

THE NATIVE WOODLAND BUSINESS IN COUNTY WICKLOW FROM THE 17TH CENTURY

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Abstract

Wicklow has the highest percentage forest cover in the Republic of Ireland. Most of the present woodland consists of productive plantation forests established in the 20th century. These form the basis of a successful forestry industry. Many are now in the second rotation. The current area of woodland far exceeds that present in the county at the start of the 17th century when the forest cover was in the order of 2-3%, a figure that fluctuated to a small degree over the following two centuries as the woodland was harvested and new trees planted. In 1908 the county had a forest cover of 3.5%.

The woodland formed part of private estates mainly between the 17th and 19th centuries. The Watson-Wentworth estate, centred at Coolattin near Shillelagh, subsequently owned by the Fitzwilliam family, was the largest and owned 36,000 ha of land. 950 ha of this comprised coppices and scrub woods, mostly the former. This represented a high proportion of the woodland area in the county with the woods extending from Shillelagh through to Rathdrum.

These, mainly oak, woodlands were a significant revenue source for the estate and were managed in a disciplined manner on a coppice with standards system. The business was market driven with cordwood for charcoal making, structural and ship timber and, in particular, bark for the leather tanning industry being the main products.

Introduction

County Wicklow has been at the centre of the forestry restoration initiative in Ireland over the last century. The county is seen as having some of the best forests in the country, both man made and semi natural. This is reflected in a strong forestry tradition and a dynamic timber industry employing about 1,000 people based around a forest area of circa 43,000 ha.

Great progress has been made in enhancing the forest cover in the county. It has increased from 2.7% in 1840 to 3.5% in 1902 to just over 21% today. The acceptance of forestry as a sustainable industry in the county may have its roots in the business and associated skills that were to the fore over the previous 400 years. Most of the present woodland consists of productive plantation forests established in the 20th century. Many of these are now in the second rotation. Some are growing on sites occupied by deciduous woodland in earlier times.

There is uncertainty over the extent of forest cover that existed in the county from around 1600 and on what happened to the resource between then and the start of the 20th century. However, we know there was a substantial market-driven business centred on native woodland in Wicklow and elsewhere in Ireland in the 17th and 18th centuries. The business generated good profits for its owners but eventually went into decline because of a change in market dynamics resulting from a decline in demand for its main products. Some would argue that the business declined because the timber resources became exhausted. This paper aims to provide an overview of the business. To facilitate the process a snapshot is taken of the events surrounding the management of one particular estate, the Watson -Wentworth estate in Wicklow, which became the property of the Fitzwilliam family towards the end of the 18th century. To put the research into context, the level of

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forest cover in Ireland as a whole, and in particular County Wicklow, over the last four centuries will initially be briefly explored. The research draws heavily on a plethora of papers held in the National Archives, the National Library of Ireland, the Sheffield Archives and further a field, in addition to other published material. Noteworthy are papers by Jones (1986), Loeber (1994), Kelly Quinn (1994), in addition to McCracken's book (1971).

