration:** Norse use of the Scots pine by Mike Taylor, Tain (from Crawford 1995)

# ***Woods, Trade and Boats***

Edited by Coralie M Mills

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## INTRODUCTION

***Chris Smout***

The Scottish Woodland History Group met again last year in the A K Bell Library in Perth, on October 25<sup>th</sup> 2012, with a maritime theme to consider: 'Woods, Trade and Boats'. We began with an excellent paper from Arnvid Lillehammer, formerly of the University of Stavanger and the Stavanger Museum, who surveyed the Scottish trade in timber to Norway, which flourished in the sixteenth and seventeenth centuries between east coast Scottish ports (Dundee in particular), and the south-west Norwegian provinces, especially Agder and Ryfylke (where Stavanger is situated) and Sunnhordland (mainly south of Bergen). It was a trade born of the Scottish need for timber and the Norwegian need for grain products, and arising when the farmers of south-west Norway began to clear their land of the forests that had grown up on deserted land after the plagues and depopulation of the late Middle Ages. It was facilitated by the proliferation of sawmills, a new technology, along the Norwegian rivers close to the sea, often allowing the Scots to tie their boats up at the same small places in the fjords to load up with wood, year after year. The main exports from Norway were beams or baulks of pine, sawn deals, and barrel hoops of hazel, with a little firewood: and the main imports were grain, flour, 'Scots bread', which was perhaps oatcakes, with a little woollen and linen cloth, or shoes, and the balance paid in coin: as time passed, the Scots cargoes became more varied because they sailed first to Holland and bought goods like tobacco, rice, figs and raisins to sell in Norway. Sometimes, as around 1620, the boats numbered several hundred in a year. The trade came to an end in the early eighteenth century, partly because deforestation in Norway sent the Scots further afield to Sweden and the inner Baltic to look for wood, and partly because customs regulations, trying to concentrate the trade in Stavanger itself, killed the goose that laid the golden eggs. One aspect of the trade was the specialised traffic in prefabricated boats from the fjords of Sunnhordland, exported by Orkney and Shetland skippers and presumably mainly used in the islands as fishing yawls. The area that made them is still famous for the quality of their boats.

This splendid start was followed by an important paper from Anne Crone and Coralie Mills, summarising their work on dendrochronology, carried out over many years on oak in Scottish buildings and more recently on Scots pine as well. The great value of aging timber through examining the tree rings is the ability to build up data sets that cover a very long period, independent of the possible biases and gaps in the documentary record. They were able to show how buildings from the earlier middle ages consistently used Scottish-grown oak until, in the middle of the fifteenth century, there starts to appear a switch to imports of oak beams and battens from southern Scandinavia and the Baltic (as found in Stirling Castle), and increasingly from the mid-sixteenth century, of pine beams and boards, especially from Norway. In the eighteenth century, the dendrochronology backs up the written history in revealing a switch to the inner Baltic, with timber used in Fort George, for example, coming from Karelia, the disputed province on the borders of Finland and Russia. The granary at Elie from around 1808 has German oak, and more surprisingly, some American oak as well.

A joint paper from Robert Prescott and Dan Atkinson followed, discussing ship timbers reused onshore, and found today in a range of buildings. Naval timber can often be recognised by an ancient system of 'race marks' cut on the beams to allow shipyard identification in the eighteenth and nineteenth centuries. *The Unicorn* in Dundee is a treasure house of such material. When the vessels were broken up, the wood might be reused, and buildings such as the royal dockyards at Chatham made extensive use of recycled material. Other buildings in England that contain naval timbers include the Chesapeake Mill in Hampshire that was constructed from the remains of an American warship captured in 1812, and Liberty's store in Regent Street, London. Timbers from *HMS Beagle* that carried Darwin round the world ended up as part of a shed by the River Roach in Essex, but it is now unfortunately destroyed. Ships timbers, though not specifically naval timbers, also occur in buildings in Scotland, as at Portsoy and

Dunbar: old fishing boats in seaside burghs were a ready source for local joiners, and many of these boats were constructed from Scottish larch, oak and pine –itself a good topic for further research.

After lunch we reassembled for the afternoon papers, led by Eric Graham's exposition of the building of the *Great Michael* for James IV, a ship which represented a 'quantum leap' in naval design and led to an arms race between Scotland and England, where Henry VIII countered by building vessels like the Mary Rose. The origins of such ships were shown to lie with the Portuguese carracks, essentially elaborate floating gun platforms, tiered like castles. The oak used in the hull of the *Great Michael* could have used up to eighty hectares of forest, and the pine used in the decking was also demanding on native resources. In fact a good deal of the wood came from outwith Scotland, from Norway and France.

Jim Skelton took us forward nearly three centuries to the ship-building enterprises at the mouth of the river Spey, initiated in 1782 by Dodsworth and Osborne's purchase of Glenmore forest from the Duke of Gordon. The timber was floated in rafts down the river, ending at a well-equipped shipyard with sawmill and wind mill at Speymouth. By 1806 when they ceased operation, some 19,000 tons of shipping had been launched, including the frigate *HMS Glenmore*. After the end of the Napoleonic wars the industry had varying fortunes, but up to twenty firms were involved over time, though not more than seven in the area at once. More than 80,000 tons of shipping were built at Speymouth altogether, and there was particularly a new spurt of activity in the 1840s. The importance of the industry to the local economy was reflected in the length of the toast lists at celebration dinners following a launch—thirteen toasts were par for the course.

From this we turned to the west-coast tradition of birlinn building and its modern successors in the region, described by Gavin and Colin Parsons. Birlinns had their origin in Viking boats, but the design and the association with chiefly display lasted through to the eighteenth century. Somerled in 1156 sailed against a rival with eighty warships, which gives an indication of the scale of birlinn construction even in the early middle ages. Some had as many as sixteen oars, but always a single mast, and their image is familiar on gravestones throughout Argyll and the isles. Gaelic poetry even in the eighteenth century shows their continuing prestige as weapons of war and symbols of power, and confirms that the hulls at least were built of oak. The tradition of vernacular ship building continued in the area long after the need for warships was past, and oral history shows how it was passed down to the present day. Small wooden boats are still skilfully made in the west.

After a tea break, Barbara Crawford resumed the Norse theme that had run through much of the day's proceedings by showing how the Viking earls of Orkney had looked to the mainland to find the wood supplies they needed to maintain their sea power. They were also earls of Caithness, and Sutherland was within their power, but particularly tempting were the resources of Ross. Operating through client Norse colonists in Easter Ross at Dingwall and elsewhere, they were apparently able to control a whole suite of glens to the west, leaving their trace in place-names like Eskdale (ash glen), Alladale (alder glen) and Dibiedale (deep glen), and various Annats which indicate the meeting place of two rivers. The tall pines of Strath Carron were perhaps especially valuable for masts – even as late as the eighteenth century they attracted the attention of the royal navy, and one can readily imagine how the Viking earls had them floated downstream to ship-building yards at the mouth of the rivers.

## **SCOTS IN THE TIMBER TRADE ALONG THE WESTERN AND SOUTHERN COASTS OF NORWAY IN THE 16TH – 17TH CENTURIES**

***Arnvid Lillehammer***

Thank you so much for the invitation to present a picture of the so called Scottish Timber Trade along the western and southern coasts of Norway in the 16th and 17th centuries. I have presented some of my research on seminars in Britain before, the first time in St. Andrews in 1983 (Lillehammer 1986) and the second time in Aberdeen in 1987 (Lillehammer 1990). The third time was in Hull in 1999 (Lillehammer 2002). But in all these seminars I concentrated on just a small part of our long and winding Norwegian coast: the district of Ryfylke (Illus 1) where I myself grew up and know quite well.

In those seminars I could present a very lively trade with tens of Scottish vessels every year crossing the North Sea buying different kinds of processed wood from the farmers: primarily board, beams, barrel-hoops and firewood. But after those three visits I have not had much chance to continue my work with this trade since I for many years was alone teaching Norwegian and European history from 500 BC to 1815 AD at the University of Stavanger, which did not give me much time to do any historical research. But when I got the question about this seminar, I saw a chance to broaden my geographical approach, and try to give you a picture of this interesting trade along the whole western and southern coast of Norway with the following question as a point of departure:

*How was the timber trade in Ryfylke compared to the trade from other parts of this long coast? Was it different or was it in conformity with the corresponding trade in other districts.*

Let me start by saying a few words about the background for this trade, both the international background and the local Norwegian background. A saying from 1526 illustrates how common the Scots were along the Norwegian coast already in the first half of the sixteenth century:

*Gud bevare os, nei det er vel heller en Scotte, som indtager Trælast!*  
In English: *Good Lord, no, it must rather be a Scot, loading timber.*

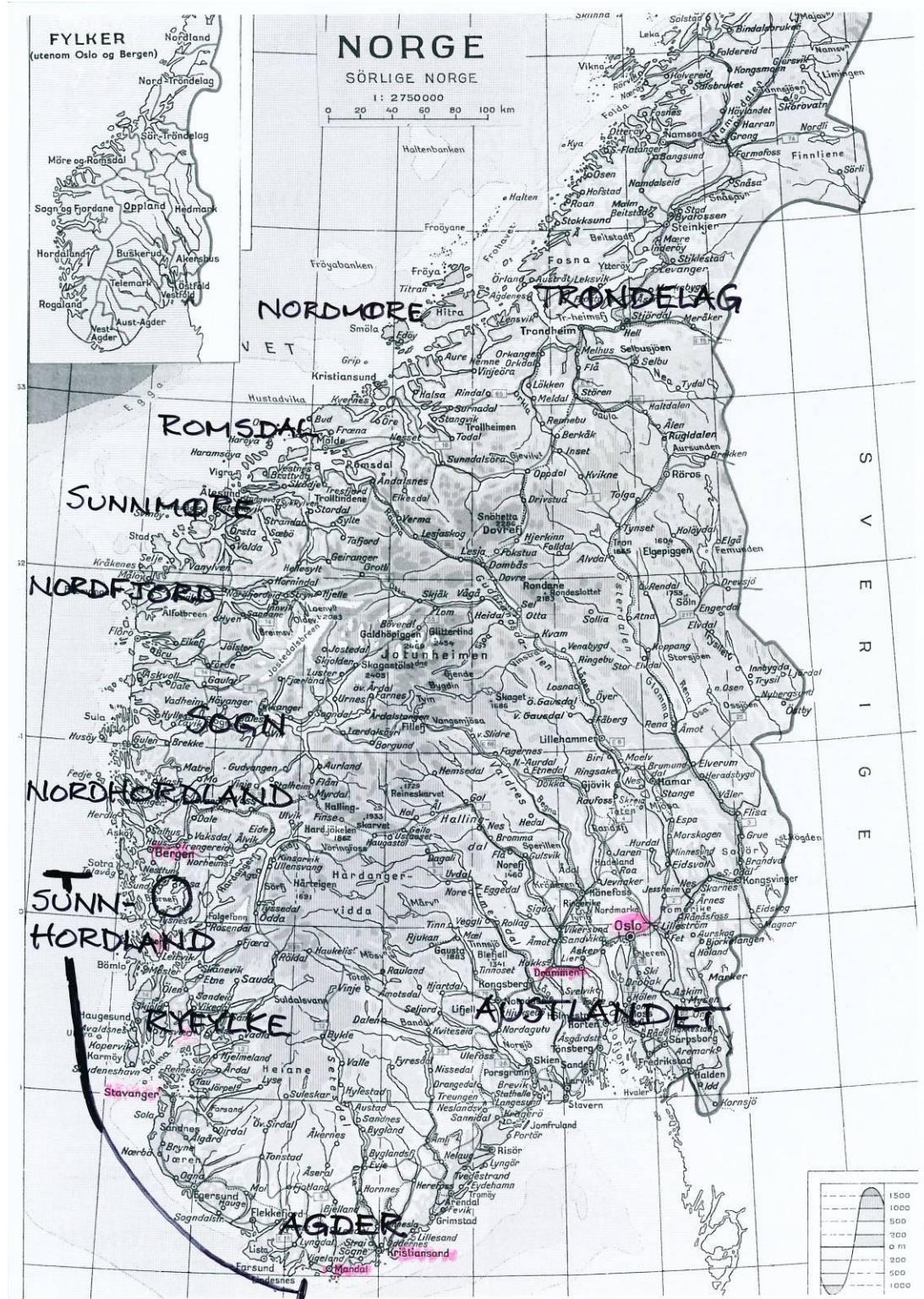
The outburst came from some seamen on a Hanseatic vessel on its way from the Baltic to Bergen when they saw a suspicious kreier in the harbor of Mandal on the southern coast of Norway, a vessel that later appeared to be a pirate.

### **THE EUROPEAN BACKGROUND**

The background to this trade was the increasing consumption of wood in western Europe in early modern times and the sea-road from Norway went to countries which in the 15- and 1600s established a new world economy. We know that the consumption of wood in Western Europe increased rapidly as Dutch and British towns grew and required great quantities of beams for the frames of houses and commercial buildings. House-building also required an increasing number of boards, or ‘deals’ as they are called in the Customs Books. The shipbuilding industry needed deals, beams, planks, masts, tar and pitch; the fisheries needed barrel staves and barrel-hoops; and the mining industry needed timber to shore up galleries. Firewood was also needed for heating dwelling houses, and wood was used in most of the tools of the time. The great consumption of wood led to shortages in the neighbourhood of big towns and timber had to be brought from a distance by ship, which partly explains why the western and southern coast of Norway, with its easily accessible forests, came to play a prominent part in the trade.

Timber was a bulk cargo, low in price compared to weight and volume and transportation costs (especially over land) would thus strongly influence the market price. In the sixteenth and seventeenth

centuries the forests along the coast of western and southern Norway (Illus 1) were located close to suitable harbours mostly free from ice except in midwinter, and the distance to the market was short. With a favourable wind a ship would not take more than a few days to cross the North Sea, either to Germany, to the Low Countries or to the British Isles.



Illus 1 Map of Southern Norway, annotated with the districts where the Scots traded timber. The most important were Sunnhordland, Ryfylke and Agder.

## THE NORWEGIAN BACKGROUND

Early in the sixteenth century Norway reached the bottom of the crisis which Norwegian historians refer to as 'the depression of the Late Middle Ages'. After a vigorous expansion of farming up to about 1300, the Black Death and other plagues of the fourteenth and early fifteenth century led to a marked decrease in population, followed by the desertion of a great many farms. This process of desertion led to a change of the agricultural landscape: in the vast areas emptied by plague, rough grazing, meadows and fields became after a few generations overgrown with a dense wood which, according to seventeenth-century testimony, had to be cleared again before deserted farms could be brought once more into cultivation.

In addition to this, western and southwestern Norway has heavy rainfall. In some places the average rainfall is more than 2000 mm a year. Moreover, the topography is characterized by steep hillsides, so that the rain falling in the mountains has only a short way to travel down to lower-lying areas or the fjords. Throughout the fjords, rivers and burns abound, many of them suitable sites for sawmills to be set up (Illus 2).

## THE SAWMILLING

The close contact between the eastern coast of Scotland and the western and southern coast of Norway go far back – at least to the Viking age. We may presume that Scottish vessels had visited Norway buying timber also in the centuries before 1500. But during the sixteenth century the contact increased enormously. As mentioned, the need for timber increased in Scotland as elsewhere. But on top of that we have to take into consideration a new way of processing the timber. The sawmills, run by waterpower, a revolutionary technological innovation, are also an important contribution to our understanding of the growth in trade across the North Sea from the 1500s.

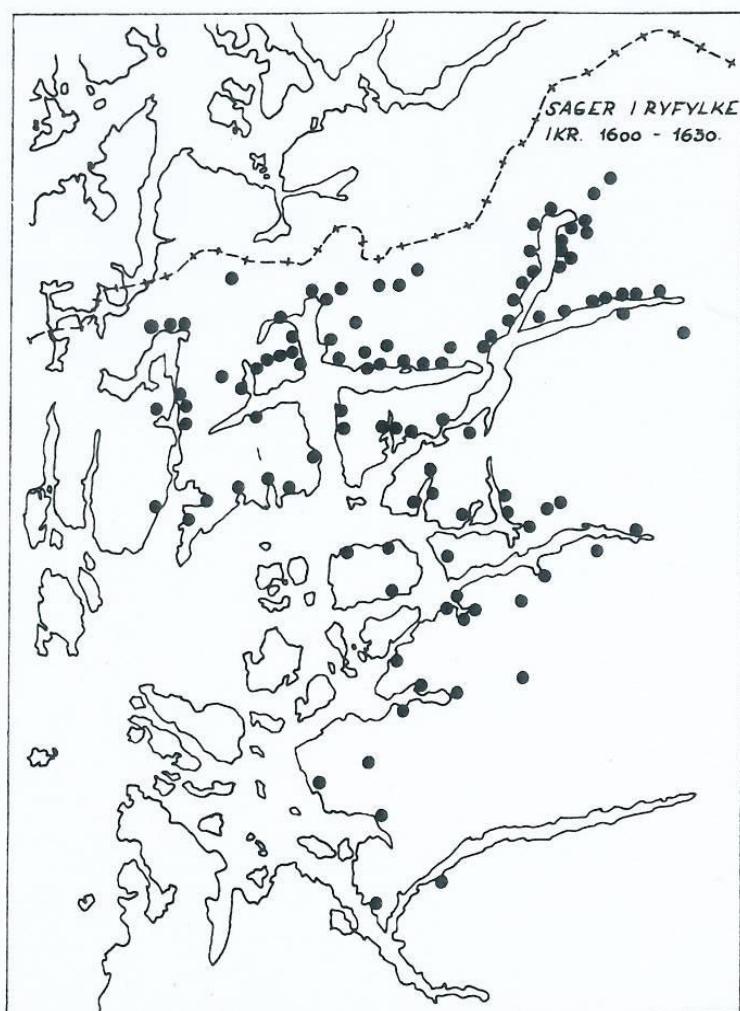


*Illus 2 Ryfylke: one of the waterfalls with sawmill – the ruin on the shore below.*

This new technological innovation made it possible to cut far more boards than before when you had to use an axe to produce them. Sawmills were probably known in Scandinavia at the end of the fifteenth century, and when the demand arose, the sawmill turned out to be made for Norwegian waterfalls and rivers (Illus 2). They were not expensive to build. A local smith could make the saw blade, and a carpenter – and even the farmer himself – could easily put up the building with material from his own forest. And the building costs were recovered by selling a hundred or so boards. Even small sawmills could cut a couple of hundred logs a year, which gave about 1000 boards.

But most of the precipitation in Norway falls as rain in autumn and as rain and snow in winter. Consequently the sawing activity was done by flood water during autumn and during the melting season in spring, in periods when ordinary farming activities were slack.

From the 1520s/1530s onwards we may assume that sawmills were known and used over most of southern Norway. During the 1500s more and more sawmills were built and it may have been not far from 2000 of them in Norway at the beginning of the seventeenth century. In the district of Ryfylke, presented in my lectures in the 1980s, in the year 1621 I found 83 sawmills in use at the same time (Illus 3). Later the numbers decreased, but there were still between fifty and sixty sawmills in use in Ryfylke in the 1630s and 1640s. The activity was rather high.



*Illus 3 Ryfylke sawmills in use 1600-1630*

## THE EVIDENCE AND THE SCOTTISH PART IN THE TIMBER TRADE

In my contribution to the seminar in St. Andrews in 1983, I presented in tabular form the Scottish activity in Ryfylke, where the Dutch also were a significant contributor together with other nationalities. So let me therefore briefly repeat some of my results from 1983.

