SCOTTISH WOODLAND HISTORY CONFERENCE

NOTES XXII

Murthly Castle and Policy Woods

TWENTY SECOND MEETING

TUESDAY 3rd OCTOBER 2017

MURTHLY CASTLE, PERTHSHIRE

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

Native Woodlands Discussion Group is grateful to Forestry Commission Scotland for financial support for this conference and help in making the 22nd meeting of the Scottish Woodland History Conference a success:

Forestry Commission Scotland
Coimisean na Coilltearachd Alba

Edited by Mairi Stewart

ISSN 2049-8985

In 2017, the NWDG Scottish Woodland History Conference (*formerly the Scottish Woodland History Discussion Group Conference*) was organised by Mairi Stewart and Noel Fojut 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.

Front cover: Murthly Castle and New Murthly Castle. An oblique aerial photograph taken facing north, 1947 (SAW003572 © HES Aerofilms Collection)

CONTENTS

The twenty second annual meeting of the NWDG Scottish Woodland History Conference was held at Murthly Castle and grounds on Tuesday 3rd October 2017. The following papers were presented.

CONFERENCE INTRODUCTION

Mairi Stewart

The group met on October 3rd in the impressive main hall of Murthly Castle, in Perthshire, which allowed us the opportunity to talk about and explore the remarkable tree heritage of the Murthly policies. The estate has been the home of the Steuart Fothringham family since the early 17th century and several family members were notable tree enthusiasts. Walter Steuart Fothringham was a founding father of the Forestry Commission. An earlier ancestor, William Drummond Stewart, travelled widely in the west of America in the mid-19th century, bringing back amongst the first Douglas fir to be planted in Scotland.

Douglas fir at Murthly in 1876. Thought to have been planted around 1840, among the first to be brought as seedlings to Scotland by William Drummond Stewart, laird of Murthly (courtesy Forestry Memories)

The first speaker was the current owner, Thomas Steuart Fothringham, who outlined the story of the Murthly landscape through the ages. The castle itself has 15th century origins, with a yew hedge in the walled garden being the earliest datable tree feature (1660s). The tree heritage that the Murthly lairds have left is remarkable, including over 50 champion trees, which together with fine avenues and architectural features, make up the splendid, designed landscape.

Next, Syd House gave an interesting account of north American tree introductions and the 'heroic' Scottish plant hunters associated with this activity, which fuelled the 'conifer rage' that arose in the 19th century. This opening up of the Pacific Northwest proved to be a pivotal period for discovering the new trees that would become successfully established in Scotland and drive the 20th century forestry industry.

Julie Candy of Historic Environment Scotland spoke about the Inventory of Gardens and Designed Landscapes, its function and future development, which will see sites created in the 20th century included in the Inventory. She drew attention to the dynamic and sometimes ephemeral nature of historic gardens and landscapes, which are perhaps more affected by owner whim than other designated sites.

It seemed appropriate that, as we sat within the walls of the ancient castle that is likely still home to very old Scottish structural timber, we heard more about Coralie Mills' work on dating Perthshire timbers. Coralie gave a fascinating account of the current state of the tree-ring record for the county (of old). Perthshire straddles the lowland/highland boundary, which places it in a unique position in terms of diversity of woodlands and there is clearly considerably more work to be done to understand the links between the built heritage and woodland history.

Our last speaker was conifer conservationist and horticulturist, Tom Christian, who charted landscape developments at Murthly, placing them in a wider national context and describing the work with the Royal Botanic Garden Edinburgh's International Conifer Conservation Programme (ICCP), which raises threatened conifers from wild-collected seed and plants them in a dedicated network of 'safe-sites'- Murthly being one such site.

Murthly ranks as one of the finest designed landscapes in Scotland, with an important assemblage of trees. It has been famous for its trees ever since Birnam Wood 'marched' to Dunsinane. but it is perhaps only in the last 150 years that it has attracted the regular attention of tree enthusiasts. Today, it supports a remarkable treed landscape, not constant, but as Julie pointed out in relation to the Inventory, always changing, and as demonstrated by Thomas, periodically revised according to the influences and interests of the times. After lunch, we were fortunate to be able to explore Murthly with Thomas and Tom, who gave a guided tour of the trees and landscape features that make Murthly so special.

See p.32 for a summary of the walk.