Woodland cover

We were told in school that Ireland was once a thickly wooded country. The woodland clearance was said to have accelerated in the seventeenth century after the arrival of the English planters and the turmoil that followed. There is a consistency in how the story is related. The evidence is usually no more than a repeat of what someone else wrote, often based on thin evidence, rarely on any new research. As Foster (2001) points out: "when faced with complications and confrontations of Irish history, where axes and whetstones lie conveniently to every hand, there is an understandable temptation to simplify the story by adherence to one big idea". In the forestry context the one big idea relates to how the vast woodlands of Ireland were exploited by the foreign invaders from the start of the 17th century. In the 18th Century an anonymous Munster poet supported this view in the poem "Kilcash" and its haunting lines, 'Cad a dhéanfimid feasta gan adhmaid? Tá deireadh na Coillte ar lár...'. 'Now what will we do for timber? The last of the woods are gone...'. Jonathan Swift (1735) who also contributed in no small way to this impression states: 'I believe there is not another example in Europe, of such a prodigious quantity of excellent timber cut down, in so short a time, with so little advantage to the country, either in shipping or building'. Reasons put forward for the alleged clearance included a desire by the new landowners to liquidate assets, the need to drive the Irish out of their hiding places and to supply timber for shipbuilding, charcoal making, house building and fuel, the manufacture of barrels and bark for the tanning industry. McCracken (*op.cit*) estimated that 12-14% of the country was still covered in woodland at the beginning of the 17th century. However, Forbes (1932) had earlier challenged the claims that Ireland had been heavily forested in 16th and 17th century. His views were rejected, however, by Neeson (1991), an Irish Nationalist with no training in professional forestry, primarily on the basis that Forbes, being an Englishman, was biased, and did not understand the situation. Forbes's views are shared by Rackham (1995), who states that it is a myth that Ireland was heavily wooded in the 17th century and agrees with Forbes that the country was one of the least wooded areas in Europe with a likely woodland cover then of some 2-3 per cent. Recent work in Belfast by Hall (2000), and others, also points towards evidence that the great forest clearance in Ireland may well have taken place prior to the arrival of the Vikings. Data on timber exports from Ireland, and on the quantities of timber used to make charcoal, pipe staves and so on would tend to support this view. Exports for instance were in the order of 7,000m³ /annum (McCracken, *op.cit*) during the 17th and 18th centuries and the volume of wood consumed in a large charcoal driven iron smelting plant at Monart, just west of Enniscorthy, around the same time only amounted to about 10,000m³/annum, (Barnard 1985). We know there were many other active charcoal smelters throughout the country but it is hard to relate the alleged clearance of almost one million hectares of woodland to the relatively modest requirements of such activities. Equally, we read about millions of pipe staves being manufactured and exported in the 16th and 17th centuries but when the volumes of timber concerned are annualised they are less than 10,000 m³. Assuming a conversion factor of 50 percent from round timber to final product this equates to some 20,000 m³ or the produce from 60-100 ha, depending on stocking levels.

All of these data would support the view held by a number of authors that the figure for woodland cover at the beginning of the 17th century was more likely to be in the order of 2-4%.

There is also uncertainty over the level of forest cover that existed in Wicklow from 1600 and on what happened to the timber resource between then and the start of the 20th century. We know there was more woodland in the county in earlier times from pine stumps, dating back hundreds of years, which are commonly found beneath the peat at high elevations in the Wicklow hills. McEvoy (1944) cites evidence of the primeval forest in addition to oak and birch charcoal pits, at 363 m above sea level on the lee side of the Wicklow hills.

The current area of woodland in Wicklow far exceeds that present at the start of the 17th century when only about 2% of the area appears to have been covered by trees. This figure fluctuated to a small degree over the following two centuries as the woodland was harvested and new planting took place, albeit it at a low level. In 1908 the county had a forest cover of 3.5% (7,695 ha), Department of Agriculture and Technical Instruction for Ireland (1908). This included the trees planted by landlords and their tenants during the so-called “age of enlightenment” in the eighteenth and the first half of the nineteenth centuries. These amounted to about 1,175 ha, (Carey, Unpublished, 2005).

Documentary evidence is thin on the ground apart from good records for one or two of the larger estates, notably the Watson-Wentworth estate (subsequently the Fitzwilliam estate centred at Coolattin near Shillelagh, which is dealt with in some detail below) and to a lesser extent the Meath estate. Many records, including most of those from the 17th century Petty Down Survey, also perished in the Four Courts fire in 1922. There is reference to the presence of woodland in Wicklow near Enniskerry, Glencree, Glendalough and Newcastle in the 12th century. Le Fanu (1893) states that the Royal Forest at Glencree had faded from memory by the 16th century. He refers to a systematic onslaught on the timber in the forest in 1290 with the establishment of large timber works at Glencree and Newcastle when Eleanor, the wife of Edward Ist, was building her castle at Haverford in Wales. By 1304 the forest at Newcastle was reduced to 48 ha. Hore (1856) refers to woods and fastnesses in Shillelagh and Glenmalure and to timber from Wicklow being the main supply for building houses in Dublin. He also cites Wicklow timber being used in the roof of Westminster Hall and the spire of the ancient detached bell-tower of Worcester Cathedral which “rose 150 feet above the stone work of the tower made of massive timber, un sawed, polished only with an exe, not having one sawed side”. Hayes (1794) comments that the timbers which support the chapel of King’s college Cambridge, which was built in 1444, and the roof of Henry 8th chapel in Westminster as being from Shillelagh. Hore (*op.cit*) also refers to the use of the proverb, “the Irish will never be tamed whilst the leaves are on the trees” as being generally misunderstood. It did not imply that the Irish could not be conquered so long as the country was full of woods but rather that the best season for carrying on war against the natives was after leaf fall in the autumn.