In the sixteenth and seventeenth centuries, foreign ships sailed directly to the fjords of Ryfylke to trade in timber. The oldest source to quantify this navigation is a list from 1567. In that year 38 vessels visited Ryfylke; 1 Frisian, 4 German and 4 Dutch: but no fewer than 28 were Scottish. Not until after the turn of the century, however, are there Customs Books that provide fuller details of this trade over a longer span of time. Apart from an incomplete book from 1601, the current Ryfylke Customs Books start in 1602 and exist for most of the century. Their content changes in the middle of the century, but between 1602 and 1646 very detailed information is given about the ships: the tonnage, their arrival and departure dates, the names of skippers and their origin, and the volume of the commodity; before 1624, even the names of the sellers, and after 1630, the names of the vessels are also given.

The vessels visiting Ryfylke were of different origins. The trade brought Swedish, Danish, German, Frisian, Dutch, French, Spanish, Irish and English in addition to Norwegian and Scottish vessels to the long Norwegian coast. But the dominating ones were the Frisian and Dutch, which are best regarded as one group, and the Scottish. Each of the 34 years between 1602 and 1646, for which it is possible to quantify, saw 29 or more Scottish vessels in the fjords of Ryfylke. In the tax-year 1619-20 alone as many as 115 Scottish vessels were crossing the North Sea to buy timber from this small part of the Norwegian coast. But it is also important to note that the Frisian/Dutch ships were generally much larger than the Scottish ships – on average over 20 lasts compared to between 10-14 lasts. In spite of this the activity is very often in some parts of the coast called skottehandelen – the Scottish Trade – even today in oral tradition. And in some parts, for instance in Ryfylke where I come from, the seventeenth century is called skottetida – that is The Scottish Period.

There is a further interesting feature in the material. If we compare the number of Scottish calls with the rest, and particularly with the Frisian/Dutch, we find that Scottish calls constituted an increasing share of the total during the first four decades of the century. While they often constituted less than 50 per cent in the first decade, after 1610 they constitute more than half of the total calls each year, with an increasing trend.

That the Dutch and the Frisians stopped trading with Ryfylke may be connected with deforestation in the district, which meant that the products had to be made smaller. The larger trees may have been cut down first in the vast exploitation of the first decades of the century. The Dutch and the Frisians may have been interested mainly in larger sizes, and therefore turned to trade elsewhere along the Norwegian coast, while the Scots still found it worthwhile and profitable to obtain timber from Ryfylke.

## WHAT KINDS OF COMMODITIES WERE EXPORTED?

By the middle of the seventeenth century the Customs Books record about 150 different exported commodities of wood. Just a few are interesting in connection with the Scottish trade in the fjords of western and southern Norway up until then.

The wood was as a rule processed before it was exported. Very seldom one finds whole trees, that is, logs, in the lists. Five types of goods dominate the Scottish trade: boards, beams, barrel-hoops and firewood – and from the district of Sunnhordland the Scots also bought another important commodity which I will return to later.

The most important and valuable items were the boards. It was the Dutch, the Frisian and the German vessels that left the coast with most of the sawn boards. Even though the Dutch and the Frisians after 1635 almost disappear from the records in parts of the southwestern coast of Norway, the Scots, even if

they completely dominated the timber trade in numbers, did not dominate the export of boards. They never stood for more than just over 40 per cent of the exported boards. Their vessels were too small. For instance in the tax-year 1641-42 with a total export of about 170,000 boards, only 74,000 went on Scottish vessels.

However, the most important kind in timber for the Scots consisted of beams. Up to around 1630, beams 9 and 12 ells long dominated the export from Ryfylke. Yet the longest beams were comparatively few in number. Beams of 9 ells length were on the other hand a typical Scottish commodity. But in the early 1630s the length of the beams changed. From then on quite a few beams were only 6 or 8 ells long. At the same time the contemporary sources call the beams 'skottebjelker' – that is Scottish beams. In some years 80 to 90 per cent of all the beams from Ryfylke were sold to Scottish skippers as in 1641-42 when 91 per cent out of 28,000 beams left the fjords of Ryfylke in Scottish vessels.

We can see the same trend when it comes to the barrel-hoops. In quite a few years the Scots were handling more than 50 per cent of the export of barrel-hoops; in the tax-year 1631-32 even 83.9 per cent from the district of Ryfylke. This probably indicates a large production of barrels on the eastern coast of Scotland in connection with the fisheries in the seventeenth century, for example, in 1620-21 about 420,000 out of 680,000 barrel-hoops left Ryfylke in Scottish vessels.

The firewood may not have played any significant part in the so called Scottish trade. It was probably used to fill up space in the vessels ships after other commodities had been loaded. Most Scottish ships seem to have taken away only three cords of firewood or less. This is not much compared to a ship from the continent that loaded as much as 70 cords of firewood.

### **WHAT DID THE SCOTTISH SKIPERS BRING WITH THEM?**

The evidence from the beginning of the seventeenth century tells us that the Dutch, Frisians and Germans mainly traded timber for currency, while the Scots instead brought goods, particularly cereals or cereal products, mostly grain, flour, malt and bread. Some rye may be a Baltic re-export. And besides the cereals, textiles played some part in the import, particularly linen cloth.

An example is the skipper William Smith of Aberdeen visiting Norway in May-June 1622 with 30 ells of linen cloth, 4 pair of shoes, 1 barrel of malt and 1 barrel of grain. At the same time the skipper Sander Small from Elie brought with him 30 ells of linen cloth, 8 ells of blue cloth and 6 pair of shoes.

By the middle of the seventeenth century the trend is clearly towards a multiplication of goods. In addition to the cereals and the linen, it is more common to find liquor, bar iron, iron pans, knives, peas, beans, soft soap etc. In the second half of the century this trend became even stronger, at the same time that the exported timber gradually became more manifold in type. The variety of imported goods increased. The trade was no longer so distinctly dominated by cereals or cereal products. Among other things there was now also trading in hemp and tobacco, tobacco pipes, red wine and liquor, earthenware, onions and carrots, sugar, rice, prunes, figs and raisins. Many of these goods came from Holland on Scottish vessels. That means that the Scottish trade on the western and southern coast of Norway, during the seventeenth century, changed from a predominantly two-way trade into one with a more triangular element involving the east coast of Scotland, the Low Countries and Norway.

### **THE RYFYLKE EXAMPLE IN A BROADER PERSPECTIVE**

As I substantiated in my earlier work tens and tens of Scots were busy crossing the North Sea during the sixteenth and seventeenth centuries trading processed timber from the district of Ryfylke – buying boards, beams, barrel-hoops and firewood. However, what about the rest of the long western and southern coast of Norway? Is it possible to put the picture from Ryfylke into a broader perspective?

I hope you will understand that it has not been possible for me to go through and analyse all the Customs Books from other districts along the coast. But when I was asked to present a background sketch of the Scottish Trade, I delved into the available source material that today is accessible on what in Norway is called Digitalarkivet, an open archive on the Internet run by the Norwegian Public Record Office. By studying some of the Customs Books from other districts along the coast it was possible to see some interesting and perhaps not so surprising patterns.

### **WHERE DO WE FIND THE SCOTS?**

Test samples in the Customs Books from other parts of the Norwegian coast give a clear picture of the Scots thinning out the further north along the western coast we go. In a list from the tax year 1611-12 from Nordmøre we find only one Scot, a skipper from Queensferry with a ship of 25 lasts, bringing with him 9 barrels of malt, 15 barrels of barley, 36 barrels of oats, 4 barrels of peas and 4 barrels of Scottish bread. He took on board one hundred and forty dozen boards, 3000 barrel-hoops and 4 cords of firewood. But he seems to be an exception.

Nordmøre is the northern part of Fylket – the county – Møre og Romsdal. Further south we have Sunnmøre and in the middle we have Romsdal. In both Romsdal and Sunnmøre we find some more Scots visiting. In 1627-28, some 65 vessels visited Romsdal and of these, sixteen had Scottish skippers. A few years later – in 1630 – some more Scottish skippers visited Romsdal. That year 25 are said to be from Scotland.

In Sunnmøre the number of Scots fell. In the tax-year 1628-29 none of the eight vessels visiting Sunnmøre were run by a Scottish skipper. In 1629-30 just three out of nine vessels were run by a Scot; in 1630-31 just three out of fourteen, and in 1631-32 just one vessel out of twelve was managed by a Scottish skipper.

And there is a striking distinction between the vessels visiting Romsdal and Sunnmøre and the vessels visiting the coast further south. The vessels visiting this northern part of the west coast of Norway seems to have bought only boards processed on sawmills, and neither beams nor barrel-hoops.

In the southern end of the coast that I have looked at, the coast of Agder on both sides of Kristiansand, the material is more difficult to interpret and unfortunately I have had no chance to study the original Customs Books. But after having looked at some of the so called bygdebøker, which are very detailed local history-books about some of the municipalities along that coast, it is possible to maintain that the Scots were along that coast too in abundance, and to define a clear boundary between an eastern and a western part of the southern coast. Like in the northern part of the west coast, we find Scots also in the eastern part of the southern coast. But there the Dutch skippers were completely dominant. The Scots were all over the coast there too, but gradually seem to have concentrated their trade in the western part, west of the town of Mandal, the part of the coast closest to Rogaland. Further east the Dutch were predominant during the centuries under discussion.

Also along this coast we find quite a few sawmills with 22 mentioned in Lister len (fief) in 1614. In the Customs Books from Agder we also find a variety of exported timber: masts, beams, posts, booms or spars, laths and boards. But the documents also mention firewood, wooden nails, birch bark, tar, oars and oar material.

So, what about the district north of Ryfylke, the county Hordaland? It is necessary to split this county into two parts, the district north of Bergen – Nordhordland – and the district south of Bergen – Midhordland and Sunnhordland. In the sixteenth and seventeenth century the district south of Bergen is covered under one name only, Sunnhordland, in the Customs Books.

Regarding the district Nordhordland it is possible to maintain that the timber trade played a more minor part than in the district south of Bergen. There were a few sawmills working at the turn of the century 1500-1600, but the district was not covered with easily accessible dense forests in the same way as the district further south. And as far as we can see, the timber trade in Nordhordland did not last beyond 1650.

This picture is mirrored in the sawmilling activity. A list of sawmills from 1647 underlines the picture. That year mentions only 4 sawmills in the district of Nordfjord, 21 sawmills in the eastern part of Sogn, but 39 sawmills in Sunnhordland. And I remind you of the half hundred sawmills or so in Ryfylke at that time.

However, the district south of Bergen was, when it comes to the timber trade, one of the busiest districts on the western and southern coast of Norway – together with the district of Ryfylke. And here in Sunnhordland, as in Ryfylke, the Scots played a dominant part. A Customs Book from Sunnhordland from the tax-year 1597-98 lists 81 foreign vessels: 55 or 68 per cent of them were Scottish. And the Scottish part of the total visits increased in the first half of the seventeenth century – to more than 80 per cent. For instance in 1622-23, 60 out of 70 skippers were Scots, that is more than 85 per cent, compared with Ryfylke in the year 1623 when 74 out of 99 skippers were Scots, that is just almost 75 per cent.

When we look at what was exported on Scottish vessels at that time, we also find that these two districts played a very important part in the so called Scottish Trade.

In tabular form we can see that Ryfylke may have sent more boards on Scottish vessels, but when it comes to the beams Sunnhordland seems to have been as interesting for the Scots as Ryfylke. And Sunnhordland may have exported more firewood on board Scottish vessels than Ryfylke. Even if it is risky to compare two different years, I think that the trend we see when we compare the two tax-years 1623 and 1627-28 for Ryfylke and Sunnhordland respectively, give us a hint of the balance between the two districts.

#### **Commodities on Scottish vessels from Sunnhordland 1622-23, from Ryfylke 1623 and from Sunnhordland 1627-28:**

	<i>Boards</i>	<i>Beams</i>	<i>Beams</i>	<i>Barrel-hoops</i>	<i>Fire wood</i>
		<i>12 ells</i>	<i>9 ells</i>		<i>in cords</i>
Sunnhordl. 1622-23	6372	822	6714	186240	167
Ryfylke 1623	14340	954	8478	354600	212
Sunnhordl. 1627-28	6012	1788	9006	268800	208

The volume of wood going out from these two districts varied from year to year and from commodity to commodity. In some years and for some commodities Sunnhordland tops the list, while in other years Ryfylke tops the list. Some examples: in 1622-23 Sunnhordland sent out 6,372 boards on Scottish vessels while Ryfylke sent out 14,340 boards the year after. In 1623 Ryfylke sent out 954 of the 12 ell beams while Sunnhordland in 1627-28 sent out 1788 of the 12 ell beams on Scottish vessels. Anyway, these two districts, and maybe the western part of the Agder coast, seems to constitute the most important stretch of coast for the Scots buying timber in Norway in the sixteenth and seventeenth centuries. I may be a bit bold, but my impression is that in the first decades of the seventeenth century between two hundred and three hundred Scottish vessels may have crossed the North Sea to buy timber in different parts of the western and southern coast of Norway each year. And most of them visited Sunnhordland, Ryfylke and Vest-Agder.

## FROM WHERE IN SCOTLAND DID THEY COME?

By studying the Customs Books which I have chosen at random, it may also be possible to say something about where the Scottish skippers came from, and by doing so I think I can see a vague pattern. In the Customs Books from the first four decades of the seventeenth century we find mentioned about 40 different Scottish towns or harbours. Even Glasgow is mentioned, but very seldom. Not unexpectedly the other towns or harbours are all on the east coast, from Shetland in the north to Dunbar in the south. But the distribution is uneven!

To me it was not surprising to find that Dundee was a dominant home town for the Scottish skippers. But Aberdeen was also an important point of departure. An example, in the tax year 1627-28 fourteen of the Scottish skippers visiting Romsdal in the north are said to be from Dundee or Aberdeen – eight from Dundee and six from Aberdeen. But that must have been a exceptional year, and three years later we find a more manifold picture in Romsdal too. Of the 25 vessels from Scotland in 1630 Dundee with eight and Aberdeen with three vessels make up almost half of the Scottish fleet, but that year skippers from Kirkcaldy, St. Andrews, Anstruther and Glasgow too visited this northern part of the western coast. And we find the same picture further south, in Sunnmøre where the three vessels from Scotland in 1629-30 had skippers from Dundee (two) and Anstruther (one).

We see here that skippers from Fife visited the northern part of the western coast. This is not surprising either. From my previous work with Ryfylke I knew that the small harbours and towns along the Fife coast were dominant among the Scottish skippers' background. Looking at some of the Customs Books from Sunnhordland, together with Ryfylke the other most important district in Norway for the Scots, I found that skippers from Fife showed up there too in abundance.

But by dividing up the eastern coast of Scotland an interesting pattern emerges. Since Dundee seems so dominant, I found it useful to divide the coast up into four parts – North, Dundee, Fife and South – and counting what the Customs Books tell about the origin of the skippers. Even if this is a bit at random and must not be valued for more than it is, a kind of spot test, I think it will be confirmed by further research.

What I found was that more than 40 per cent of the Scottish skippers in Sunnhordland came from the north of Scotland, while only about just over 20 per cent came from Fife, contrary to the picture in Ryfylke where more than 50 per cent came from Fife many years after 1630. A bit surprising is that it looks like the south was better represented in Sunnhordland than in Ryfylke. And, as I will return to later, I have not found any skippers from Shetland in Ryfylke, and just a few from Orkney, while they were very active in Sunnhordland almost every year.

It is also, from this casual sample, possible to see the difference between Sunnhordland and Ryfylke concerning which towns or harbours of departure dominated in the two districts. Vessels from Orkney and Shetland dominate many years in Sunnhordland together with Montrose and Dundee, while the harbours and towns in Fife dominate in Ryfylke. An interesting observation is that the south of Scotland seems to have had closer contact with Sunnhordland than with Ryfylke. The reason may be that many vessels from Leith, which may have been larger than the average, also visited Bergen, the largest and the most important city in Norway at that time, before sailing south to buy timber in Sunnhordland.

### **Ships from different parts of the Scottish coast visiting Sunnhordland and Ryfylke**

	<i>North</i>	<i>Dundee</i>	<i>Fife</i>	<i>South</i>
Sunnhordland 1597-98	42.3 %	15.4 %	17.3 %	25 %
Sunnhordland 1622-23	45 %	11.7%	23.3 %	16.7 %
Sunnhordland 1627-28	49.3 %	9.3 %	21.3 %	18.9 %
Ryfylke 1623	13.7 %	24.7 %	47.9 %	5.5 %

### From where did the Scottish skippers originate?

<i>Sunnhordl.</i> 1597-98	<i>Sunnhordl.</i> 1622-23	<i>Sunnhordl.</i> 1627-28	<i>Ryfylke</i> 1623
Leith 10	Orkney 9	Orkney 8	Dundee 18
Dundee 8	Dundee 7	Fraserburgh 7	St. Monans 11
Montrose 8	Shetland 7	Dundee 7	St. Andrews 8
Shetland 7	Leith 5	Kirkcaldy 7	Montrose 5
Orkney 5	Aberdeen 5	Shetland 6	Pittenweem 5
		Leith 6	Crail 5

### THE CLOSE CONTACT BETWEEN SELLER AND BUYER

As I showed in my lecture in St. Andrews in 1983, many of these skippers returned not only to the same district, but even to the same fjord year after year and even more than once in a year, trading with the same farmers. This must have resulted in strong connections between seller and buyer. What I did not find out almost thirty years ago was if the skippers, in spite of this close connection, visited different districts. Would skippers visiting Ryfylke also visit Sunnhordland sometimes to buy boards or beams, barrel-hoops and fire-wood?

I must confess that I have been too busy with other obligations to look further into that. But by chance I came across some information that may indicate that at least now and then the Scottish skippers visited other districts than those they usually called on.

When I talked in Aberdeen in 1987 I used a skipper called William Walker from Aberdeen as an introduction and an example to illustrate this trade. He visited a harbour called Tednalandsvågen in Ryfylke in August 1623. By chance I have now found him twice the year before, but then in Sunnhordland, the first time in May and then again in July 1622. It has been impossible for me to follow this up, but I mention it here today to underline how the Norwegian Customs Books make it possible to follow the Scottish skippers in detail.

### THE INTERESTING EXPORT OF BOATS FROM MIDTHORDLAND

Parallel to the ordinary trade in different wooden commodities the farmers of a very restricted area south of Bergen developed another speciality. In a text from 1714 – *Beskrivelse over Bergens Stift* or in English, *An Account of the See of Bergen*, Godøysund on the island of Tysnes is particularly mentioned as an important loading berth for vessels buying different kinds of timber. The same source mentions particularly vessels from Shetland and Orkney arriving in Godøysund to buy small boats which they need for their fishing around their islands. An article in a local history magazine from 1920 argued that from 70 to 120 such boats could be loaded on board one ship. It has been impossible for me to verify this, and I am not quite sure if I swallow such high figures. If it is true, the Scottish vessels visiting the area in the beginning of the eighteenth century must have been much larger than the vessels visiting the same area a hundred years before.

Anyhow, it was a challenge for the Scottish skippers to carry boats. If they were finished before they were taken on board, they would fill up too much space at the expense of other commodities. The problem was solved by not finishing the boats. They were just slightly joined and the different parts numbered before disassembled so they could be stowed on board the vessel and put together again after they reached the islands across the sea.

This trade occurred in a very restricted part of Hordaland, in an area we today would call Midthordland, in the municipalities Os and Strandvik along the northern shores of Bjørnefjorden, while many of them were loaded in Godøysund at the southern shore of the fjord.

This trade goes back at least to the end of the sixteenth century and I find it probable that this was an old tradition going even further back, maybe hundreds of years.