The Policies of Murthly Castle

Thomas Steuart Fothringham

Setting

This area of Perthshire is well-known for its many champion trees, including the tallest hedge in the world (at Meikleour), the oldest living thing in Europe (a Yew tree (*Taxus baccata*) at Fortingall) and two former Champion trees (for height) in the UK and Ireland: a Sitka spruce (*Picea sitchensis*) in the 1980s at Murthly Castle, and a Douglas fir (*Pseudotsuga menziesii*) at the Hermitage in the 2000s. This area was also home to many of the early tree collectors, such as Douglas and Menzies, who are now celebrated in a permanent exhibition at Pitlochry.

This remarkable local heritage is exemplified at Murthly by the last visit of the Tree Register in 2007. Owen Johnson measured 54 trees, of which 36 were Perthshire champions, 14 were Scottish champions, and eight were UK & Eire champions. Of the UK & Eire champions, seven lie within two hundred yards of each other. There is perhaps no greater concentration of champion trees. Owen Johnson admitted that he did not have time to measure any more trees! (150 were measured by Alan Mitchell during the Tree Register's previous visit in 1983.)

The designed landscape is low-lying, bound to the north by a long sweeping curve of the Tay, to the south by the railway line, to the west by the A9, and to the east by Murthly village. There are long views to the east down Strathmore and to the west to Birnam Hill and up Strathtay. The northern and southern views are limited by hills and rising ground respectively.

Visitors arriving *via* the East Drive will pass along three main avenues: Lime (*Tilia x europaea*); Giant redwood (*Sequoiadendron giganteum*); and Lime and Yew. They will see one UK & Eire champion tree (2007): a Grand fir (*Abies grandis*) – for girth of 751cm – within the redwood avenue, and two joint Scottish champions (2007): Hornbeams (*Carpinus betulus*) for their height at 23m. Visitors arriving via the West Drive will pass along two main avenues: one of Atlas cedars (*Cedrus altantica f. glauca*), and another of young Spanish chestnut (*Castanea sativa*) within an older Oak (*Quercus robur*) avenue. One of the Atlas cedars is a Scottish Champion (2007) for its girth of 562cm. Nearer the castle on the western approach is also a tremendous Sitka spruce of 54m, which is a Perthshire champion (2007).

Within the landscape sit several constructions (past and present) around which the policies have been designed or which have enhanced it: the old and new castles, the Malakoff Arch, the walled garden, the chapel, a sunk terrace, grottos, bridges, stone staircases, fountains, ponds and fishing and curling huts.

History

The Middle Ages

Trees at Murthly first appear in history in the 11th century: those in Birnam Wood that were carried before Malcolm's army before Macbeth in 1057. The famous Birnam Oak and less famous Birnam Sycamore, both on the Estate, can still be seen on the right bank of the Tay below the Telford Bridge between Birnam and Dunkeld. In the 12th century, the forest around the castle was a royal hunting forest and a royal hunting lodge was built by David I (1124-1153) on the site of the current castle. He also introduced fallow deer, whose descendants still terrorise the local trees.

Establishment of the Designed Landscape

The oldest architecture within the designed landscape is the present castle (1450), followed by the chapel (16th century) and the walled garden (1660s), complete with summer house, with the earliest datable plants being the Yews in the walled garden, some of which have grown into fully-fledged trees from their original condition as arched hedges and topiary. Some of the Yews leading to the chapel (the ones nearest the castle) probably pre-date the walled garden and even the chapel, but we can put no firm date on them. The known extent of the designed landscape at this time ran between the walled garden and the chapel, with limes planted around the eastern and southern side of the walled garden c.1711.

The walled garden, constructed in the 1660s (©Tom Christian)

General Roy's plan of 1750, showing a formal pattern of avenues and shelter belts, shows that the extent of today's designed landscape, covering a large area between modern-day Murthly and Birnam, was in place by that time.

Murthly Castle & policies, from the Roy Military Survey (1747-52). Reproduced by permission of the British Library.

In the 1820s, the majority of trees in the policies were Beech (*Fagus sylvatica*), Oak, Horse chestnut (*Aesculus hippocastanum*) and Sycamore (*Acer pseudoplatanus*), with some dating from c.1600. At this time, the building of the New Castle by Sir John Stewart prompted a redesign and considerable enlargement of the policies from 1830 by John Wallace, the fourth generation of his family to be a gardener at Murthly. It was a task important enough for him to be recalled from Forest Hill, Windsor.

Wallace's scheme included many new winding avenues throughout the policies, which remain significant features today. Amongst them was a double avenue of lime and yews leading down to the New Castle. (Some sources incorrectly date this avenue as being c.1711).

The North American Influence

In 1842 Sir William Drummond Stewart, who was Sir John Stewart's succeeding brother, brought back many curiosities from North America, including many different flora and fauna. It was in this decade that the extensive conifer plantings for which Murthly is now best known were carried out.