The 1835-1840 Ordnance Survey maps provide the most reliable estimate of the level of forest cover in the county in recent times. The map for Wicklow shows a forest cover of some 5,600 ha, representing 2.7% of the overall land area. The woodland was concentrated in areas such as the Vale of Clara, The Avoca Valley and near Shillelagh. An earlier map by Neville (1760) shows woodland and trees and suggests a woodland cover at the time of only 1,100 ha or some 0.5 % of the area of the county. The cover in the 1760s showed many similarities with the 1840 map, apart from one or two exceptions. Notable is the presence of some 100 ha of woodland in the Oakwood area of the Wicklow gap on the Neville map, a feature absent from the 1840 OS maps for the areas. This may be related to the presence of the United Irishmen camp in the area in 1798 (O’Donnell 1798). A search through earlier maps of Wicklow, notably Petty’s *Hibernia Delineatio* published in 1683, based on the Down Survey of the 1650s and Boazio’s map of Ireland produced in 1609, shows a scattering of woodland in Ireland generally and within Wicklow. Woodland areas are consistently shown near Arklow, the Avoca river, Enniskerry and Rathdrum.

A limited number of surveys and associated estate maps also provide a valuable insight into the areas of woodland that existed at in the early 17th and on into the 18th century. Most were on privately owned estates. The estates provided the basic structure for land ownership. The Watson-Wentworth estate was the largest and comprised 36,000 ha of land. There were 67 “Landed Gentry” in the county in 1838, each owning more than 410 ha of land. Besides the Watson-Wentworth estate, five owned between 8,000 and 10,000 ha, ten between 2,000 ha and 7,000 ha (Nolan, 1993). Maps for the woodlands on the Watson-Wentworth estate, and the Bayly estate at Ballyarthur in the Avoca valley in the 18th century, provide some indication of the woodland distribution at the time. Two maps of the Bayly estate dated 1700 and 1812 survive: these show a woodland area of 52 ha in 1700 that declined to 43 ha in 1812 (Bayly, E. personal communication). Evidence for the Meath estate suggests a woodland area of 5.7% in 1679 (Forbes *op.cit*).

The maps and surveys for the Watson-Wentworth estate are more comprehensive and informative and cover the period 1671-1775. These, together with other papers for the estate, provide a good insight into the woodland management business in the county from the 17th through to the 19th centuries and form the main focus of this paper.

The Watson-Wentworth Estate

The original estate, subsequently called the Coolattin estate, had its roots at the start of the 17th century. Henry Harrington, who had been granted the area in 1578 (Loeber *op.cit*), sold it to a Welshman, Calcott Chambers around 1609 whose brother subsequently sold it on to Thomas Wentworth (The Earl of Stafford and Lord Lieutenant for Ireland). Stafford was packaging together a substantial area of land in the county for his own benefit. One of his key objectives was to convert the timber on the lands into pipe staves for export. However, for this and other reasons, he upset too many people and in 1641 was executed. After this the lands passed to his brother, subsequently through two generations, including both the 1st and 2nd Marquis of Rockingham, and finally to the 4th Earl of Fitzwilliam in 1782. The Fitzwilliams continued to manage the estate, albeit on a smaller scale, on into the 20th century when it was sold off to speculators in 1978.

The Irish estate was essentially an outlier of the main Watson -Wentworth estate at Wentworth in south Yorkshire. The building of the main residence at Wentworth with a frontage of 182 metres between 1724 and 1750 at a cost of £82,500 - about €10 million at today's prices (Young, 2000), was financed to a significant degree by revenues from the woodland business and land leases related to the Wicklow estate.