In the Customs Book from 1597-98 we can read that at least seven skippers from Orkney and Shetland bought such boats. And it is always only skippers from Orkney and Shetland that buy such boats. Some examples: Anders (Andrew) Jensen from Shetland bought as many as six boats that year. Mats Sinclair from Shetland and John Sinclair from Orkney bought four boats each.

The boats were of two types, four-oared boats and six-oared boats. Together about fifty to sixty could have left the district on vessels from Orkney and Shetland each year in the first half of the seventeenth century. As an example: In 1622-23 seven Orcadians left with 15 four-oared boats and 3 six-oared boats, and twelve Shetlanders left with 29 four-oared boats and 10 six-oared boats.

And to complete this particular trade I must also mention that with the boats or even without boats on board, some of the vessels carried oars to the islands. For instance William Brand from Kirkwall was in the area twice in the tax-year 1627-28 and bought 2 dozen oars the first time, and another 2 dozen the next time he visited. Two other Orcadians also bought oars that year.

## SUMMING UP

The strong trade connections between the east coast of Scotland and the western and southern coast of Norway, and especially the central south-western part of the coast, are readily explainable in economic terms. In Scotland there was a great need for easily accessible timber while parts of the timber districts where the Scots traded were districts with a deficiency in grain. To me it is clear that a 'symbiotic relationship' existed between the burgesses and skippers from the east coast of Scotland and the farmers along the western and southern coast of Norway. The Scots had cereals to offer, either locally grown, or acquired in the Baltic trade thanks to their fleet of small vessels. The farmers in Agder, Ryfylke and Sunnhordland had just the kind of timber that the Scots wanted, particularly beams and barrel-hoops – and for the Orcadians and Shetlanders also boats.

Yet this direct trade between skipper and farmer ended in Ryfylke just before 1720 due to the changing relationship between the town of Stavanger and the district around it. The Customs House on Nedstrand in Ryfylke was closed in 1686, and in 1717 a royal resolution ensured the privileges of Stavanger and forbade the Scots to trade in the fjords: all timber had from then on to go through Stavanger and the Customs House there. From that year the number of Scottish vessels in Ryfylke dropped remarkably: the Scottish trade was brought to an end there.

In Sunnhordland, the district outside Bergen, the trade seems to have lasted longer, probably due to the distance between the city of Bergen and the district with the sawmills, and the forests. The burgers in Bergen of course also wanted to control this trade, But, as late as 1736 the stiftamtmann in Bergen counted 35 permanent loading berths where Scottish vessels loaded timber (and now also lobster) under a Customs House on Eldøy on the island of Stord. In the 1730s these loading berths were still visited by foreign vessels every year, mostly Scottish. That the trade with the farmers continued further into the eighteenth century in Sunnhordland can explain why Sunnhordland has a stronger position than Ryfylke among historians and in oral tradition when it comes to the Scottish Trade.

Anyway, I hope that my contribution here today has given you an understanding of how great and important the so called Scottish Trade must have been. What I have done is scarcely more than just touch on a very interesting research topic that I hope can be further evolved both on the Scottish and the Norwegian side of the North Sea.

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(or follow this link <http://www.arkivverket.no/arkivverket/content/view/full/6445> )

## TREE-RINGS, TIMBER & TRADE: THE DENDROCHRONOLOGICAL EVIDENCE FROM SCOTLAND

**Anne Crone & Coralie M Mills**

### INTRODUCTION

Dendrochronology is capable of providing more than dates for historic timbers; the provenance of the timber may also be determined, by comparison with an ever expanding network of reference chronologies of known geographic origin (eg Bonde *et al* 1997; Daly 2007). Thus, it is possible to use tree-ring analysis to distinguish imports from Scottish native timbers and to examine changes in the timber trade and the woodland resource over time. Aspects of this work are reported more fully in current papers (Mills & Crone 2012 and Crone & Mills in press), showing the progress made since earlier summaries (Mills & Crone 1998; Crone & Mills 2002). We begin by summarising the tree-ring evidence for the Scottish native timber supply, especially for the periods prior to the great switch to imports, to help understand why this change happened.

In the British Isles, oak is the species subject to most archaeo-dendrochronological work so far; therefore much of this paper relates to oak. However, tree-ring studies for some other species found as timber in Scotland, especially pine, are developing and are mentioned along the way. We find both native and imported oak and pine timbers in Scotland, as well as a range of other species, as we shall see.

### DENDROCHRONOLOGICAL EVIDENCE FOR THE NATIVE TIMBER SUPPLY



*Illus 1 Excavations at the 1<sup>st</sup> millennium BC Cults Loch Crannog have produced oak timbers which have been dendro-dated to the 5<sup>th</sup> century BC. So far only a few isolated sections of prehistoric oak chronologies have been dated in Scotland, for sites in the SW, possible through their proximity to the more continuous Irish and N English oak chronologies*

In the prehistoric period, there are so far only a handful of dendro-dated sites in Scotland. Unlike Ireland and England, there is as yet no continuous prehistoric oak chronology for Scotland. Suitable material comes up infrequently, and dating currently relies on matching with long master chronologies from Ireland or England, and thus works best in SW Scotland. Prior to the 1st millennium BC, Scottish dendro-dated material is confined to a few natural bog oaks from the Solway Firth. Recently oak from two crannogs in SW Scotland have been dated to periods in the first millennium BC (Illus 1), against Irish chronologies (Cavers *et al* 2011). A number of other sampled prehistoric timber assemblages are so far undated. In summary, some progress is being made in covering the 1st millennium BC in SW Scotland, but there is a very long way to go to achieve continuous prehistoric oak coverage.

A few Roman sites in Scotland have yielded small assemblages of oak and other native species like alder, but have had too few rings to be dated, coming from young fast-grown trees. The sample is small, and so it is difficult to generalise about the timber supply at this time. In the Early Historic period, there are more positive results, with dated oak chronologies from Buiston Crannog in Ayrshire (Crone 2000a) and Whithorn in Galloway (Crone 1998a), both dated against Irish chronologies. The large assemblage from Buiston revealed good management of woodland resources over an 80 year period of occupation, from the late 6th to mid-7th centuries, with timber drawn from a mixture of mature oak coppice, young maiden trees, and stands of oak between 200 and 300 years old.

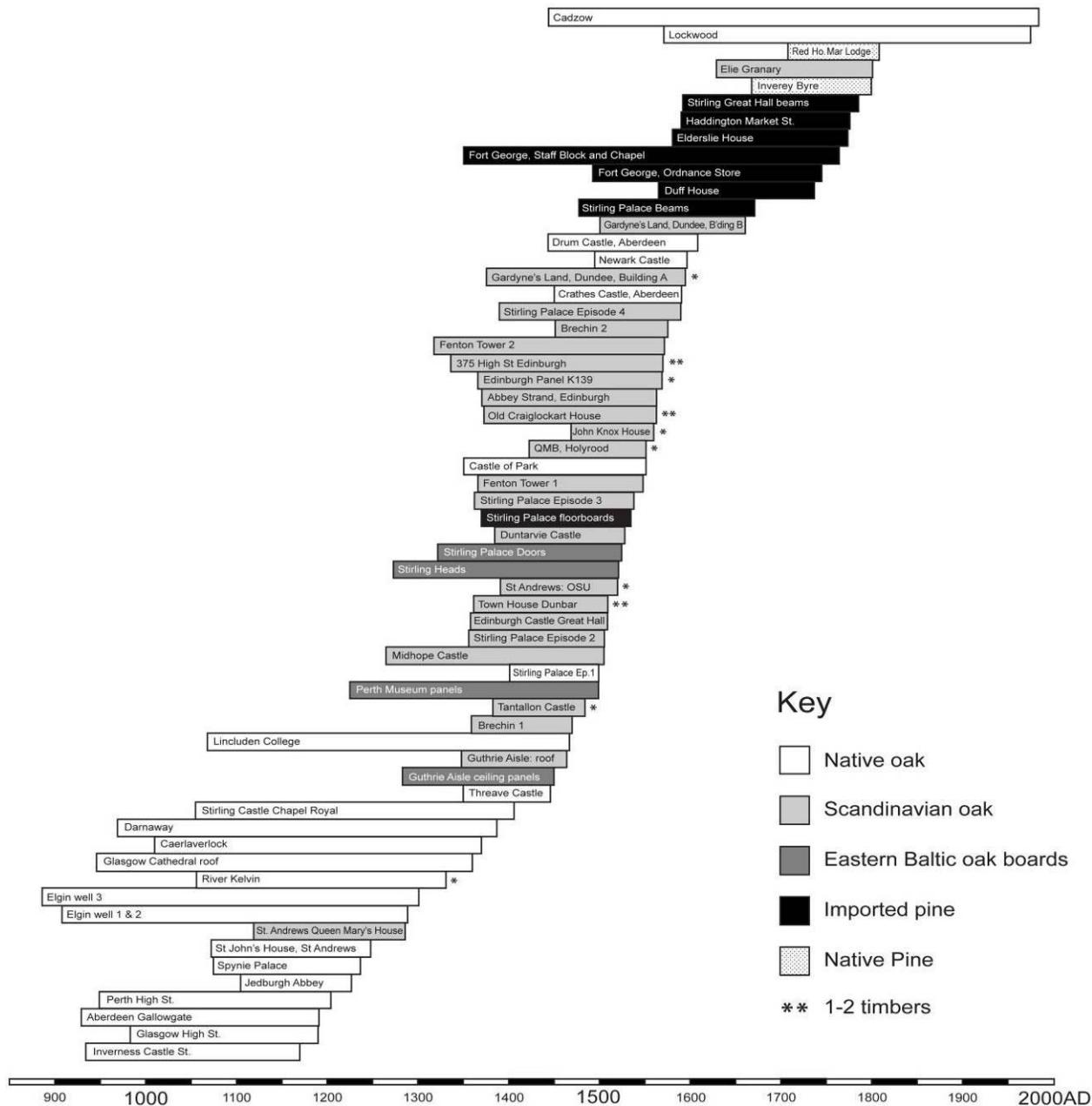
Given the nautical theme, it is worth mentioning that an oak stem post, from the Isle of Eigg, now in the National Museum, was examined some time ago for dendrochronology, using a body scanner, but unfortunately it could not be dated as there were too few rings. Radiocarbon dating indicates a likely 9th century date. The stem post was unused, but had been prepared and placed in a bog, perhaps to keep it ready for use, then seemingly forgotten about.

So, some of the 1st millennium AD now has oak chronology coverage, but only for SW Scotland and only between the 3rd and 8th centuries. There is then a gap in the 8<sup>th</sup>/9<sup>th</sup> centuries before the next set of native oak chronologies from medieval sites. It was hoped that timbers from some early burgh sites might extend coverage back sufficiently to bridge it, but despite the large number of timbers examined, only about 10 so far extend back beyond the 10<sup>th</sup> century, and only into the later 9<sup>th</sup> century (Illus 2). A much larger number of dated timbers from early burgh excavations and the earlier great medieval buildings, like Glasgow Cathedral, are from trees which started to grow in the mid 10th century. This synchronicity of birth dates has led to a suggestion of an event in the earlier half of the 10th century that allowed woodland regeneration (Crone 2006). Woodland can regenerate when settlement contracts, reducing the pressure for fuel, building materials and agricultural land. Finding material to span this gap continues to be an important objective in working towards continuous oak chronology coverage for Scotland.

Tree-ring coverage for Scotland improves dramatically from the 10th century, with timbers more forthcoming from urban excavations & standing buildings, and developed upon the early dendro work in Scotland undertaken by Mike Baillie (Baillie 1977; 1982). After 8th century Whithorn, the next dated *building* episodes are 12th century, in the early stages of burgh development. For instance, excavated timbers from Aberdeen, Inverness, Glasgow and Perth identified a major phase of building activity in the late 12th to early 13th century, which used local oak from mature woodlands that had been able to regenerate after the 10th century event (Crone 2000b).

The white bars in Illus 2 are sites containing native Scottish oak and predominate up to about AD 1450. An especially important feature to note is the long length of the white bars. This means many of the native sites include very old growth oak, in the region of 300-400 years old. While it is lovely to have lots of rings to work with for dating, that is probably not a good sign regarding the state of Scottish forestry. It seems to hint at using whatever is to hand rather than managing the timber resource for construction, and is very different from England at this time, where young managed oak timber dominates the record.

After about AD 1450 the imported oak, represented by grey bars takes over and there are only a few structures with native oak.



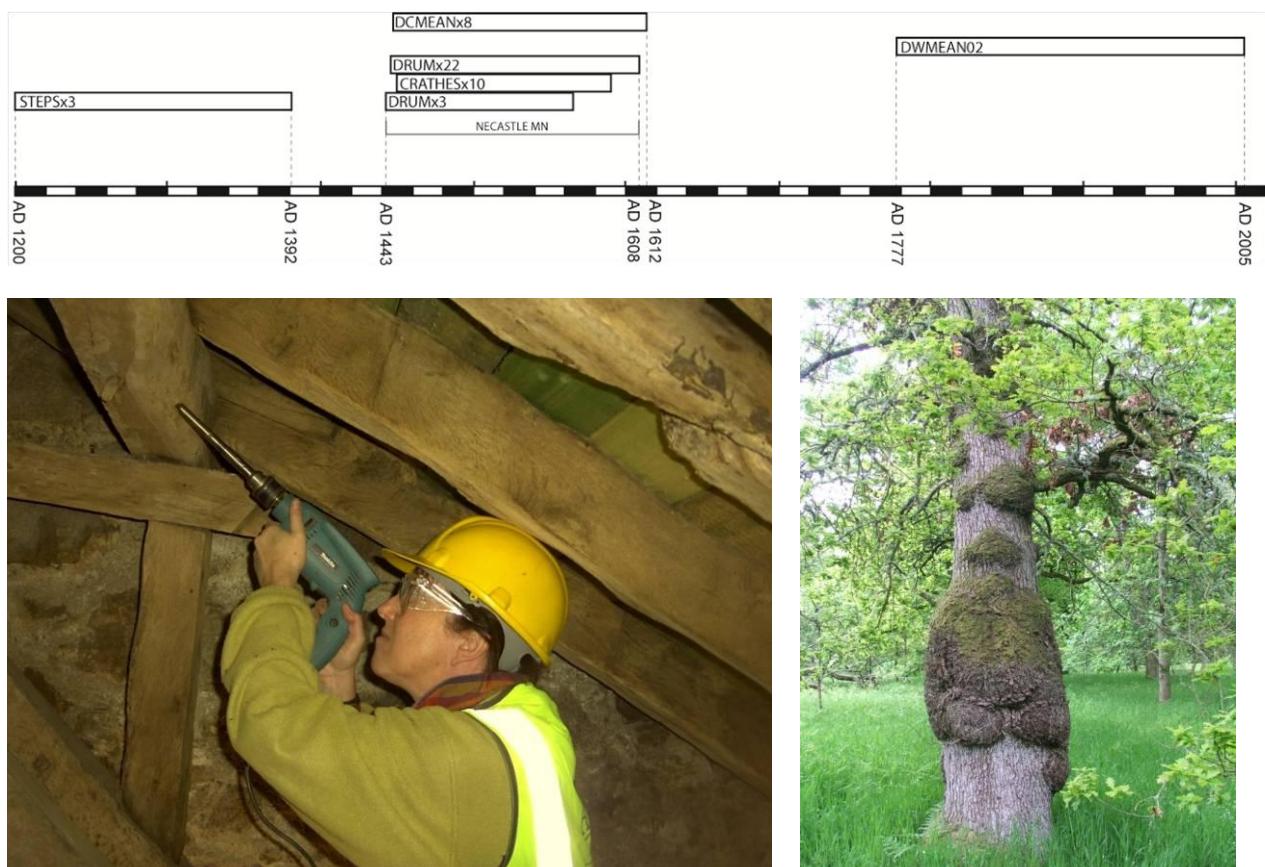
*Illus 2 An impression of the Scottish dendrochronological coverage over the last millennium. Each bar represents all the dated timbers from a particular site. Colour codes indicate provenance and species.*

Several oak-lined wells in Elgin provided an interesting example of a medieval site with native timber (Murray *et al* 2009). Radially split planks lining Well 1 had between 235 and 355 rings and were felled in AD 1301. This chronology matched closely with nearby Darnaway (see below), indicating a local source. The important point is the use of such high quality timber in a mundane and hidden structure, which suggests that good oak was still plentiful at this time, at least in NE Scotland.

Randolph's Hall at Darnaway Castle, the seat of the Earls of Moray, is a rare survivor of a medieval open timber-roofed hall. All of its timber is likely to have been obtained locally, from the Royal Forest of Darnaway which appears frequently in medieval records as providing timber to major building projects

across Scotland (Lord Doune 2010). The main felling phase in the hall roof was in AD 1387 and together the sequences spanned AD 969-1387 (Stell & Baillie 1993). The sequence lengths were very variable. Baillie noted that different types of trees were selected for different purposes; older trees used in curved braces; young, straight trees in false hammer-beams. This seems to reflect Darnaway's woods being managed properly for timber production; possibly this is unusual for Scottish woods more generally at this time, and may explain why Darnaway supplied more distant medieval building projects.

Issues emerging with the Scottish timber supply in the late medieval period are evident at Stirling Castle, the subject of a major dendrochronological study (Crone 2008a). For example, oak lintels in the late 16th century Chapel Royal proved to have been re-used from a 15th century building. They did not match the nearest chronologies from Perth and Glasgow, but gave very high correlations with Darnaway (Stell & Baillie 1993) and Spynie Palace in Moray (Mills 2002). They span AD 1055-1406, from oaks over 340 years old. These timbers have been transported to Stirling from NE Scotland, quite possibly from the Forest of Darnaway itself, presumably because such good timber was not available locally in the 15<sup>th</sup> century. Subsequently that 15th century building was demolished, and the timber was re-used in the late 16th century chapel, by which time imported oak is more generally the norm in Scotland. Timber recycling also becomes increasingly common across Scotland in the late medieval period, reflecting difficulties with supply. Through the 16th century, much of Stirling Castle is remodelled and the Renaissance Palace built. This massive Crown project could access any resources it liked, but used next to no native oak. There are just a small number of young native oaks in the ceiling of the King's Presence Chamber, and most of the timber needed at Stirling is imported (Crone 2008a).



*Illus 3 Drum Castle: The early 17<sup>th</sup> C roofs contain native oak, one of the last dated native Scottish oak structures (lower L). A longer history of oak use is evident, but not yet a continuous chronology (top): the medieval steps add earlier coverage while samples from living oaks in the Old Wood of Drum (lower R) show 18<sup>th</sup> C origins. Gaps (top) indicate periods of exploitation and subsequent regeneration or planting.*

After the mid-15th century, at present we can count the number of dendro-dated native oak sites on the fingers of one hand (illus 2). Drum Castle's roof (Illus 3) is one of the few late native timber assemblages amongst that sea of imported material, using timber felled over several years in the early 17th century (Crone & Mills 2007). The quality is not good, rather twisted and slow grown in its outer decades. An early 17th century documentary record shows Drum oaks being bought by shipbuilders in Aberdeen, and so it seems the best oak was sold, and what was left was kept aside and used in the castle rebuild. The timbers are cut from trees which started growing in the 15th century, rather like the few pieces of native oak found at Stirling Palace (Crone 2008a). This may represent attempts at woodland regeneration, spurred by the Acts of Parliament being passed from the early 15th century aimed at getting landowners to protect woodlands and plant trees (Smout *et al* 2007, 38). However, this would have broadly coincided with the onset of the Little Ice Age which perhaps hampered any attempts at regeneration.