The most striking of these terraces are the Winding and Step Terraces, planted with Douglas firs, which are remarked on by all visitors to Murthly and which give off a wonderfully sweet aroma in warm weather. He also laid out Deodars (*Cedrus deodara*) in front of the castle, rhododendrons and *Cupressus* varieties in the Sunk Terrace in 1852-3, Lawson Cypresses (*Chamaecyparis lawsoniana*) in the Low Terrace, avenues on the East and Old West Drives, the Dolphin Terrace, the American Garden (parallel to the East Drive), Douglas firs along the river banks, and perhaps extended the yew avenue (the Dead Walk) up to the chapel, though this last addition may have taken place earlier.

The 'dead walk' of yews, linking the castle and the chapel, probably the oldest arboreal feature on the estate. (©Tom Christian)

The champion Grand fir (*A. grandis*) mentioned above was described in the Tree Register's Summer 2015 newsletter as being:

"*now 57m tall with a columnar bole 764cm thick and is probably the most massive tree in northern Europe. The American points system for comparing giant trees even gives it as many*

points (498) as the biggest known in the wild forests of Washington and Oregon, though it is still growing as fast as ever".

How Sir William would love to know!

Sir William and his successors, Sir Douglas Stewart and Walter Steuart Fothringham, also planted many conifer specimens to the east and north of the castle, reaching right to the riverbank to the east of the Jubilee Terrace. It is here where seven of Murthly's eight Champion trees (2007) are to be found, including a Serbian spruce (*Picea omorika* - planted 1897 – 29m high), two Sakhalin spruces (*Picea glehnii* – planted 1897 – 20m high and 247cm girth), a Spruce (*Picea omorika x sitchensis* – 35m high and 326cm girth), cut-leaf Norway Maple (*Acer platanoides* "dissectum" - planted 1897? - 212cm girth), Western Hemlock (*Tsuga heterophylla* – 51m high) and, at the bottom of the Low Terrace, a Mountain Hemlock (*Tsuga mertensiana* – planted 1862? - 401cm girth). The Serbian spruce is, in addition, thought to be the tallest in the world outside its native habitat, though this has not been verified. There are also two Scottish champions in this area, one of a group of three Serbian spruces being 225cm in girth, and a hornbeam with a girth of 373cm. (The one other Scottish champion in the policies is a Lawson cypress to the east side of the walled garden, for its height of 26m.)

Americans in particular continue to be drawn to Murthly by Sir William's connections with their country, where he was one of the first white men to penetrate the West and interact with native tribes. A visitor from the American Conifer Society in 2011 remarked that it was both humbling and inspiring to see American conifers at Murthly which were larger than those where he lived.

Stagnation

By the turn of the 20th century, the castle was thickly enclosed (as was the fashion at the time), with an avenue of Monkey puzzles (*Araucaria araucana*) planted between 1871 and 1890 up to the chapel within the avenues already laid out on both sides of the path thereto, and high hedges surrounding the lawn in front of the castle. The garden itself was also very overgrown. An avenue of Noble Firs (*Abies procera*) had also been planted in 1897 between the bottom of the Step Terrace and the river to mark Queen Victoria's Diamond Jubilee, along with further specimens to its east.

The wealth and density of trees already on the Estate, together with the effect of two World Wars on finances and the availability of labour, no doubt all contributed to the stagnation of the polices for much of the 20th century. The American Garden and Kitchen Garden were abandoned in 1936, along with some of the more outlying avenues. Others that marked the excesses of the Victorian age and made the area around the castle exceptionally dark were felled, including the Deodars in front of the castle and the Cypresses flanking the Sunk Terrace; others were felled due to canker (the Jubilee Avenue c.1950 and the monkey puzzles leading to the chapel during WW2); The Step Terrace was also thinned at this time as the Douglas firs grew. Finally, the Yews immediately to the south of the castle, on the top of the bank in the garden, were felled to allow light to penetrate into the building. Finally, the new A9 which opened in 1976 truncated the avenue of Grand fir from the West Drive, and also truncated the river drive to Birnam Hotel at a point just south of Birnam. This had once been the main intended drive to the castle from the west.