Interest in the Shillelagh and surrounding woods goes back to the early part of the 17th century when there was a growing awareness of their potential value, particularly for ship-building, and a conflict with the needs of the pipe stave and charcoal industries. However, concern was also expressed because of the presence of "shake" in the timber that would tend to downgrade its value.

A number of surveys of the woodlands were carried out between 1611 and 1775. Although the earlier surveys suggested some 2,500-3,500 ha of woodland existed in the Shillelagh area, some of this may have extended into north Wexford. The later surveys done on the Watson-Wentworth estate indicated a woodland area of 600-800 ha between 1728 and 1749 comprised of coppice woodland with some scrub. The area in 1749, which amounted to some 800 ha, and extended from Shillelagh to Cashaw and on into Rathdrum, represented almost 73 % of the area of woodland for the county estimated from Neville's map in 1760. The estate dominated the woodland business in the county.

The Woodland Business Management System

The business centred on the management of 30 separate coppice woods. These were managed on a coppice with standards (reserves) system. This was geared towards the production of a number of primary and secondary timber products. These included timber for shipbuilding, construction, charcoal production and a range of secondary products and bark for the tanning industry.

The coppice system involved the reproduction by stool shoots of suckers after the cutting of trees close to the ground - or "smack smooth"- (McEvoy *op.cit*) at an angle to facilitate water runoff. Rotation lengths varied from 20-34 years, averaging 24. The rotation was related to the strong market for bark, which was widely used for leather tanning, and the fact that tannin levels in bark tend to peak at this age. It also satisfied the needs of the charcoal industry by providing manageable and easily combustible sizes of timber.

Typically, a number of trees called *reserves* or *standards* were left to grow on to about one hundred years to provide larger timber. These were not even aged and after each cut of under wood they usually consisted of a large number of young trees (*wavers*) of about 20 years of age and a smaller number of more mature trees (*black barks*) grown on for a number of coppice cycles. The wavers were thinned gradually leaving a few

selected trees to reach maturity at about 100 years by which time four coppice cycles would have been obtained. Sessile oak was the dominant tree species, apart from small proportions of birch, ash, hazel, alder and sally. Preference was for a monoculture of oak. Production data are sparse but Harmer and Howe (2003) suggest a range of 3.6-5.1 m³/ha/ annum for oak coppice in Britain. We have no information on the origins of the particular system in the area or on when it was introduced to Ireland. However, it was widely practised in Britain and in Europe generally in earlier times. Dubourdieu (1991) states that two thirds of the broadleaf forests in France - 4.9 million ha - are managed using simple coppicing or coppicing with standards.

The system was also practiced on other estates throughout Wicklow including the Carysfort and Meath estates and on smaller estates such as those belonging at the time to Cunningham, Tighe, Bayly, Tottenham and La Touche, the last including one side of the well known Glen of the Downs. Nisbett (1903), based on a 1902 survey of the woodlands in the county, estimated that just over 50%, some 3,200 ha, had formerly been coppice woodlands. The scheme was approved and supported by the RDS and at its meeting on the 30th June 1791 it awarded Francis Synge of Glanmore estate near Ashford a premium of £2 "for every acre of coppice wood sufficiently fenced against cattle" (Dublin Society 1791). This is equivalent to about €500 per ha.

The structure, management, and business generated by the woodlands at the Watson-Wentworth estate in Wicklow is outlined in some detail by Jones (*op.cit*). Surveys carried out in 1724 and 1749, besides giving the area, tenant name and age also give the date for felling and comments on the condition of each coppice. Protection against animal trespass was seen as being essential and double ditches were often used for the purpose. A Trespass Book dated 1713 gives a good insight into the steps taken to ensure compliance with related procedures. Although paid Coppice Keepers were employed for protection there are lots of references to coppices being damaged by grazing animals.