We undertook a wider study at Drum Castle, which showed it has used its own oak for a very long time, including some late 14<sup>th</sup> century oak steps, as well as its roofs in the early 17th century (Illus 3). We hoped to build a continuous long oak chronology, as the Old Wood of Drum was thought to be truly ancient woodland, but the trees sampled proved to be 18th century in origin (illus 3). We know there were oak trees at Drum in that 17th-18th century gap, as Mary Irvine of Drum was selling off the 'Scrably old oaks' to shipwrights and bark merchants in the mid 18th century, and planting lots of saplings.

As we shall see below, from the late medieval period, imported timber comes to dominate the record. However, the record may be skewed partly because imported timbers are easier to date and provenance; there are more reference chronologies available for the exporting regions of Northern Europe, while our native chronology coverage is geographically patchy in Scotland. Thus, for example, we have not so far been able to date some very good samples of oak from the late medieval Eaderloch Crannog, near Roy Bridge. Some of the pine from the crannog has been radiocarbon-dated to the late 16<sup>th</sup> century (Crone 2011) but we have not been able to dendro-date it; we are working on extending native pine chronologies to date such material (see below).

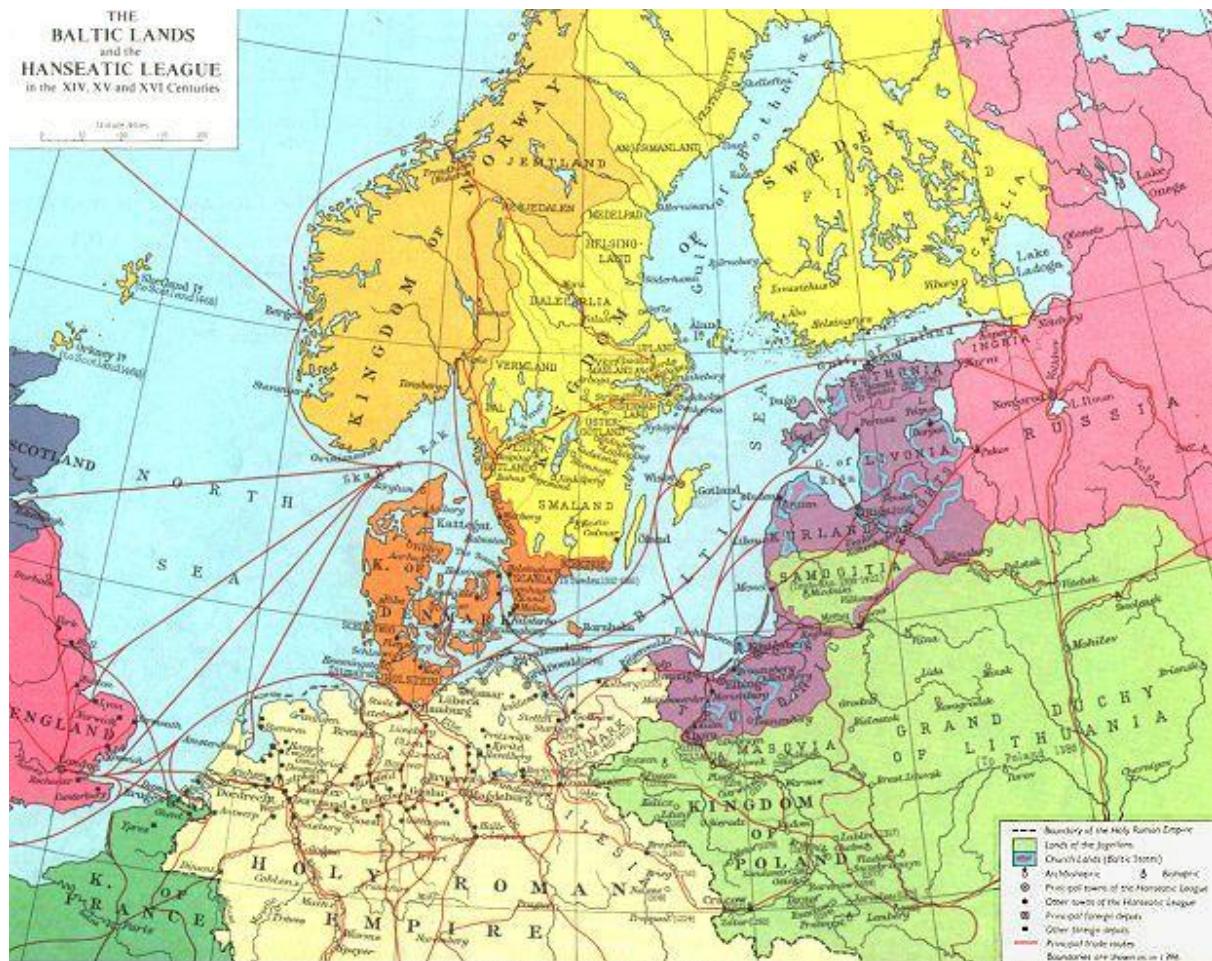
Our record is also skewed because commissioned work has focussed on high-status buildings and oak timbers. Only occasionally are we asked to investigate vernacular post-medieval buildings, as there are fewer with high level designations or in institutional care of course. The vernacular buildings are more likely to use local native non-oak species, but they are also less likely to survive or have their fabric protected than many of the high status buildings. A little work has been done sampling cruck cottages in Perthshire (Moirlanich near Killin and Sunnybrae in Pitlochry) which contain ash and some other native non-oak species but they are not yet dated. Further work on extending non-oak living trees chronologies is needed to facilitate dating, and recent work on old living ash, for example, in the Trossachs shows promise for being able to expand native ash chronologies for dating (Mills *et al* 2009).

In terms of non-oak timber, most progress is being made with native pine. Within the NOAP project (Native Oak And Pine project) we tested the feasibility of dating pine timbers in vernacular buildings near source woodlands, using Mar Lodge as a test case (Mills 2008). Dating proved possible for some local cruck frames because of the living pine chronologies we had first built in the area. However, several other sampled buildings close to the native pine heartlands could not be dated at that stage, due to a combination of the patchy native pine reference chronology coverage, relatively short sequences, and sometimes very mixed-source assemblages (Crone 2009; Mills 2009). Further progress is being made through the Scottish Pine Project, led by dendro-climatologist Rob Wilson at University of St Andrews, in extending the network of native pine chronologies for Scotland in time and space (Wilson *et al* 2011) and in developing new methodologies. The current NERC funded SCOT2K part of the project has particular relevance to historic dating, focussed on establishing chronologies for the last two millennia, using a mixture of living trees, historic timbers and sub-fossil material.

Apart from the bias in much of our dendro data (Illus 2) towards oak and high status buildings, there is also uneven geographical coverage in the sites studied, and from the late medieval period we have more eastern and central belt sites, thus in areas that were most readily able to access imported timber. However, ongoing research indicates that local oak may survive for longer elsewhere. Recent analysis of timbers from a Jedburgh townhouse showed it was built with native oak, very probably local, felled in the 1660s (Mills 2013), and is currently the latest native oak structure dated in Scotland. It seems likely that away from the major ports, the rural south of Scotland may have maintained a local oak supply into the post-medieval period and the same may be true in other parts of Scotland with little dendro work undertaken so far. We assessed oaks in a cruck-framed cottage in Torthorwald near Dumfries some years ago, when it was being restored, but they had too few rings to date; this represents another bias in the data, that really young timbers, of whatever species, cannot be dated or dendro-provenanced so we cannot include them in the picture. Much of the young material we encounter may be native.

### THE DENDROCHRONOLOGICAL EVIDENCE FOR IMPORTS

Despite the biases, indisputably our records show a massive shift from native oak to imported timber from the late medieval period for much of Scotland, and we now consider the dendrochronological evidence for foreign timber, imported into Scotland in response to the issues with the domestic oak supply outlined above, which became critical after about the mid-15<sup>th</sup> century. In this section we look exclusively at the evidence for the trade in building timber. Other imported wooden objects have been provenanced through dendrochronology, for example medieval barrels found in Perth, Aberdeen and Edinburgh that came from France, Poland and Scandinavia, but this is a different trade altogether.



Illus 4 Scandinavia and the Baltic region in the 14<sup>th</sup> to 17<sup>th</sup> centuries (Muir's Historical Atlas 1911)

Mostly we will be looking east, to Scandinavia and the Baltic for the source of our imported timber (Illus 4), but the earliest dendro-dated example is an oak plank which formed a bench in a building in the Norse settlement at the Biggings, on Papa Stour in Shetland. The plank gave a *terminus post quem* (or *tpq*) of AD 1198 which means the tree was probably felled sometime in the first half of the 13<sup>th</sup> century. It was imported from southern Ireland, probably via the Hiberno-Norse settlements at either Cork or Waterford.

The only other example of imported timber prior to 1450 comes from Queen Mary's House, St Andrews with a *tpq* of AD 1286 (Baillie 1995, 132). These were oak timbers from the eastern Baltic which lacked sapwood but were probably felled sometime in the 14th century. Trade between the Hanseatic ports of the eastern Baltic and Scotland began to develop in earnest in the late 14th century, with the opening of the Sound between Denmark and Sweden and these timbers may have arrived via this newly established route, possibly as ballast alongside another cargo.

Taking the oak imports first, these are coming from two distinct areas: the oak boards are coming from the eastern Baltic while the beams are coming from Scandinavia (Illus 4).

The imported oak boards are the 'estland boards' so frequently referred to in the documentary sources. The earliest example that we have found in Scotland are the boards used in the barrel vaulted ceiling in the Guthrie Aisle, Angus with a *tpq* of AD 1459 (Crone & Fawcett forthcoming). More examples have been identified from the 16th century including: fine fretwork panels now in Perth Museum, probably from St John's Kirk in Perth, *tpq* AD 1508 (Crone *et al* 2000); the carved roundels known as the Stirling Heads *tpq* AD 1530, from Stirling Palace; and the boards used in massive oak doors throughout the Palace at Stirling, the one shown (Illus 5) giving a *tpq* of AD 1533 (Crone 2008a).



Illus 5 Examples of 16<sup>th</sup> century 'Estland' oak boards used in Stirling Palace: (L) One of the Stirling Heads *tpq* AD 1530 (Image © Historic Scotland), and (R) sampling one of the dated doors *tpq* AD 1533

Eastland boards were exported out of the Hanseatic ports of Danzig, Konigsberg and Riga but the oak will have come from forests over a vast hinterland that included modern day Poland and probably as far east as present-day Belarus and the Ukraine (Haneca *et al* 2005). They were floated down the Vistula and Daugava rivers in huge rafts. European colleagues are working to identify sources in this vast area more accurately and this is being helped by the development of dendrochronology in states like Belarus.

While the boards represent a significant specialist supply, the bulk of the imported timbers at this period are squared oak beams, or baulks from Scandinavia (Illus 2). Scandinavian beams have been found in a wide range of buildings - used mainly as joists and rafters. The earliest examples (Illus 6) include:

- Guthrie Aisle, Angus – where they formed the roof structure onto which the painted boards mentioned earlier were mounted (Crone & Fawcett forthcoming)
- Brechin, a small unprepossessing townhouse in which timbers from a much earlier roof had been re-used (Crone *et al* 2004)
- Royal building projects such as Stirling Palace (Crone 2008a)
- Tower-houses such as Fenton Tower, in East Lothian (Crone 2013)
- Urban buildings such as John Knox's House (Crone 2005) and other houses up and down the High St in Edinburgh



Illus 6 Buildings with 15<sup>th</sup> or 16<sup>th</sup> century Scandinavian oak timber.

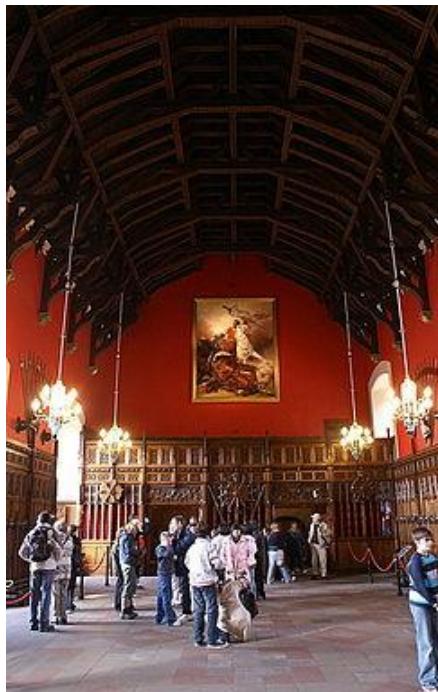
Clockwise from top left: Guthrie Aisle beams AD 1464; Stirling Palace AD 1538/9 (Photo © Richard Fawcett); Fenton Tower AD 1572 (Photo © CFA Archaeology); John Knox House AD 1560 (Photo © Colin Smith under Creative Commons License - see <http://www.geograph.org.uk/photo/156927>); The Merchant House, Brechin AD 1470 (re-used timber).

There are many regional oak chronologies from Denmark and southern Sweden and consequently it is now relatively easy to identify timber with a southern Scandinavian provenance. However, it is not yet possible to identify the specific country because, as a result of their closely entwined political and trading

relationships, the regional reference chronologies probably contain a mixture of material from both countries.

Scottish buildings in which timber from southern Scandinavia has been identified (as opposed to Norway which we will come to) include the Guthrie Aisle, Fenton Tower and Stirling Palace (Illus 6), where oak from this area was so favoured by the Royal builders that it was used in all building projects from the beginning to the end of the 16th century.

In contrast there are very few oak chronologies from Norway. This is because oak only grows naturally in the coastal districts of south-western Norway and during the later medieval period the bulk of the oak was exported to countries such as Denmark, Germany and the British Isles. It was rarely used in building in Norway presumably because it had greater value as an export commodity and consequently there has been little native material available to build a regional chronology. As a result it has always been more difficult to demonstrate the presence of Norwegian timber. We have many timber assemblages to which we can ascribe a generic Scandinavian provenance and we suspect that they are probably Norwegian but the correlations are just not strong enough to state with any certainty.



*Illus 7 Examples of Edinburgh buildings with 16<sup>th</sup> century Norwegian oak beams.*

(L) *The roof of the Great Hall at Edinburgh Castle (Photo ©Mike Pennington under Creative Commons License see <http://www.geograph.org.uk/photo/1299970>), and*

(R) *Queen Mary's Bathhouse, Holyrood (Photo © Clive Thompson under Creative Commons License <http://www.geograph.org.uk/photo/1027092>)*

Examples that we are confident contain oak timbers from Norway include (Illus 7):

- the roof of the Great Hall in Edinburgh Castle (AD 1509/10, Crone & Gallagher 2008);
- floor joists in Queen Mary's Bathhouse at Holyrood Palace (*circa* AD 1566, Crone forthcoming a);
- and the beams of the painted ceiling originally in Abbey Strand, in Edinburgh (AD 1563/4; Crone forthcoming b).

All the buildings listed above are in Edinburgh and in fact almost all dated 16th century buildings from Edinburgh and the Lothians contain Norwegian oak, matching what the documentary sources indicate.

Oak imports begin to peter out in the early 17th century: Gardyne's Land in Dundee (Crone 2001) and Lambs House (Crone 2010a) in Leith (Illus 8) are the only two buildings in this century in which we have identified imported oak, and in both cases it is only a few oak timbers in an otherwise pine construction. There are economic reasons for this. The export of oak from Norway was prohibited after 1602 because the remaining supplies were vital for the construction of the Danish-Norwegian fleet, so it is interesting to find Norwegian oak in 17th century Scottish buildings. Clearly a small amount was still making its way out of the country. Thus Gardyne's Land and Lambs House reflect the main trend throughout the 17th century, the dominance of imported pine beams in building construction.



*Illus 8 Predominantly pine buildings with some of the last few imported 17<sup>th</sup> century oaks:*  
 (L) *Gardyne's Land, Dundee, oak tpq AD 1660* (Photo © Yottanesia under Creative Commons License, see <http://commons.wikimedia.org/wiki/File:Gardynes-land-high-street.jpg>); and (R) *Lambs House, Leith, oak AD 1608/9* (Photo © Anne Burgess under Creative Commons License, <http://www.geograph.org.uk/photo/224353>)

However, pine was also being imported throughout the 16th century. As we have heard from Arnvid Lillehammer huge quantities of pine deals, or boards were being exported from Norway to Scotland but we have very few surviving examples. This is possibly because the deals would have been used as floorboards, sarking, panelling, etc, components which are most easily stripped out and replaced, or are not often considered for their dendro potential. It is more than likely that the painted ceilings which are so characteristic of Scottish interior décor in the late 16th/early 17th centuries are constructed from imported pine deals (Illus 9). Not surprisingly we have rarely been allowed to take samples from any of these! So currently, the only dated example of 16th century pine deals are the floorboards found over the Queen's bedchamber in Stirling Palace (Crone 2008a).



*Illus 9 Some early Scandinavian pine imports at 302-4 Lawnmarket, Edinburgh (Photos © AOC Archaeology). Different groups of joists gave tpq dates of AD 1591 and AD 1605. The painted boards (R) have not been analysed but boards in decorative ceilings of this period are likely to have been imported from Scandinavia.*

Pine beams from Scandinavia, as opposed to deals, also begin to appear towards the late 16th century: we have one certain 16<sup>th</sup> century example so far from the Bay Horse Inn, in Dysart in Fife, containing pine joists felled in AD 1584 (Crone 2010b). Pine timber then becomes the dominant import in the 17th century. This is clear from the documentary sources and it is what we have observed and sampled in numerous 17th century buildings. However, we have only been able to date successfully a few of these buildings because pine has proved notoriously difficult to date. The joists used throughout Lambs House (Illus 8) are all Scandinavian pine (AD 1608/9) as are the joists used throughout a tenement on the Lawnmarket (Crone & Sproat 2011) in Edinburgh (Illus 9).

Arnvid Lillehammer's paper has given us some clue as to why imported pine might be difficult to date. He has described how Scottish skippers were able to trade directly with the farmers along the shores of the numerous little fjords which break up Norway's west coast. It is likely that the tree-ring signal from these small and varied environmental niches may be too distinctively local to be picked up in the regional chronologies. Thus, one possible reason for the lack of success in dating some of the 16th and 17th century pine assemblages may be the extent and quality of chronological coverage in the source region.

Duff House (Illus 10) is a good example of the difficulties in identifying Norwegian pine. We know that at least some of the timber in the roof of Duff House came from Norway; the quotation here comes from legal papers drawn up shortly after construction (Court of Session Papers 1743).

*'And as for the Timber, the Petitioner provided himself partly from his own Woods in Braemar, where there are very fine Trees, which he caused to be flotted down the River Dee to Aberdeen, and from thence brought about to Banff, and partly by Cargos, which he caused to be imported for his own Use from Norway, and some part of the Timber....were furnished to him by Mr William Adams of Edinburgh, Architect'*

Yet although it was possible to construct a robust chronology which incorporated 34 sequences, some 70% of the sampled roof timbers, it only produced low correlations against regional chronologies

from Sweden and Norway (Crone 2008b). With this level of correlation and no other corroborative evidence we would have given the chronology a generic Scandinavian provenance. The felling date of AD 1736/7 matched well with the documented history of construction.



*Illus 10 The mid-18<sup>th</sup> century switch in pine source: (L) Duff House, Scandinavian pine roof timbers, probably from Norway, date to AD 1736/7; (R) The Chapel at Fort George, pine roof timbers, probably from Karelia (an area straddling the modern Finnish –Russian border), date to AD 1764*

Duff House (Illus 10) was built with Norwegian pine in the first half of the 18th century but by the end of that century, the Norwegian forests had been exhausted through over-exploitation and the timber trade switched its attention to the eastern Baltic where the ports of St Petersburg, Riga and Memel were the conduits for vast quantities of timber coming from the Russian hinterland (Thomson 1991; Zunde 1999).

Initially the northern ports supplied Scotland's timber needs and we have identified timber from their hinterland in the roofs of the Chapel (Illus 10) and the Staff Block at Fort George (Crone & Mills 2008). The timbers were dated against chronologies bordering the Gulf of Finland and probably come from the region of Karelia, which straddles the modern border between Finland and Russia.

By the latter half of the 18th century the Baltic port of Memel dominated the Scottish timber trade (Thomson 1991). All the timber used in the buildings listed below compare most closely with chronologies from the Baltic states, Latvia, Lithuania and Estonia but the timber was probably coming from a vast area which may have stretched as far east as the Volga river;

- the Ordnance Store, Fort George (Crone & Mills 2008)
- modifications to the Great Hall in Stirling Castle, carried out by the British Army (Crone 2008a)
- a townhouse in Haddington (Crone 1998b)
- in the piling under a country house at Elderslie, in Glasgow (Crone 2007)

And finally, we end this gallop through the evidence in the early 19th century, a period which sees another massive change in the timber trade. The Napoleonic wars made the Baltic trade nigh on impossible and the British government turned to America for its timber supplies. Very few buildings of this period have been analysed, with the Granary at Elie in Fife a rare example (Mills 2002b). When first analysed, early 19th century German oak was identified, but there were other oak timbers in the building which couldn't then be dated. Recently, and very serendipitously, as a result of work on a four-poster bed from Cheshire it was possible to provenance these oak timbers to the American east coast.

## DISCUSSION

The dendrochronological evidence, despite some obvious biases, clearly shows that much of Scotland becomes reliant on imported timber from the mid 15<sup>th</sup> century onwards. The facility to use tree-ring analysis to provenance as well as to date timbers, allows us to examine the shifts in the sources used over time. The late medieval imports are dominated by oak baulks from Scandinavia, and fine cleft boards, the 'estland boards' of the documents, coming from the eastern Baltic. While it can be difficult to pinpoint from where within Scandinavia the oak beams came, there is growing dendro evidence that in the 16<sup>th</sup> century Edinburgh and the Lothians favoured Norwegian oak, while many other sites match most closely with Southern Sweden/Northern Denmark. While there are occasional pine imports in the 16<sup>th</sup> century, the big switch from imported Scandinavian oak to imported Scandinavian pine occurs from the early 17<sup>th</sup> century, as oak supplies become depleted in the exporting regions. The Scandinavian pine is in turn eclipsed by pine from further east and north in the Baltic by the second half of the 18<sup>th</sup> century, with ports like Riga and Memel coming to the fore and exploiting vast hinterlands. The disruption of the Napoleonic Wars to the Baltic trade caused another shift, this time to the New World colonies, North America especially, and we expect to find more such material in 19<sup>th</sup> century buildings, as yet little studied dendrochronologically.

What are the reasons for the dwindling of native oak in the historic Scottish tree-ring record? Possible biases in our data have to be touched on, including the uneven geographical coverage in the sites studied, as from the late medieval period we have more eastern and central belt sites. Another bias is that much of the work summarised here is the result of commissioned studies on high status buildings in institutional care, and a different array of timber types and sources would be represented if more vernacular buildings were analysed. Until recently, little work was done on non-oak species and now this is underway it is starting to reveal a longer history of local native timber use in the post-medieval period. Furthermore, really young timber cannot be dated so we cannot include it in the picture but much of the young material, found in all manner of Scottish post-medieval buildings, may be native.

Nonetheless, our records clearly show a massive shift from native oak to imported timber from the late medieval period for much of Scotland and that must reflect underlying social, economic and environmental reasons. It is evident that we have to think about at least some of the problems being deep-rooted in the medieval period, even if consequences only become evident in the late medieval and post-medieval periods (Crone & Watson 2003). The following are amongst the possible causes.

A gross over-simplification no doubt, but the lack of political and social stability in Scotland in much of the medieval period with prevalent war, famine and disease may have undermined the long term thinking needed for successful forestry. Furthermore, the hunting interests of the medieval elite may have taken precedence above forestry objectives, while the needs and traditional rights of the rural population, for grazing, fuel, timber and so on, was often in tension with any timber production, and indeed often underpinned the ability of the tenants to pay rent to the landlord.

Bark stripping to supply tanbark, whether undertaken with or without consent, appears to have had great impacts on Scottish woodland, and is mentioned as a problem in some of the late medieval Acts of Parliament. As the Scottish cattle trade developed, this pressure seems likely to have increased.

The onset of the Little Ice Age in, arguably, the early 15th century may have undermined the intentions of Acts passed to protect and plant trees. Some landlords responded to these acts, but their attempts coincided with the worsening climate, perhaps reflected in the poor quality of late examples of native oak, at Stirling and Drum for example. There are some rare survivors from late medieval planting of oak, such as Cadzow where dendro-dating shows the oldest trees hail from the mid 15th century, and where some at least appear to grow on older broad rigs.

On the east coast and in the central belt especially, where most of our studies have been done in the late medieval and post-medieval periods, imported timber could be cheaper, easier to access (through sea transport), and arguably better (with earlier access to sawmilling and specialist timber producers) than that available in the home supply.

However, our record is drawn together from largely serendipitous site-specific opportunities, and therefore has been skewed to reflect the conservation priorities and economic circumstances of our own time. As we seek opportunities to broaden the reach of dendrochronology in Scotland, to other regions and species, we may find a more balanced view emerges, with more evidence yet to come regarding the continued use of Scottish woods for timber into the post-medieval period.

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## **SHIP TO SHORE: RACE MARKS, TIMBER MANAGEMENT AND THE RECYCLING OF SHIP TIMBERS IN THE 18-20TH CENTURIES**

***Robert Prescott & Dan Atkinson***

### **INTRODUCTION**

For a number of years we have been interested in the marks left by shipwrights on ship timbers during the building of ships. Understanding the significance of these marks and the way they develop across time can help us comprehend changes in shipyard practices and can also help with the dating of archaeological assemblages that contain marked fragments of re-used ship timber.

Close inspection of the few surviving intact ships and ship fragments from archaeological sites of the Georgian period reveals that ship timbers were marked at various stages of the building process. These marks were applied using a range of tools, namely the scieve-tool or race knife, chisels and die-stamps (see Figure 5, below). The practice has ancient roots and reflects the complexity of ship-building, with different work-groups in the ship-yard (e.g. sawyers, pattern-makers and shipwrights) needing to communicate with each other over different stages in the building process.

Ships operate in a harsh environment and are built to withstand the rigours of short working lives, in which owners aim to recover their investment costs before the loss of strength in the ship's structure renders the vessel unfit for carrying heavy burdens, at which point the ship is broken up. As a result, the number of historic ships available for study from any one period is likely to be small and has posed problems for research in this area. However, a well-built ship whose structure is weakening to the point where she becomes unseaworthy can still, if taken apart carefully, provide a source of re-cycled timber for use in ship repair or in the construction of buildings on dry-land. This prudent, ecologically sound policy has been widespread in the Royal Dockyards throughout the Georgian period and has greatly extended the study of shipwrights' marks from the few surviving historic ships to a wider range of industrial and domestic buildings ashore.

The following text falls into two parts; first, a review of some major examples of re-cycled ship timber used in terrestrial buildings; second, a description of the range of information carried by shipwrights' marks at the height of their development in the Georgian Royal Dockyards. Most of the data has come from sites in England, but there are growing signs of a similar potential for sites in Scotland, particularly those associated with recycled timber from merchant ships and local vernacular craft such as fishing vessels.

### **SOME BUILDINGS CONTAINING RE-CYCLED SHIP TIMBER IN THEIR CONSTRUCTION**

The 18th century French shipwright Blaise Ollivier was sent on an information-gathering expedition to English and Dutch Royal Dockyards by his French patrons. His instructions were to gather details of the ship-building practices employed by France's principal rivals in naval warfare. One marvels at the relaxed security which permitted this expedition to succeed and Ollivier's manuscript observations provide an extraordinarily rich commentary on naval ship-construction during a century of almost continuous naval warfare. Speaking of ship-breaking he reports:

*'The English shipwrights break their ships as soon as they are no longer fit to put to sea and they judge that in order to repair them safely it would be necessary to shift the frames ... They preserve here with great care all their old ship timbers, and find a useful purpose for each timber, whether to build the dockyard buildings or to line the sides and the building-platforms of their docks. I saw this economy at Portsmouth and at Chatham, where several sheds and other buildings are composed solely of old ship timbers'* (Ollivier 1737).

In the light of modern knowledge we can add to this that these recovered old timbers have also been used for ship repair, thus easing the chronic timber shortages in the Georgian Dockyards.

Since Ollivier's time there have been frequent claims that timber-framed buildings ashore contain recycled ship timbers. However, a measure of caution is called for. When investigated, many such claims prove to be unfounded, usually because the re-used timbers in question can be identified as originating in other terrestrial timber buildings.

The mere presence of race-marked timbers is not sufficient to identify a ship-based origin, for house-carpenters also mark their timbers with a race-knife. How can one identify re-used ship timbers in a building? Clearly, a sound knowledge of ship-structure will help the observer to identify isolated fragments of ship timber but even the inexperienced can be helped by considering the following points (Prescott & Atkinson 2003):

- The relatively greater strength, pattern and complexity of ship-wrights' work when compared with that of house-carpenters;
- The scantlings of re-used ship timber components often tend towards sizes larger than necessary for their new task in a terrestrial building; sometimes deck beams and masts are ripped longitudinally to render them more suitable for use ashore;
- The timber-marks observed on ship timbers are usually extensive, whereas those seen in terrestrial carpenters' work are more spare, often amounting to no more than construction guide marks or serial sets of roman numerals for rafters and roof trusses;
- The presence of redundant features in ship timbers when deployed ashore, such as empty rebates for carlings, and bolt holes for missing elements such as lodging knees, used to brace the original deck beams.

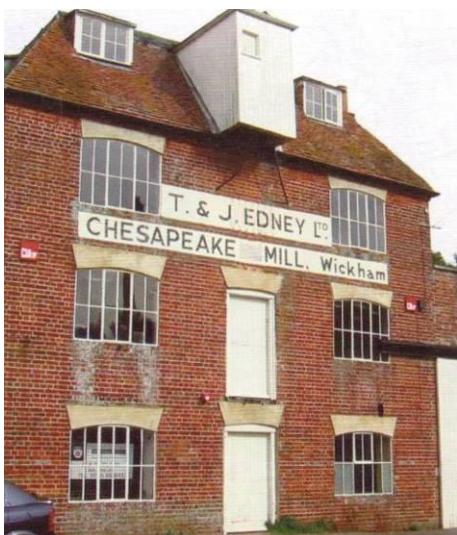
The practice reported by Ollivier was continued right through into the 20th century. Chatham Historic Dockyard today contains some of the largest examples of industrial buildings built with recycled ship timber (Coad 1989). The Sail and Colour Loft, built in 1723, is a three storey building in which extensive re-use of ship timber has occurred. Recycled deck beams appear as floor joists and some of the ground floor pillars are the ribs of a 17th century warship taken apart in the dockyard. The Upper Mast House and Mould Loft, dating from the 1750s, is a magnificent timber building which employs re-used timber as pillars at ground floor level, this time using deck-beams whose origin is clearly shown by the long tailed scarps and the rebates for carlings in the compound beams.

The most recent building to be investigated is the Wheelwrights Shop, a small three-aisle building from the 1780s. The roof is supported on a series of re-used deck beams, many braced with recycled knees. In addition, the building contains much former ship planking, in its many-layered floors, beneath which lies a large assemblage of timbers including, inter alia, deck-beams, futtocks (components of compound ribs), carlings, a stem apron and cutwater timbers (Figure 1). We have identified the great majority of these timbers as originating in *HMS Namur*, a 2nd rate ship of the line launched in 1756 and taken apart in the dockyard in 1833.



*Figure 1: Interior view of the Wheelwrights Shop, Chatham Dockyard, showing the disassembled timbers from HMS Namur laid out neatly beneath the floor. Most of the posts and knees used to support the roof are re-cycled deck beams*

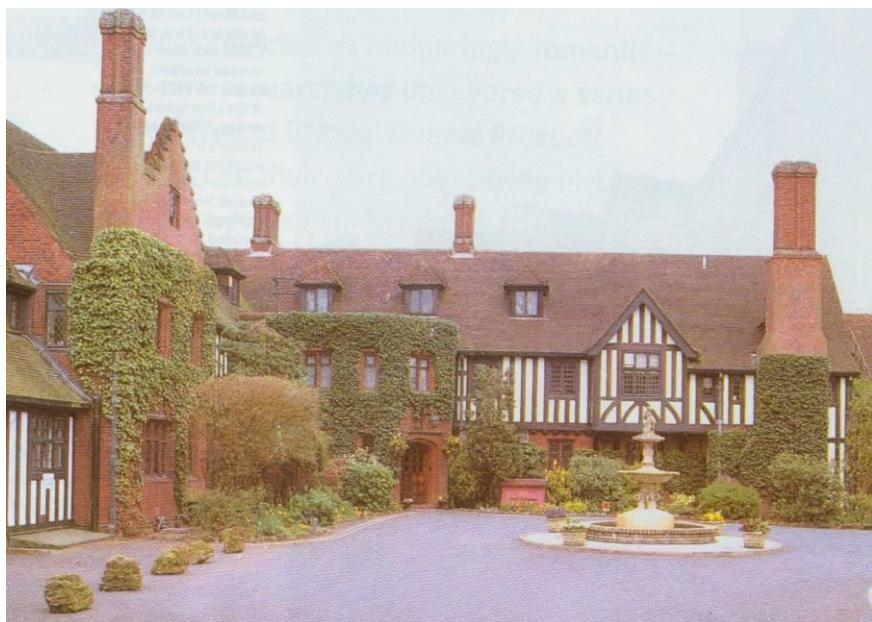
Recycled ship timber can also be identified in buildings beyond the confines of the Royal Dockyards. These cases relate to smaller naval vessels that were sold for breaking by commercial shipyards or timber merchants. The most significant of these is the United States frigate *Chesapeake*, built in Gosport, Virginia in 1796 and taken as a prize by *HMS Shannon* during the War of 1812. After disposal by the Royal Navy she was taken apart by a commercial timber yard in Portsmouth and her timbers were used to build a water-mill (Figures 2 & 3) on the River Meon at Wickham, Hampshire, in 1820 (Prescott *et al* 2004).



*Figure 2 (L): The four-storey Chesapeake Mill employs ship timber at every level. Particularly impressive are the large deck-beams of North American pine which support each floor and whose original length has in fact governed the dimensions of the mill. Figure 3 (R): Interior of the Chesapeake Mill; a deck beam from the frigate Chesapeake showing the rebates for the mast partners and a centre-line pillar (photo copyright R G W Prescott)*

Particularly impressive are the large deck-beams of North American pine which support each floor and whose original length has in fact governed the dimensions of the mill. In addition to these massive deck beams there are other features of ship origin. These include the oak planks forming door and window lintels, which carry evidence of the frame spacing in the ship, reflected in the spacing of pairs of trenails, indicating where the planks were fastened to the ships frames or ribs. The surviving timbers are in such good condition that they often carry the ghostly imprint of other timber features, now missing, to which they were joined. From this information it has been possible to reconstruct details of the decorative moulded margins of missing items such as the carlings which spanned the spaces between deck beams.

In the early 20th century there was a brief final flourish in the re-use of warship timbers, when professional architects, rather than the anonymous builders of the vernacular tradition, employed timbers from naval vessels in prestige projects, building in the Tudor revival style popular at the time. The father and son partnership of Edwin T Hall and E Stanley Hall designed two such projects, the retail premises of Liberty's Tudor House off Regent Street, London in 1923 and Stone Manor, near Kidderminster (Figure 4), built as a private residence for the industrialist J C Hill in 1926. Liberty's incorporated timber from both *HMS Hindostan* (built in 1828) and *HMS Impregnable* (built 1860), while Stone Manor contains timber from *HMS Arethusa* (built in 1846), a veteran of the Crimean War and reputedly the last British warship to go into action under sail. Although these architect-driven projects are well-documented, from an archaeological point of view the problem with them is that the designers 'cleaned up' the surface of the timbers to improve their appearance before use, thereby removing many of the tell-tale signs of their origin.



*Figure 4 : Stone Manor, near Kidderminster, an architect-designed product of the early 20<sup>th</sup> century fashion for the mock Tudor style*

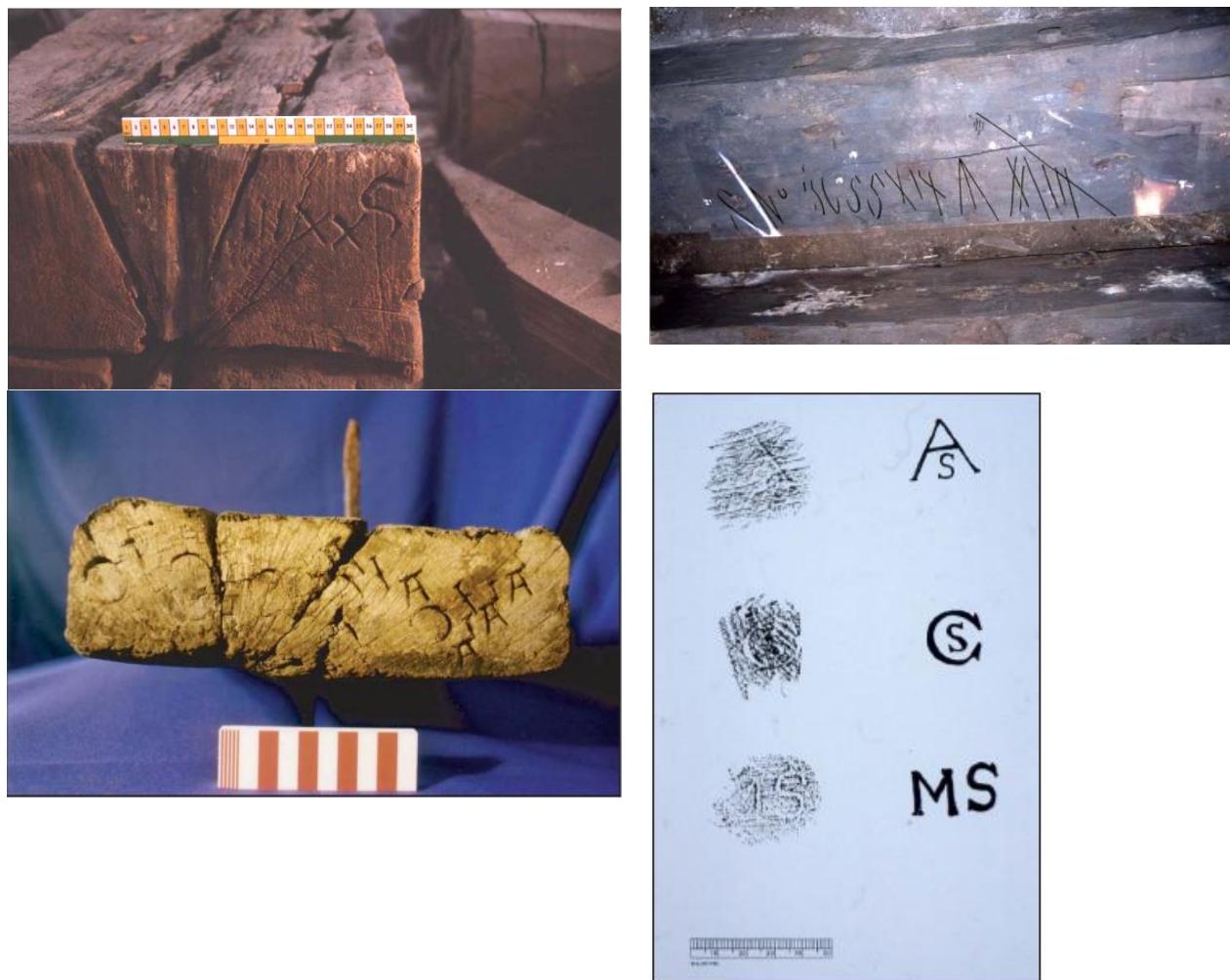
#### **TIMBER MARKING AT ITS ZENITH - THE ROYAL DOCKYARDS IN THE 18<sup>TH</sup> AND 19<sup>TH</sup> CENTURIES**

Though shipwrights' marks are found on archaeological ship remains throughout Europe and the Near East over many centuries the examples of timber marking from earlier periods relate, in the main, to simple location marks useful in the construction process. This appears to hold true well into the early modern period. However, when we look at the evidence for the marking of timber in the Royal Dockyards of the 18th and 19th centuries we find the practice has reached unprecedented levels of complexity. The process is now characterized by much more extensive marks that yield a greater variety of information, much of it in abbreviated plain language.