The resident Land Agent was responsible for the coppice woods, assisted by a small team of Coppice Keepers and a substantial number of Woodmen recruited from among the estate tenants. The Head Coppice Keeper was paid £9-4s-9d (about €1100) in 1749 while the other Coppice Keepers were each paid about € 340. Woodmen, including woodcutters, squarers, sawyers, cleaves, barkers, ditchers, hedgers and carters, were paid on a piece rate basis.

Woodland Products Timber for Building including Ship-building.

This was sold squared, sawn and in the round. The ship building products included keels, rudders, deck beams, boat boards, plank logs, gunwales and many other items including thousands of ship pins. These were sold direct to shipbuilders or to dealers. Most of the ship timber went to Wicklow and Dublin but some was exported to Whitehaven in Wales.

The building timber included a wide range of timbers used in construction from purlines, to beams, riberrys, rafters, laths, shingles, doorcases, clapboards. There were many customers. Interesting items in 1718 included 134 tons of squared timber delivered to Trinity College, Dublin from the woods at Tomnafinnoge, Ballykelly and Drummin at a price just over £3 per ton (€300), timber for churches at Castleruddery, Coolkenno and Clonegal and 70 tons delivered to Wicklow Courthouse for £176. Some industrial items such as millshafts, cartshafts, axle beams, plough shares, mill wheels and barrel staves were also manufactured in addition to furniture items such as chair bottoms, backs and rails.

Bark

Throughout history oak bark has been used for tanning leather. The tannic acid derived from ground bark seeps through the pores of animal hides, draws out the water and coats each fibre with a preservative. Bark was usually removed from trees in the spring and ground in specially constructed bark mills located close to or in the larger coppices. Prices were attractive and doubled between 1700 and 1735 and remained more or less the same until they peaked during the period between 1790 and 1815 (Linsay 1975). There were eight

bark mills across the Wentworth – Watson estate in the early part of the 18th century. According to the account books for 1707-1708, two bark mills were constructed in Roddenagh and Coolelug woods at a cost of about £8 each (just less than €1,000). The mills were therefore relatively cheap to construct and moved as felling years changed from one coppice to another. Jones (*op.cit*) suggests that water powered bark mills may have operated on the estate from as early as 1711.

Bark was sold by the barrel to a number of tanners. These were about 17 in number with addresses in Dublin, Waterford, Wexford, Wicklow and elsewhere. Production varied between years and is summarised in Table 1. Between 1707 and 1719 annual revenue from bark sales averaged almost £1,400, the equivalent of about €170,000. This represented 45% of the total gross sales for timber and bark.

Cordwood for charcoal

Charcoal is a carbon product obtained from the controlled burning of wood with a restricted air supply. Although it is commonly used now as a source of fuel for barbecues, historically its greatest use has been in the metal industries, particularly in the manufacture of iron and steel. The presence of substantial quantities of iron ore and limestone, which is used as a flux in iron-making and timber, together with the difficulty of sending timber profitably any distance by water transport, are attributed by McCracken (*op.cit*) to the widespread growth of ironworks in Ireland during the period. Over 160 ironworks were established in Ireland during the 17th and 18th centuries (Andrews 1956) of which about eighteen were in Wicklow. Some dated from the early part of the 17th century and were located in places such as Aughrim, Avoca, Ballard, Ballinacash, Carnew, Vale of Clara, Glendalough and Woodenbridge. One of the largest ironworks was located at Monart, west of Enniscorthy (Barnard *op.cit*). This was established in the 1650s in an area recorded to have 600 ha of woodland and is estimated to have consumed in the order of 10,000m³/annum. Many ironworks were destroyed during the 1641 rebellion after which some were restored. As timber prices were considerably lower than in Britain, the iron ore was often imported from areas such as the Forest of Dean and the processed iron re-exported. The ironworks are perceived as being vast consumers of wood. However, the sparse figures available do not appear to support this hypothesis. For instance the process required about 20 cords of timber (51m³) or 2.25 tons of charcoal to make one ton of bar iron from iron ore. Averaging annual export figures for bar iron from Ireland for the seventeenth/eighteenth centuries, given by Andrews (*op.cit*), gives a figure of 193 tons per annum, the equivalent of just under 10,000m³ of timber. This in present day terms cannot be considered as being a substantial quantity. However, there were wide fluctuations between years with a maximum of 1,692 tons exported in 1697 to a minimum of 14 tons in 1740.