This information is priceless in telling us about the various working processes of the several dockyards; processes that range from timber procurement by purveyors in the forests, to the delivery, storage, conversion, use, and re-use of the various timber resources in the yards. A number of factors contributed to these developments over many years, such as increasing levels of numeracy and literacy in the work-force; increased technological development and standardisation in the rapidly growing Royal Navy; and changes in dockyard administration aimed at better records of timber supply, the need to cut back waste and pilfering, and to improve quality control by changes to the monitoring of work.

Sources for this part of the paper are principally drawn from our study of the Wheelwrights Shop (*HMS Namur*, launched 1756); our survey of the timber ‘arisings’ (ie timbers extracted from the ship during repairs carried out over many years) from *HMS Victory*, launched 1765 and subject to regular dockyard maintenance ever since; and our on-board survey of timbers in *HMS Unicorn*, a 5th rate frigate launched at Chatham in 1824 and still afloat in Dundee (Atkinson 2007).

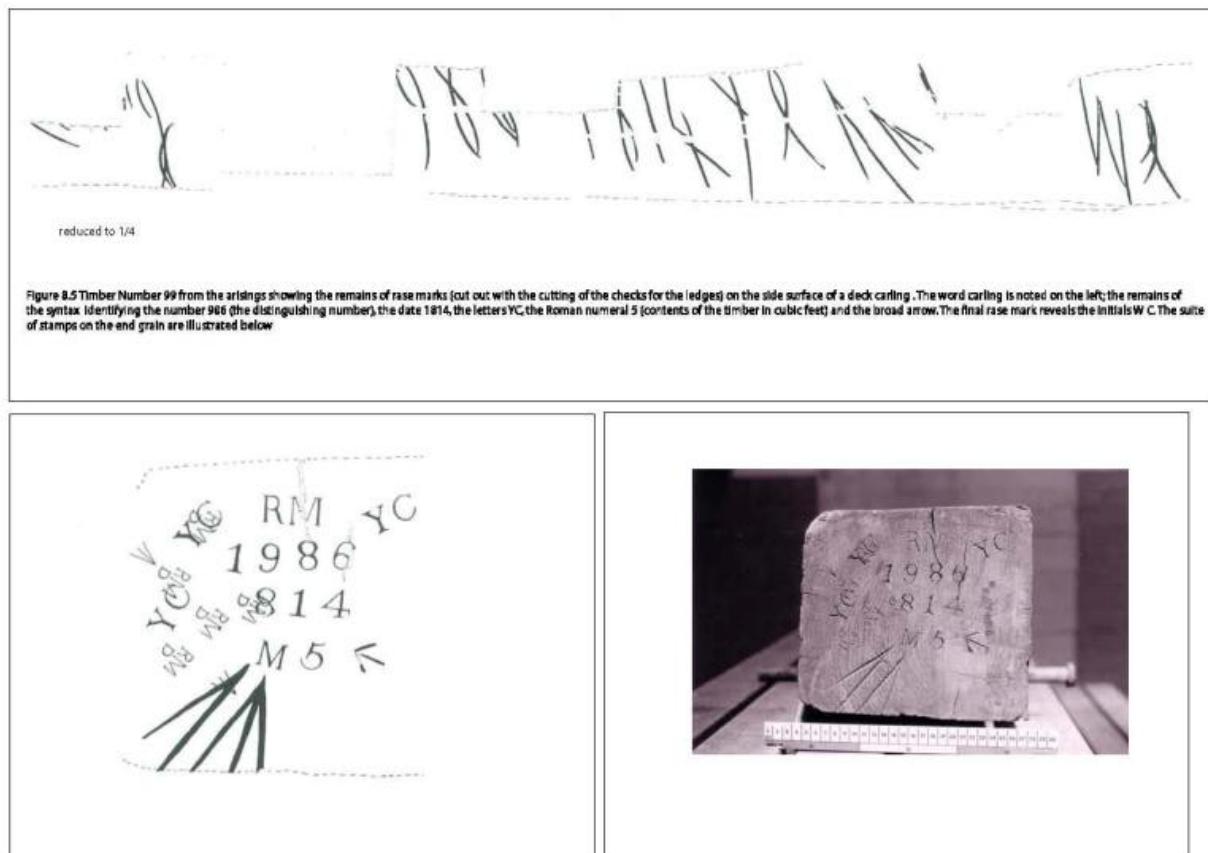
### READING THE MARKS



*Figure 5: Different marking methods observed in re-cycled warship timbers from the dockyards at Chatham and Portsmouth. Clockwise from top left: Carving on beam end – S XX III; Rase mark on a futtock – syntax; Numerous stamps; Stamps on a plank.*

Reading carved and stamped inscriptions presents no problem. They are usually very clear, if sometimes faint in the case of stamps lightly struck. Race marks are much more varied and idiosyncratic. The problem is that the race knife is good at incising straight lines but poor at rendering curved lines such as

some letters of the alphabet and Arabic numerals. It helps the reader to identify where the shipwright stood when using the race-knife, for the entry and exit points of the stroke have different shapes. Once this is mastered by the reader, now able to see which way up the marks were made, all that is needed is exposure to a large number of marks to achieve fluency. These points will become clearer when the reader studies Figures 5 – 7.



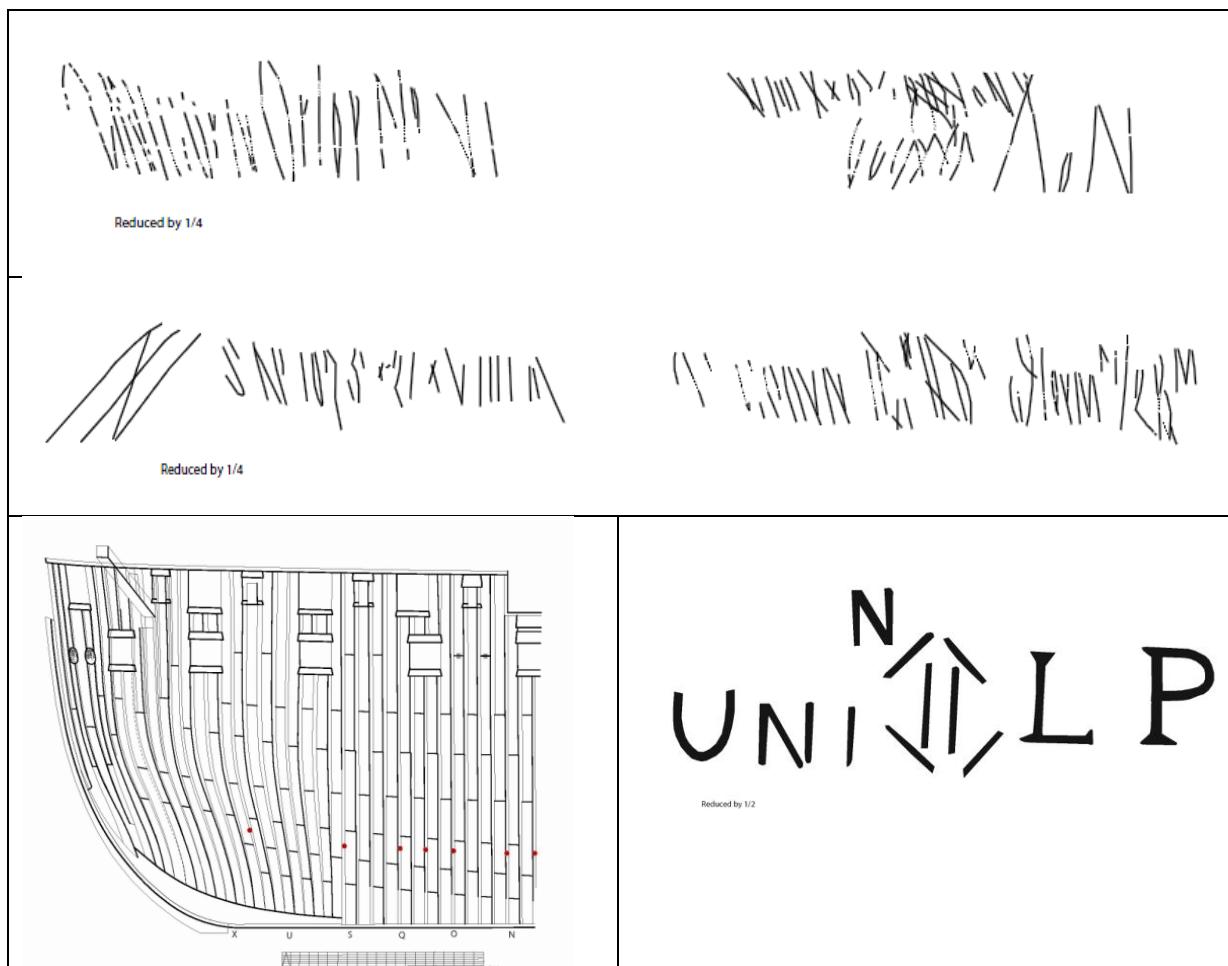
*Figure 6: Timber marks on a carling from HMS Victory: The lengthy inscription on the side face of the carling (above) has been partly obliterated by the rebates cut out to receive the ledges spanning the space between adjacent carlings but the full inscription has been preserved by the stamps and race marks on the end grain of the timber. This piece was our 'Rosetta Stone' equivalent, helping us to understand the full syntax encountered at the later, Timber-Master period in the Dockyards.*

### THE CONTENT OF THE MARKS

It is clear from documentary sources for the dockyards (mainly at the National Archives, Kew; the Caird Library, National Maritime Museum; and smaller archives at Chatham and Portsmouth) that by the 18th century numerous personnel in the yards contribute to marking timber. These included Principal Officers, eg the Master Shipwright, the Clerk of the Survey and the Clerk of the Check; inferior officers, eg Foremen of the Yard and Quartermen; and the numerous shipwrights forming the working squads. The latter workmen are mostly responsible for carved and raced inscriptions, the dies are the prerogative of the Principal Officers and their assigned assistants. Examining a large corpus of inscribed timber from dockyard-built ships reveals a wide range of information, that can include the location of parts of the ship for which the timber is intended, the name of the ship, the date at which the timber came into the yard, the contents (quantity of the timber being marked) and the date of its being re-worked in the yard. There are also many construction marks to help craftsmen fit the ship together and occasionally we encounter personal names of shipwrights and more senior officers from the yard.

With so much information to be imparted it is no surprise to find a syntax governing the form and sequence of the marks developing over time. This practice attained its ultimate form in the 19th century, following the appointment of Timber Masters to the Royal Dockyards in the years following 1801. This was a most significant development in Dockyard Administration. The Timber Master, with his Assistants, was tasked with recording the entry of new timber into the yards, controlling its distribution to the various work groups and effectively minimising waste and embezzlement. Each species of tree entering the yard was given a progressive serial number within the year of receipt, and these numbers were carried forward onto each piece of timber worked up from those trees. For its time it was an astonishing change, with great effect upon quality control (not unlike the methods used to track materials through modern day enterprises such as the building of space vehicles).

The examples shown illustrate the richness of information contained in the copious markings left by shipwrights and their colleagues at the peak of the development of the system, particularly in the period following the appointment of the Timber Masters and their assistants in the early 19th century.

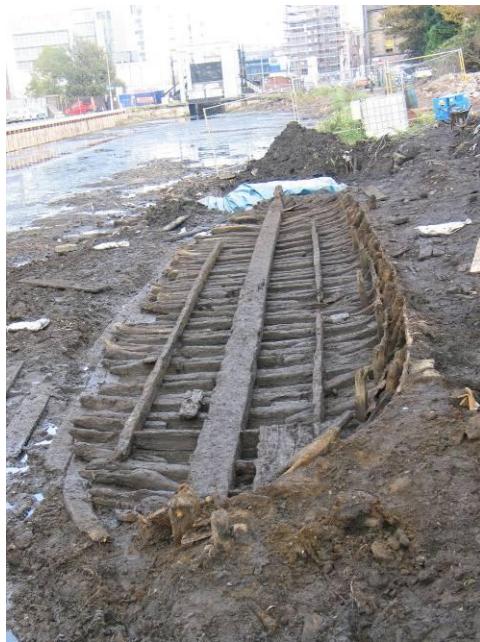


**Figure 7: Race marks and carvings from deck beams and frames of HMS Unicorn (not to scale)**  
**Above:** clockwise from top left, the mark reads *Unicorn Orlop (beam) No VI (6); the second mark shows a fragmentary syntax and a No V (5) all of which are upside down; the third mark reads Unicorn Lr Dk Interm ½ BM (lower deck intermediate half beam); the fourth mark provides the standard syntax, SNo 1075 (timber serial number 1075), space mark, 21 (year 1821), space mark, roman numeral VIII (presumably a job number) and the broad arrow.*  
**Below:** left, frame diagram showing the location of futtock carvings (red dots); right, carving denoting the ship name(UNI), roman numeral 2 in brackets denoting 2<sup>nd</sup> futtock and letters L and P (for Larboard side, joint line or station P)

## SOME FUTURE RESEARCH QUESTIONS IN SCOTLAND

There is growing evidence for the presence of re-cycled ship and boat timber in Scottish buildings. Archaeological sites containing abandoned or ship-wreck material are also adding to the potential for such research in Scotland, both related to shipwrights' marks and to re-cycling. Some examples are listed below:

- Dunbar, a harbour-side warehouse, incorporating re-cycled deck beams and some spars
- Edinburgh, Gledstanes Land, re-used ship planking in turnpike stair
- Edinburgh, Leamington's Wharf (Figure 8), an early 19<sup>th</sup> century canal barge (see Atkinson 2012)
- Kirkcaldy, Law's Close, a 16th century merchant's house with many maritime connections, including examples of re-cycled ship timber
- Anstruther, several industrial and domestic sites incorporating keel, plank and spar timber
- Portsoy, a harbourside warehouse incorporating re-used frames, planking and spar (Figure 9)



*Figure 8 : Timber marks in a non-naval context; a Canal barge from Leamington's Wharf on the Union Canal in Edinburgh*



Figure 9: Portsoy example. Left: the quayside warehouse at Portsoy Harbour, on the Moray Firth. The building contains examples of re-cycled ship timbers used as rafters, lintels and posts. Right: a window lintel fashioned from the frame timber of a substantial coasting vessel.

While the absence of Navy Board dockyards in Scotland presumably provided less opportunity for the breaking of warships, there were many shipyards building for the short seas and coasting trades who would have had repair and ship-breaking facilities. Re-cycling of timber of the kind seen in the above examples will have eased the timber supply problems of these yards. We can expect to gain many more insights into all aspects of ship-building and timber management in Scotland as research continues.

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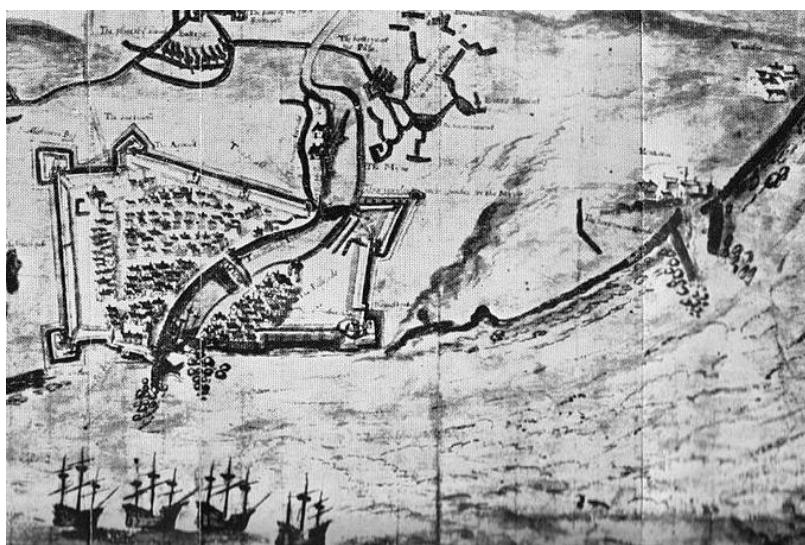
## BUILDING THE GREAT MICHAEL: THE FIRST MODERN WARSHIP

**Eric Graham**

This illustrated presentation speculates on the hull design and rig of James IV's massive late mediaeval warship - the *Great Michael*. Unfortunately, there is no known contemporary visualisation of her from which to determine her hull and rig design. There is also no evidence of any estimate of how much timber was used in her construction. To surmount this problem my approach here is to compare the known features of other naval vessels approaching her size which were launched around the same time.

The starting point of any line of enquiry lie in the claims of the 16<sup>th</sup> century Scots chronicler Lindsay of Pitscottie (Dalyell 1814) whose sparse but tantalising description is: *Ane great scheip callit the greit Michell And maist of strength that ewer saillit in Ingland or France. This scheip was so great stut and tuik so mekill timber that scho waistit all the wodis in Fyfe except Falkland wode, by all the tymmer that was gottin out of Norway ... 12 score feet long & 35 broad between her walls which were each ten feet thick.*

Pitscottie was, of course, born some twenty years after the event and so was describing what he had been related to him by others (he claimed to have spoken to her first captain Sir Andrew Wood of Largo).



Illus 1 (Above L) Siege of Leith map (extract), 1560, with 'Newhavin' to the RHS, showing probable slips from which the Great Michael may have been launched, from The Book of the Old Edinburgh Club, vol. XXXII / Wikimedia commons; (Above R) Chapel built by James IV for the shipwrights at Newhaven; (Below) Detail of Granville Collins map c.1690 of Leith with possible slipways on the shore. Last two Images courtesy of Early Scottish Maritime Exchange Library

Such was her size that a new slip had to be laid out on a green-site shore and the town of Newhaven (Illus 1) was created to accommodate the international workforce assembled to construct her under the direction of the French naval architect Jacques Terrell. The cost to the Scottish royal purse was punitive. Her short career under the Scottish flag and eventual sale to the French crown has been ably mapped out by others, notably by Norman MacDougall in his article in *Scotland and War AD 79-1918* (MacDougall 1991). It is generally accepted that her launch in October 1511 sparked a naval race between Scotland, England and France.



Illus 2: *The Santa Catarina do Monte Sinai* c 1540, Circle of Joachim Patinir (Wikimedia Commons / National Maritime Museum Greenwich)

Pitscottie's description makes it certain that she was a multi decked carvel hulled carrack. This design was first introduced in Atlantic waters by the Portuguese late in the previous century and it broke through the size limitations of the traditional clinker built partially decked European cog. So to visualise that *Great Michael* one must look to European marine paintings of the period mostly undertaken by Flemish artists. In my opinion the key image is that of the giant war carrack *Santa Catarina do Monte Sinai* (Illus 2: the other vessels in the distance are also her but in different points to the wind) whose keel was laid down in 1512. Details of this painting can be readily viewed on numerous websites. Other relevant images are the more stylised drawings in the 'Anthony Rolls' that listed the royal Tudor fleet of the 1540s - including the *Great Michael*'s contemporaries the *Great Harry* and the *Mary Rose*. (Ed's note: See [http://en.wikipedia.org/wiki/Anthony\\_Roll](http://en.wikipedia.org/wiki/Anthony_Roll) for these images.)

From the substantial hull section of the wreck of the latter (c. one third of the hull) an estimate can be made as to how many trees were felled to provide the main timbers used in the construction of *Great Michael*. Not long before the *Mary Rose* overset during the Battle of the Solent (1545) she had undergone a conversion (1536) that had added a new gun deck the length of her carrack hull; raising her tonnage from 500 to 700 tons burthen (just under three quarters of the *Great Michael*). From this surviving hull section it has been estimated that her complete hull construction required 600 large oaks. The main deck beams alone weighed three quarters of a ton each. By this crude reckoning the needs of the 1000 ton *Great Michael*'s builders must have been in the region of 850 -900 mature oaks - sufficient to strip the 'wodis of Fyfe'.

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## SPEYBUILT: THE STORY OF A FORGOTTEN INDUSTRY

***Jim Skelton***

***Editor's note:*** It is well worth reading the author's fuller account in his excellent and well-illustrated book on the subject, reference below (Skelton 1995).

The first attempt to market Spey fir on any scale was in 1630 when Sir John Grant of Freuchie sold to Captain John Mason a 41 year lease of the Woods of Kincardine, for £1,666-13-4d sterling or £30,000 Scots. Little information is available about this contract but some timber was floated down to Speymouth and exported.

In 1727 the York Building Company bought from Sir James Grant of Grant '*60,000 trees of the best of the fir woods of Kincardine, Abernethy*'. The price, at 2s 4d per tree was £7,000 sterling, payable in instalments, the first being due in August, 1728.

By 1732 the first four instalments had been paid but the fifth did not appear. Later in the year, Colonel Horsey, Convenor of the Company was foolish enough to visit Strathspey, together with Richard Birch, the Company Accountant. The Laird of Grant promptly obtained a warrant for their arrest. Colonel Horsey was obliged to find the money or face imprisonment. The money was eventually found, Accountant Birch remaining in gaol until it was paid. The business was wound up shortly afterwards.

Up to the 1720s, the timber had been floated down the Spey as separate items, a 'loose float', consisting of upwards of 5000 pieces. Aaron Hill, of the York Buildings Company, saw that this was not the best way of doing the job and instigated the practice of building the timber into solid rafts with a seat at each end for oarsmen to sit on and steer their craft down the river.

The Duke of Gordon owned fishing rights on the lower Spey and to take advantage of them had built 'braes' or loose stone dykes across shallow parts of the river. Openings were left in the 'braes' for the salmon to pass upstream, where they were caught in iron cages. These were tended day and night by the Duke's tacksmen. When timber rafts came down the river a clash of interests occurred as the rafts damaged the braes as they passed over, and in 1780 the Duke of Gordon brought an Action in the High Court in Edinburgh to prevent Sir Ludovic Grant and other Grants from floating timber down the river to Garmouth. In reply, the Grants showed that floating timber was an old established practice, demonstrating that the York Buildings Company had been floating timber down the Spey since 1728 and Capt. John Mason had done so in 1630. The Court upheld the rights of floating timber down the river and a public right of navigation was established.

This right of navigation was again challenged in 1977, when fishing proprietors tried to prevent Mr Clive Freshwater of the Cainrgorm Canoeing School, from canoeing the length of Spey from Grantown to the sea. As in the 1700 case, the historic precedents were invoked and Mr Freshwater proved again the public right of navigation down the Spey.

During the first part of the 19th century timber was the predominate source of wealth on Speyside, providing cash for the Lairds and employment for the workers. In 1835 the New Statistical Account gave the grand value of timber sold at Speymouth in 1812 as £40,000 sterling while the Annual Floater's ball at Rothiemurchus was the prime event of their social calendar.

The time taken to float a raft from Rothiemurchus to the sea was around 12 - 16 hours and on a summer day with an early start the floaters could land their raft at Garmouth and walk as far as Rothes on the way home before being overtaken by darkness.

On their voyage down the Spey the floaters had difficulties with rocks and other obstacles. One of these was a rock at Knockandhu, near Ballindalloch. On 13th March, 1809, Sir J P Grant wrote to Sir George MacPherson Grant asking permission to remove the rock. This was answered on April 3rd by Sir George saying, '*The emoluments my tacksmen derive from the assistance they afford in passing the rafts at that place is by no means the only advantage accruing to my property from the Rock in question, as a considerable part of my estate in its neighbourhood possesses a local advantage to floaters in consequence of this obstruction which induces that class of men to give me a higher rent than the land would otherwise fetch.*' The rock remained.

Rafting was still carried out on the Spey until the end of the 19th century. The Banffshire Journal for April 15th 1886 gives an account of three men on a raft who came down from Rothes in an hour and a half and were swept out to sea, being rescued by boat later that night.

Oak had always been the material from which ships had been built, the Viking longships were clinker built from oak planks. However, by the middle of the 18th century the demands on the English oak forests by shipbuilders who required timber for ships and by ironmasters who required hardwood to produce charcoal for iron smelting had made oak a progressively scarcer and more valuable commodity (Abraham Derby had not yet managed to smelt iron using coal as fuel).

The British Admiralty were having to import timber from the Baltic and from North America and alternative sources were eagerly sought after. Several attempts had already been made to exploit the forests of Scots pine (*Pinus sylvestris*) or Fir, as it was known, which stood in Strathspey, but none were successful, due in part to the remoteness of the timber from the coast and the absence of roads.

In 1782, Alexander, 4th Duke of Gordon, advertised for sale the Forest of Glenmore, which allegedly contained '*100,000 trees, fullgrown and fit for the Royal Navy.*' This advertisement was seen by two Yorkshire 'raff', or timber merchants; Ralph Dodsworth, once Lord Mayor of York and William Osborne, merchant of Kingston upon Hull. They contacted the Duke and in the spring of 1783 Dodsworth was in Glenmore assessing the value of the timber.

He arrived by ship at Speymouth and walked to and from Glenmore, 50 miles each way over rough tracks! He wrote to William Osborne in Hull that although he could not count 100,000 first class trees, the timber was of good quality, and '*we observed many coarse and crooked trees standing in the Forest which we understood were of little or no value, but as we intend to build ships they will be useful to us in that line*' ie for knees.

A contract was quickly drawn up and signed and the Glenmore Company, as they now were, took possession, having bought Glenmore Forest for £10,000, sterling (£120,000 Scots). Dodsworth's partner, William Osborne arrived in Speymouth shortly after the contact was signed, bringing with him both capital and organisation. The Industrial Revolution had come to Speyside!

He began by acquiring Red Corff House on the shore as a centre for his operations. This he increased to two stories high and made into accommodation for his workmen and an office for himself. He engaged men to commence the cutting of a canal to enable shipping to sail from the Spey right up to Red Corff House. A slipway was laid out and more workers dwellings erected. Osborne brought very few men with him from Hull; there were only 12 Englishmen in the Parish in 1791. He relied heavily on the local labour force and was not disappointed.

Once his affairs were in motion at Speymouth, Osborne proceeded up the river to Glenmore, where he engaged more staff and created an organisation to cut the standing timber, sned and dress it, carry it to water driven sawmills and convert it to square baulks. A vast amount of work had to be done prior to this however. Dams had to be built, sawmills erected, streams diverted and straightened and roads built. If this amount of work had been accomplished as speedily in the South it would have been considered extremely good going. To carry out the same work fifty miles up the Spey was little short of miraculous! At this time there were very few roads in the North of Scotland, except for the military road built by General George Wade some 70 years previously. All the machinery and tools, etc, for the sawmills had to be imported by sea and laboriously taken by horse transport along Speyside, the river being navigable for the first 500 yards only.

However, this programme had advanced enough by the spring of 1785 to enable winter felled Glenmore timber to be rafted to Speymouth when Thomas Hustwick, a shipwright brought from Hull by Osborne, was ready to commence building and the first vessel, a brig of 110 tons, and 9' draft, the *Glenmore* went down the slipway before the end of 1785! 1786 saw the launch of the *Yucatan* a three masted ship of 240 tons and by 1791 some 19 vessels had been launched, some over 500 tons. A total of 3,582 tons had been built at Kingston Port, as it was now called.

To further the work at Kingston Port, the Glenmore Company, as Dodsworth and Osborne now called themselves, had erected a street of houses called Southshore Road, to accommodate the workforce.

In the space of 22 years the Glenmore Company built and launched 47 sail of ships, '*the largest of them 1,050 tons and the others but little inferior in size*', totally 19,000 tons.

These were large ships for their day, some being in the service of the H.E.I.C (Honourable East India Company) whilst one, the *Sinclair*, sailed to Sydney via Rio de Janeiro with 100 soldiers, stores and a new Governor General!

When the Glenmore Fir ran out, the Glenmore Company left Speymouth. Others were quick to take advantage of the large quantities of high quality timber now coming down the Spey from other landowners such as the Grants, Seafields and MacIntosches.

By 1815, several companies had built ships at Speymouth including Leslie, Winchester, Falconer, Logie, Robertson and Geddie. The ships they built were few in number and not above 200 tons and it was not until the 1840s when Anderson, Hay, John Duncan and Badenoch and Young had entered into the business that the total annual tonnages began to rise. In all there were about 20 different firms engaged in building at Speymouth at one time or another, but never more than seven yards in work at any one time.

After the Glenmore Company, the major builders were the Geddie family, who at times operated more than one yard, sometimes in competition with one another. Other builders included John Duncan, William Kinloch and Alex Spence. The dates and output of these yards is given below.

Glenmore Company	1785-1806	47 ships	19,000T
Geddie	1814-1890	150 ships	15,000T
Duncan	1840-1882	100 ships	14,000T
Kinloch	1844-1888	40 ships	11,000T
Spence	1865-1878	17 ships	3,300T

**Total Annual Tonnages - examples** (these are given more fully in App 2 of Skelton 1995)

1801	1,047
1807	230
1812	NIL
1814	435
1825	639
1835	314
1841	1,494
1849	1,926
1857	1,868
1867	2,838
1875	2,693
1878	2,303
1890	115

The approximate total built was 83,000 tons.

During 1907-08, several wooden steam drifters were built, the finished hulks being towed to Aberdeen or Great Yarmouth to be fitted with boilers and engines.

**DUNCAN**

One of the most famous of the Spey shipbuilder names was that of Duncan. John Duncan was born at Mathiemill near Garmouth in 1806. Nothing is known about him prior to 1840 when he started business on his own account. He bought Dunfermline House and the old Osborne Yard in 1853. John and his son, James, born 1839 at Kingston, were responsible for at least 100 vessels totalling more than 14,000 tons. Apart from fishing boats, which I have omitted to count, their last ship was launched in 1882. As both Duncans shared the initial 'J' it is difficult to tell them apart as they appear in the registers as J. Duncan.

One vessel, launched by John Duncan in 1863 was the clipper brig *Waverley* of 215 tons. After sailing to New Zealand she was then owned and registered in Sydney, Australia, where she traded along the coast and to China. In 1871 she sailed from Adelaide to Sydney in less than six days, a record passage. She was lost on the Tasmanian coast in 1899. However, the Speybuilt brig was to achieve lasting fame as her likeness is now displayed on the back of the Australian five dollar note, where her name, *Waverley*, may be seen on the pennant flying from her main truck.

The Duncan family were well established in Speymouth where John's brothers were active in the timber trade, whilst John, as well as being a shipbuilder was also a ship manager.

The *Jacinth*, a 100 ton schooner built by Duncan in 1877 was still in service in 1942.

Most of the Spey launchings were recorded in the local papers and whenever a launch from the Duncan Yard was reported the 'après launch' activities were prominent, for example

'Courant' 10th June, 1858

*'On the signal being given, the vessel glided smoothly and majestically into the water amidst great cheering. The ship is named "Barragill Castle", of 131 tons. In the afternoon and evening Mr. Duncan regaled his carpenters and friends with an abundant supply of mountain dew.'*

The Forres Gazette, March 22nd, 1854, at the launch of the *Countess of Seafield*, reports, '*In the afternoon a party of 40 gentlemen sat down to a sumptuous meal at Mrs. Leslie's Inn. Among the delicacies presented was abundance of Spey Salmon, both "Reid and Sweet". Several toasts were drunk with nine times nine. A number of choice songs were sung and the evening spent with great happiness and harmony of feeling and sentiment.*'

Again, when J. Duncan launched the *Glenmore*, a barque of 235 tons in 1858, after the dinner the more serious business commenced, this was the drinking of no less than 14 toasts, as follows.

1. The loyal toast
2. The Army and Navy
3. Success to the 'Glenmore'
4. The Health of the Builder with H.H. S.P.
5. The Health of Mr Colin McKenzie, Wood Merchant
6. The Banking Interest in Moray
7. Prosperity to the Morayshire Farmers Club
8. The Town and Trade of Garmouth
9. The Health of Captain Paterson of 'Glenmore'
10. All Strangers present
11. The Operative Carpenters
12. Captain Fyffe, Army Captain, Peninsular
13. The Duke of Richmond
14. The continuing prosperity of Speymouth

The 'Courier' of January 14<sup>th</sup>, 1859, says of the *Caberfeidh*, a brig of 150 tons, '*She made a capital launch and as it happened to be the day succeeding Old Christmas Day, we conjecture that Mr Duncan detracted nothing from the usual demonstration in the evening*'.

We may also conjecture, at a much later date and bearing in mind the launches of the *Barragill Castle*, *Countess of Seafield* and the *Glenmore*, that invitations to a launch at the Duncan Yard were much sought after.

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## HISTORIC WEST HIGHLAND BOAT CULTURE: 1. THE BIRLISS

**Gavin Parsons**

*Author's Note: Some of the material discussed in this paper appears in 'Gaelic Bards and Norwegian Rigs' in the Journal of the North Atlantic.*

The Birlinn or West Highland Galley was the vessel used by the Lordship of the Isles in the late Middle Ages. Although it has been used frequently as an image on clan crests, and appears on more than eighty 13<sup>th</sup>-15<sup>th</sup> century gravestones, not a single example of the ship itself remains or has been discovered.

From the information available, however, the birlinn appears to be similar to a Viking ship, a vessel which was fast, graceful and seaworthy. A tremendous amount of work has been done in Norway and Denmark by archaeologists in excavating examples of these ships, and replicas have been built and tested. One example of the wealth of information available about Viking ships is the Havhingsten of Glendalough project. The original had been sunk in the Roskilde fjord in Denmark in the 11th century and when the oak planking was examined using dendrochronology it was determined that the timber had been felled near Dublin in 1042. The excavated ship timbers allowed the archaeologists to reconstruct the ship and test the sea-worthiness of the vessel during a return voyage from Denmark to Ireland. By contrast, the Birlinn is not nearly so well known.

However, there are some other sources which can provide some information, one of which is Gaelic poetry from the period 1300- 1760. Another is the Åfjord boat, a traditional Norwegian square-sailed boat, which is still built and sailed today and which appears from the information available to be from the same tradition as the birlinn.

The most detailed image of a birlinn available appears on one of the panels in a wall-tomb in St Clement's church in Rodel, Harris, which was erected for Alasdair Crotach, chief of the MacLeods in 1528 (Illus 1).



Illus 1 Birlinn on the tomb of Alasdair Crotach, Rodel, Isle of Harris (John Phillips)

Arne Emil Christensen, the Norwegian Marine Archaeologist has described how the rigging and the general hull shape of the sixteenth century Rodel birlinn show the same characteristics as the ninth century Norse ships which were excavated from the burial mounds at Gokstad and Oseberg (Christensen 2006). The main difference is the stern which is straight to accommodate the rudder, rather than the graceful curve seen on the Viking ships which carried a steering oar mounted on the right-hand (starboard) side.

### A COMMON TRADITION

It seems likely, then, that the birlinn comes from the same boat building tradition as the Viking ships. Ole Crumlin Pedersen, the late Danish marine archaeologist has shown the close connection between boat building traditions around the North Sea in the early Middle Ages and how the 'clinker' method of ship building was developed at various locations in this area (Crumlin Pedersen 2010).

In a 'clinker' built boat each stave or plank overlaps the one below it and is fastened through that overlap by a nail passed through from the outside and clenched or 'clinked' on the inside over a disc of metal known as a 'rove'. In this tradition the vessel is begun by laying a keel and attaching a stempost and a sternpost. The hull is then built up from the keel – the first plank (the garboard stave) is nailed to the keel and then each successive plank is clenched to the previous one.

Was this type of construction used on the west side of Britain, and particularly, was it used in the Hebrides? Historians have tended to assume that the Gaels did not have wooden boats before the Vikings arrived in the 8<sup>th</sup> century. However there is manuscript evidence from Ireland of sea voyages made before the Viking period. The *Imramma* describe voyages made by monks during the 6-8<sup>th</sup> centuries, in curachs – boats made of hide stretched over a framework of laths. Adomnan in his biography of St Columba (who arrived in Scotland in 543) tells of ships made of hide but also refers to wooden boats being built in Iona without giving any further information (Sharpe 1995).

There is a wealth of evidence from place names, from personal names, from the Norse sagas and other sources to show that the Norse had power in the Hebrides, and that their language was spoken widely, particularly in Lewis. While the argument that clinker boats came with the Norse people is a strong one, it is possible that a clinker boat tradition was already present.

### SOMERLED AND THE LORDSHIP OF THE ISLES

In the traditional history of Clan Donald it was Somerled MacGilleBrìde who led the Gaels in the defeat of the ruling Norsemen in Argyll (Kennedy & MacBain 1894). After winning Argyll, Somerled went to battle twice against his brother-in-law Godfrey of Mann. What was particularly interesting about these two battles was that, according to the Chronicle of the Kings of Man, the battles took place at sea. In the year 1156, Somerled came with a force of 80 ships and on the night of Epiphany, fought a sea battle. In Clan Donald tradition this battle was fought somewhere off the coast of Islay. Two years later the Chronicle tells us that Somerled sailed to the Isle of Man with 53 ships and soundly defeated Godfrey in a second battle.

According to these sources then, Somerled had sufficient naval strength to make war against a Norse fleet and to defeat them. This implies that he must have had ships which were at least equal to the Norse ships.

Despite this supposed expulsion of Norse rule from the islands, it is known that Somerled's descendants, who later formed the Lordship of the Isles, had close dealings with the king of Norway, and that many island chiefs supported King Hakon's ill-fated expedition of 1263. This expedition was intended to confirm the Norwegian king as overlord of the Western Isles; however, it resulted in the Norwegian fleet retreating after the Battle of Largs. The Treaty of Perth in 1266 ceded the western Islands to the King of Scotland.