Cordwood sales were an important source of revenue for the Watson-Wentworth estate, but not to the same extent as bark and other timber sales. The accounts show that cordwood sales were almost exclusively to a local ironmaster, a John Chamney, and that the amounts averaged about 983 cords or 2,500 m³ per annum.

Financial returns

The records for the estate provide a good insight into the nature and profitability of the woodland business in the 18th century.

Table 1 gives a summary of the timber and bark sales for the period 1707-1718. Total gross revenue from timber and bark sales amounted to £42,389 of which £18,134 came from bark.

Table 1. *Gross revenue from timber and bark sales at the Watson-Wentworth estate in Wicklow 1707-1718 and number of barrels of bark produced*

Timber Sales (£)	Bark Sales (£)	Total Sales (£)	Average annual sales (£)	Number of barrels of bark
24,255	18,134	42,389	3,532	45,162

The accounts also provide information on costs of production. These are summarised in Table 2. The profit margin for all products was high, being best for timber, bark and hog staves. The more minor timber products were also profitable. For instance, between 1707-1719 total costs for these amounted to £615 compared to revenues of £2,653.

It is not possible to extend the accounts from the Watson-Wentworth estate to other areas in the county. However, snippets of information do exist. In 1809, one hundred years later, Radcliffe (1812) stated that 527 barrels of bark had been produced from a wood of 65 ha in the Avoca valley. The bark cost 4s and 8 pence /barrel to produce and sold for £1-9-0 representing a profit margin of 87%. This was the peak period for bark prices. Prices had increased four-fold during the century.

Table 2. *Costs of production and selling price for the main timber products, including bark, between 1701 and 1718*

Product	Production cost	Sale price	Approximate margin	Margin as a % of sales Price
Squaring timber	3 s-2 p/ton	£2-5-0/ton	£2-1-10	93
Cordwood	1s-6p/cord	4-6s/cord	3-4s/cord	74
Bark	1 s/ Barrel	7s-9p/Barrel	6s-9p/Barrel	87
Barrel staves	12s/1000	£1-8s-4p/1000	16s/1000	56
Hogstaves	17s/1000	£ 6-10s/1000	£5-13/1000	87
Firkin staves	8s/1000	£1-8s-4d/1000	£1/1000	70
Laths	3s-6p/1000	12s-8p/1000	9s-2p/1000	72
Lock stops	£1/1000	£4/1000	£3/1000	75

Summary and Conclusions

Wicklow, like the rest of Ireland has gone through turbulent times over the last 400 years. The woodland cover, now 21%, is almost six times what it was in 1902. The roots of the industry relate to a very different system of forest management carried on in the 17th through to the 19th century, whose products were driven by different markets to those existing today and most of which are unlikely to exist in the future. The coppice with standards system generated substantial profits for at least one large estate owner at the time and probably others. As the demand for some of the main woodland products, bark, charcoal and ship timber went into decline in the second half of the nineteenth century interest in a continuation of the coppice with standards system waned and the woods entered an age of uncertainty. By the turn of the 20th century most

were in a poor derelict state or had been partially converted into coniferous forest (Nisbett *op.cit*). Some are now owned by Coillte and are being considered for conversion back to “native” broadleaf woodland with funding hopefully coming through the Native Woodland Scheme. Others are owned by the National Parks and Wildlife Service and managed for conservation and biodiversity. Apart from a desire to somehow or other recreate the past, there is uncertainty over the purpose, given the changing markets for timber and timber products. This uncertainty may tend to undermine the scheme unless the objectives and the issue of who pays are clarified. Questions remain as to the overall sustainability of the coppice with standards system. Dubourdiou (*op.cit*) suggests it is non sustainable given that it typically removes four crops every century and ultimately results in soil degradation. Whether it was this issue or changes in the market dynamics and /or the socio-economic changes that took place in Wicklow and elsewhere in the 19th and 20th century remains to be further explored.

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