It is significant that praise of Norsemen can be found in song for several centuries after this important event, with the result that the paucity of information about the bìrlinn can be added to by what we might call 'literary archaeology' - delving into the song (or poetry) tradition for information about boats.

### PRAISE POETRY

There is evidence in Gaelic poetry from the end of the Middle Ages onward, that association with bìrlinns, or at any rate ships, had become an important part of the praise that the bards bestowed on chiefs and other nobles.

An example of this type of panegyric is *Òran do Dhomhnall Gorm Òg* (a song to Young Donald Gorm) by the seventeenth century MacDonald poet Iain Lom. The subject of the song is described as handsome, heroic, beautifully dressed, carrying the best of weapons. He is also a skilled Bowman and a valiant helmsman.

### THE BIRLINN OF CLANRANALD

The epic sea poem *Birlinn Chlann Raghnaill*, was written by Alasdair MacMhaighstir Alasdair around 1760 and is regarded by many as the finest work of one of Gaeldom's finest poets. The poem which runs to over 560 lines, describes the voyage of Clan Ranald's Bìrlinn from North Uist to Carrick Fergus, and includes the blessing of the ship, blessing of weaponry, a rowing section, the calling of suitable crew members to the various sailing positions, and culminates with the voyage itself, through a storm of fabulous intensity.

I have looked at the section of the poem which deals with the work of sailing the bìrlinn and compared the descriptions with the sailing positions which are used on the traditional Åfjord boats of Trøndelag in central Norway.

The Åfjord boats are clinker-built double-enders. The hull shows a steep sheer line leading to a high stem and sternpost (Illus 2). They are rigged with a square sail hung from a yard on a single mast, and although this type, built from sawn timber, rather than cleaved timber, dates only from around 200 years ago, the master boatbuilder Einar Borgfjord who has an extensive knowledge of building and sailing these boats has little doubt that they are part of a tradition which has continued without a break from the Viking age.



Illus 2 Åfjords fembøring (Fergus Walker)

By the time *Birlinn Chlann Raghnaill* was written around 1760, the age of the Birlinn had passed, but in his sea-poem, *MacMhaighstir Alasdair* looks back to a heroic age, when nobles were praised, among other things, for their maritime skills.

The vessel described has, as far as can be ascertained, sixteen oars and a square-sail on a single mast. The sailing positions described are: the steersman, a rigging man, a sheetman, a tackman, a halyard man, a look-out man, a bailing man, and two men to haul on the ‘back-sail ropes’.

The following example illustrates what might be found in the poem:

#### **An stiùireadair (The steersman)**

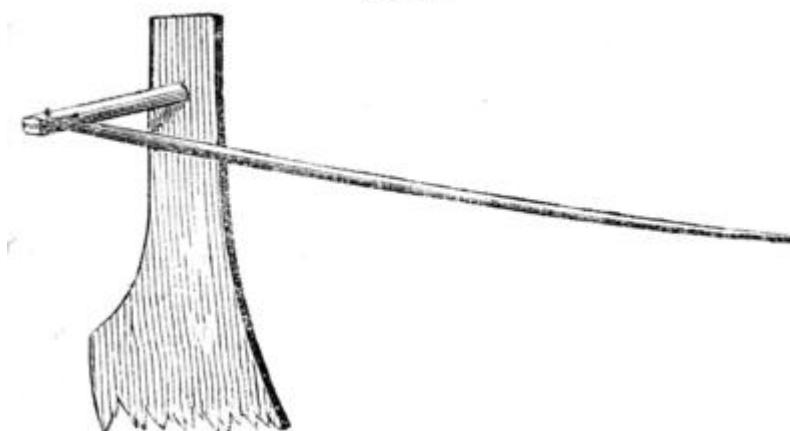
The Steersman needs to be: *Eirmseach, foighidneach, gun ghriobhag ri uchd tùilinn.* (Sure, patient, without panic in the face of a stormy sea), qualities which would surely be appreciated in any helmsman. Also, this section may contain a clue as to how the birlinn was steered. The high stern post poses something of a problem for attaching a tiller, and none of the carvings show how this was done.

*O ionad a shuidhe, 's e tearainnt,  
'S ail'm 'na asgaill*

From his sitting place, he secure  
With the helm in his oxter/armpit

An articulated tiller such as is seen on the traditional Norwegian Norlands boat (see Illus 3) is held under the steersman’s arm and this may correspond to the description given here.

Fig. 11.



Illus 3 Styrvol (articulated tiller) C F Diriks 1863

Each sailing task related in *Birlinn Chlann Raghnaill* can be matched with the tasks on the Norwegian traditional boat. The comparison shows that the *Åfjord* boat, which almost certainly belongs to a tradition which is continuous from the Viking period, is sailed in a similar fashion to the vessel described in *Birlinn Chlann Raghnaill*. This, along with other evidence of closely connected traditions of boat building around the North Sea, suggests that the *Åfjord* boats are part of the same tradition as the West Highland Birlinn.

What timber was used and where did it come from? In Hugh Cheape’s case study of woodlands on the Clan Ranald estates (Cheape 1993) he says ‘There is a vague tradition that the Clan Ranald chiefs had their galleys built at Gasgan on Lochsheilside – where possibly the best oak woods on the estates are to be found’.

Is there evidence for anything more than vague traditions? The timber used in the construction of the birlinn is often specified in songs; one example is *Iorram do Bhàta MhicDhomhnaill* (a rowing song for MacDonald’s boat) written about 1670 by the MacDonald poet Iain Lom which contains in verse 13:

<i>Dol timcheall Rubha na Caillich</i>	Rounding Rubh na Caillich
<i>Bu ro mhath siubhal a daraich</i>	right well did her oak travel

Another example is *An Làir Dhonn* (the Brown Mare), a song by Murchadh Mòr Mac ic Mhurchaidh (Big Murdo son of the son of Murdo), a MacKenzie of Achiltibuie in Easter Ross, who had lived in Lewis in the middle of the seventeenth century, where he often travelled by boat. He wrote this song from after he had left and was dependent on horse transport which he regretted sorely.

<i>Buaidh 's beannachd don t-saor</i>	Strength and health to the wright
<i>Dh'fhuaign a darach gu caoin</i>	that stitched her oak (timber) tight

There is no doubt that oak is a superior timber for boatbuilding, and it makes sense that it is praised in song. Masts however are described as being of pine, and this is common in boats today. Again from *An Làir Dhonn*:

<i>iùbhrach shocrach a' chuain</i>	Smooth ship of the ocean
<i>Dh'an cliù toiseach dol suas</i>	famed of rising prow
<i>Bhiodh giuthas dosrach nam buadh fo sheòl</i>	dense pine of powers under sail

Oars needed (as they still need) to be of the correct material. *Birlinn Clann Raghnaill* is very specific about where the wood for the oars came from:

*Chuir sinn a-mach ràimh chaola bhaisgeant' Dhaithte mhìne*  
We put out the fine narrow gleaming, coloured, oars

*De'n ghiuthas a bhuainn Mac Bharrais An Eilean Fhionain*  
Of the pine that MacVarish felled in Finnan Island

Another source of evidence has been investigated by Dr Donald MacWhannel (2003) who has studied the accounts for the building of a birlinn probably of 16 oars built for Campbell of Glen Orchy in 1635 (Breadalbane Muniments, held in the National Archives of Scotland) and also a for a 12 oared birlinn built in 1695. These accounts show, for example:

*1635 – oak boards cut and dighted in Glen 'Wiring' [possibly 'Bhiorain'] and Glen Orchy*  
*1695 – 12 dozen oak boards @ £3-6s-8d*  
*– 1 dozen broad and thick fir planks at 13s 4d the piece*

It is interesting that the account for 1695 shows 'fir planks' as well as 'oak boards' so, maybe the style of construction had changed over this period.

Dr McWhannel also studied accounts referring to work carried out for the Earl of Argyll (from Argyll Charter Chest, Inveraray) which contain various references to boatbuilding:

*1679 – discharge by Donald McIlchonill, Boatwright to Mr William Spens, servitor to the Earl of Argyll of £72 'for to go to Lochaber to buy clove boards for the building of ane great birlinn for his Lordship's use'*

It is interesting that cloven boards rather than sawn boards were being sought as late as 1679.

Other entries name woods in Argyll where timber was cut for boatbuilding:

*1692 - Donald McIlchonnel - £40 for cutting timber at Tobbermorrie*  
*1692 - 120 tests in Loch Nell's woods, 6s 8d each*  
*80 tests in Mcconchie's [Campbell of Inverawe] woods*

To sum up, a study of Gaelic verse does give us useful information about how the birlinn was sailed, especially when compared to existing knowledge of Norse vessels. Lines from Gaelic song, alongside estate documents, give information about the types of wood used, as well as an indication of where wood was cut, at least in Argyll. What would add greatly to our knowledge would be the discovery and archaeological study of a sunken birlinn.

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## HISTORIC WEST HIGHLAND BOAT CULTURE: 2. 20TH CENTURY TRADITIONAL BOATS

***Colin Parsons***

From March 2011 for a year I took part in an oral history project recording memories of boatbuilding on the north west coast. One interesting recurring theme was that there are no right angles in a boat. Christopher MacRae of Kyle, from a local family with a long history of boat building, related this story:

*'Boats are interesting: there's no right angle in a boat. Did you know that? Well so they say. There's no right angle in them. And there was a man here [in Kyle], he was called Angus the Tailor, but he built boats, after a fashion. He was keener on building boats than he was [on tailoring]. He was quite a good tailor. The boats weren't in any way quality boats really you know, but they kind of floated and that was it. But someone got on to him about "how could he build a boat?" He said to them "it's just like making a suit" he said "there no right angle in it". And that was true enough'.*

Another story related by Isobel MacKenzie of Port Henderson near Gairloch concerned boatbuilder John MacKenzie, who had built his own house, probably in the early 20th century. The house was in poor shape when Isobel and her husband took it on, and it was renovated, leaving very little of the original. They commented to an older resident at the time '*John MacKenzie must have been a small man.*' He replied '*yes that's true, but how did you know?*', and they said '*well, all the doors and ceilings were very low!*' The masonry work was to a high standard but all the joinery in the house was rather unorthodox – well finished but there was nothing straight or square in the house. There are no right angles in a boat!



*Illus 1 Donnie Campbell of Letterfearn with a Finlay Chisholm boat. Donnie helped Finlay as a boy.*

Finlay Chisholm was a boatbuilder at Letterfearn on Loch Duich in the 1950s and 60s (Illus 1). Finlay is remembered as a very good worker. He had very few tools, and his chisels were rusty, but he always made a beautiful job. ‘*To look at the wood you’d think it was machined*’ said George Stoddart of Inverinate. He told me a story of Finlay discussing an order with a client. During the discussion he stuck four sticks in a patch of grass and put a string round them, to give an idea of the size of the boat. The client asked if he had plans. ‘*That’s the plan*’ said Finlay to the dismay of his customer. But the boat turned out very satisfactory!

These stories illustrate the way the traditional small boatbuilders worked – by eye, and without plans or anything written down. In the first half of the twentieth century and before, further education was not an option for most people, particularly the less well off, and most young men went into the trades, usually following their fathers. This meant that some very able and gifted people went into the trades, and boatbuilding was no exception. Family members through several generations would carry the tradition of producing boats with minimal tools, and with no plans and nothing written down, but of a very high standard both practically and aesthetically.

Timber was sawn using a *poll sàbhaidh* or saw pit. A man each took hold of the T shaped handle on each end of the pit saw, one man below and another above the log which was laid across the pit. There were water powered sawmills in the nineteenth century, but the saw pits seem to have been used into the 20th century (Illus 2). It seems a very laborious job to us now, but pit saws as with more recently used crosscut saws were kept very sharp and the operators were highly skilled. A sharp crosscut in the right hands can rival a chainsaw for speed.



Illus 2 Robert MacRae, whose grandfather Murdo was a boatbuilder in Applecross, with a pit saw frame found in the old boatshed

The adze was a main tool of the boatbuilder, used for shaping all the components, again kept very sharp. I was told about one boatbuilder who used to sharpen pencils with an adze. The pencil would be held against the adze on the floor, and the pencil was then rolled with his foot.

Planks or strakes were steamed to shape by putting them in a wooden steam box which was fed from a boiler, a simple but effective process. The planks were fixed in place using iron rivets, which were superseded by copper ones in the 1930s.

The traditional process of small boatbuilding is carried on by a small number of boatbuilders today, largely unchanged except for the addition of a few modern techniques and power tools such as planers. Mark Stockl, the Ullapool boatbuilder, still just uses three 'moulds' – wooden shapes to fit the planks round. The rest is still done by eye. Over the last 30 years several boats have been built for the Plockton Sailing Club (by various boatbuilders) using the 'lines' of existing club boats, but they have all come out slightly different because of the aesthetic, non-written input of the individual.

Mark is passing on the tradition to final year pupils at Plockton High School (Illus 3), who can take a two day a week course in boatbuilding. This is the 'Am Bata' project which has now been going for 5 years. Pupils do repairs as well as building a new boat from scratch. Other offshoots of the project are an apprenticeship scheme and the oral history project mentioned earlier.



*Illus 3 Plockton High School pupils learning traditional boatbuilding skills in the 'Am Bata' project*

Boats have always been central to west coast culture, as they were to all coastal parts of Britain. Fishing was a major part of the economy in the 19th century, peaking about the turn of the century, and remaining important until the eventual decline in the 1970s. Boats were also important for transport, in a region with few good roads. The north of Applecross for example only got road access in 1970. Previous to that the postman came from Sheldraig in a rowing boat. When he arrived at Ardheslaig he

would pull up the boat and deliver the mail, walking to the other side of the peninsula, where there was another boat which he would use to continue rowing round the coast.

The census returns reveal that in the 19th century there were boatbuilders in almost every village. Small boats, it seems, were not built to last, although when well maintained some examples in Wester Ross and Lochalsh have lasted over 100 years. There was a big turnover and continual supply. Larger boats were also built, and there are records of schooners being built in Dornie up to 200 tons, although the works or boatyards for these have completely vanished.

With this high production of boats there cannot have been a scarcity of timber. Sawmills and saw pits were common, and there was probably some timber imported from outside the area. Boatbuilders would go to the woods and choose the best trees. This has continued to the present and the Mark Stockl has taken the Am Bata project pupils out into South Strome Forest with Forestry Commission staff to choose larch trees for the project.

In the 20th century boatbuilders obtained timber from merchants in Inverness and Dingwall, but also from local sources. Many boatbuilders were notoriously particular about the wood, demanding a high quality, and returning sub-standard timber. More recently some resorted to imported mahogany as an alternative.

Small boats are traditionally made of 'larch on oak', that is larch planking with oak for ribs, knees and other fittings. Oak has always been available and the History of the Clan MacRae (1899) says that Dunncan 'Donnachadh nam Pios' (who complied and partly wrote the Fernaig Manuscript around 1690) is said to have brought acorns from France and reared trees at Inverinate. I have found pedunculate oaks in small inaccessible woods thought to be of natural origin in the area, suggesting that woods may have been enriched and managed for oak a long way back. Boats along with houses are likely to have been the main use for oak. Elm was also used as an alternative to oak.

Pine may have been used before larch became available, but larch was planted in the north west certainly as far back as the 1700s. The Kintail Statistical Account of 1836 states that:

*'The climate notwithstanding its dampness, appears to be most favourable to the growth of plants and forest trees, - all the sorts hitherto introduced having attained great perfection. The plantings are by no means, extensive in the parish but are most thriving. Larch, spruce and Scotch firs grow rapidly; as do all the common forest trees, oak, ash, elm, birch.'*

I hope that's given you a flavour of boatbuilding in the north west. All the information collected as part of the oral history project will be archived at Plockton High School and the Portree Archive Centre. There are some extracts from the interviews at [acrosstheminch.org](http://acrosstheminch.org), and I hope to be writing a booklet on the subject in the near future probably to be called 'No Right Angles in a Boat'.

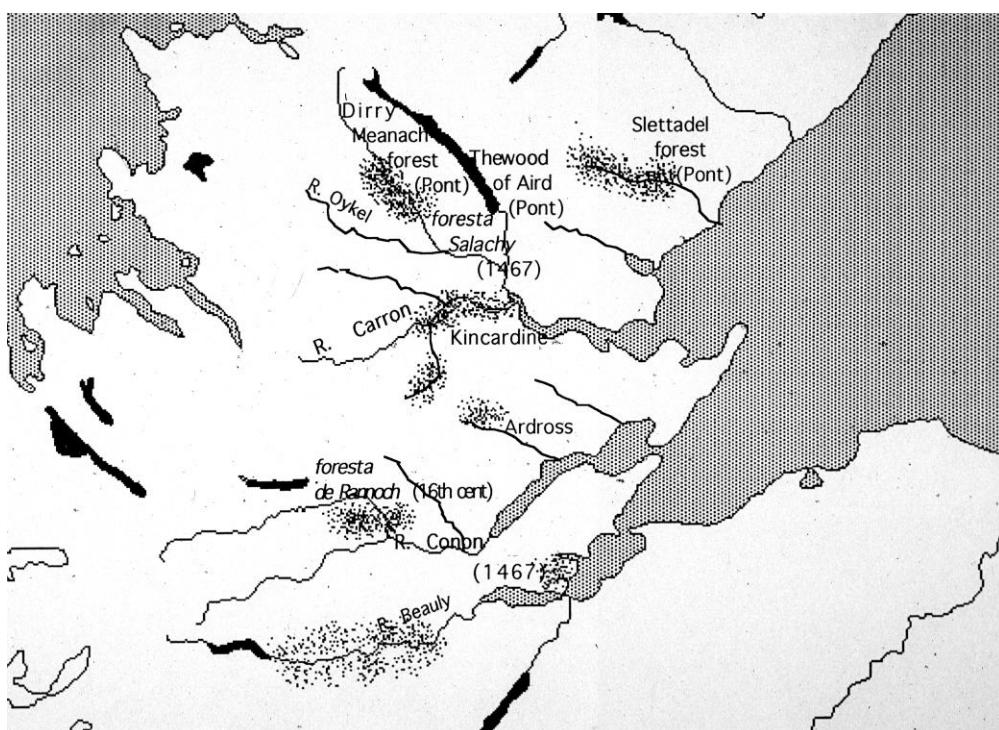
For more on Am Bata project see <http://www.am-bata.org/>

## **NORSE IMPACT ON THE WOODS OF ROSS & SUTHERLAND OR WHERE DID THE EARLS OF ORKNEY FIND THE TIMBER TO BUILD AND REPAIR THEIR LONGSHIPS?**

***Barbara Crawford***

*Ed's note: This is a summary kindly provided by Barbara, with references to her fuller accounts published elsewhere.*

My specific interest in the woods of Easter Ross and south Sutherland arises from the requirements of the earls of Orkney to maintain and repair the ships with which they dominated the seas around Orkney, Shetland, and north and west Scotland in the 11th and 12th centuries. The absence of serviceable timber from the islands and Caithness meant that they had to look further south and west, which is where they fought to win control, as the *Orkneyinga saga* tells us. Unfortunately the saga never tells us about the extraction of timber from these conquered areas. However the later history of timber extraction tells us how valuable the pine and oakwoods of these river valleys were. Early records of 'forests' (Illus 1) and place-names can be used to reveal something about the density of woodlands and Norse settlement along the coastal lowlands and in the upland valleys of Easter Ross. Some of these names (like Eskadale, and probably Ulladale and Alladale) are derived from Old Norse words for trees (ON askr = 'ash'; alm = 'elm'; öllr = 'alder'). One use of this timber may have been for the repair, and perhaps construction, of their longships by the earls.



*Illus 1 Early records of forests in Easter Ross*

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