Regeneration

A period of regeneration began in the 1970s under the stewardship of Robert Steuart Fothringham, 13th Stewart laird. Much new planting was carried out all over the policies: on the West Drive, Grand firs were planted at its western end as compensation for the loss of the Grand fir avenue caused by the A9; the Atlas cedar avenue was extended; Spanish chestnuts were planted inside the Oaks on the Dairy Road; and Beeches by the Cuddy Park. The East Drive saw new Limes between

the old, Beeches, and a new avenue of Oak and Larch (*Larix decidua*) running parallel to the East Drive. Nearer the castle, the Sunk Terrace was fully replanted with rhododendrons, azaleas and Whitebeams (*Sorbus aria*), *Nothofagus* were planted in several places, and single specimens planted in the Slogan Hole. Towards the river, the Jubilee Avenue was replanted with Beeches to mark Queen Elizabeth's Silver Jubilee, and the Secret Garden with Western Red cedars (*Thuya plicata*). Douglas firs were also felled along the riverbank and the banks are regenerating with native deciduous trees.

Robert also appointed Russell and Greer from Perth to redesign the walled garden in 1977, greatly simplifying the design to be more in tune with the strictures of modern-day labour costs.

Current activity and future plans

The beginning of the new millennium was marked with a single Oak (*Quercus robur*), which is a Stewart symbol, between the double lime and yew avenues. Thomas Steuart Fothringham, 14th Stewart laird, has been working in conjunction with the Royal Botanic Garden in Edinburgh (RBGE) since 2007 as a partner of the International Conifer Conservation Project (ICCP), which is led by Martin Gardner. Over 100 trees from around the world have been planted as of 2020. These include specimens from Chile, Tasmania, Bhutan (*Larix griffithii*), Morocco, the Himalayas, Japan, Vietnam, Spain, Sicily and eastern Europe, resulting in three major new areas of planting within the policies.

Queen Elizabeth II's Diamond Jubilee was marked with the planting in May 2013 of eight saplings, grown from Birnam Oak acorns, in a diamond formation in the Chapel Park. This planting follows a history at Murthly of marking coronations and jubilees by the planting of trees: Serbian Spruces in the Chapel Park (three of seven remaining) planted for the coronation of George V1 in 1936; a circle of seven Monkey Puzzles, with another one in the middle, in the Old Golf Course, planted for the coronation of Edward VII in 1901; and the Jubilee Avenue, first planted with Noble firs (*Abies procera*) for Queen Victoria's Golden Jubilee in 1887, and again with Beech (Fagus sylvatica) for Queen Elizabeth's Silver Jubilee in 1977.

Work with the ICCP is ongoing, with the latest planting being Umbrella pines (*Sciadopytis verticillate*) and Koyama spruce (*Picea Koyamae*).

Tree Introductions from North America To Scotland & The Scots Who Introduced Them

Syd House

'A Nation of Planters'

> *'There is no epithet, by which the inhabitants of the Northern Division of this Island in the present day, can be more appropriately distinguished, than that of a 'Planting Nation', or to speak with more correctness, a 'Nation of Planters.'*
>
> **Sir Henry Steuart '*The Planter's Guide*' (1828)**

Background

There are fewer tree species native to Scotland comparable to areas of similar latitude in continental Europe. Despite this, Scotland was largely covered by forests after the last Ice Age. Eventually, a combination of clearance for agriculture and an increasingly wetter climate resulted in a substantial and long-lasting change with large areas of peaty uplands inhospitable to the growth of native trees, reducing this cover to around 5% by the time of the Union in 1707. When substantial timber was needed in the towns and cities, it was largely met, with some exceptions, by imports from the Baltics, Russia and later the Americas. Only in rural areas was home-timber used to any great extent.

Yet, Scotland is a country well-suited to growing trees. Early attempts at improving land management, including tree planting were made from the Middle-Ages onwards but it took until the stability of Government and increasing wealth derived from the Union of 1707 to support substantial investment in land improvement which took off during the Scottish Enlightenment of the 18th century.

As part of this drive for 'Improvement', there were early enthusiastic tree planters on the estates of Atholl, Drummond Castle and Taymouth in Perthshire, Glamis Castle in Angus, Haddo House and Pitmedden in Aberdeenshire, Drumlanrig in Dumfriesshire, and Kenmure Castle in Kirkcudbrightshire, Renowned as 'The Planting Lairds', this period was the start of the first renaissance of interest in tree planting in Scotland and in using new tree species introduced from elsewhere to be planted for 'beauty, profit and effect' according to the 4th Duke of Atholl.

The first of the new trees had been introduced from England (beech, lime, sweet chestnut) from the 16th century onwards, and, a century or so later, from Continental Europe (sycamore, larch, Norway spruce & European silver fir). A stroll around the policies of some of the above estates would invariably involve evidence of the legacy of that early planting in and around well-designed landscapes.

The 18th century was also the age of 'heroic botany' when botanists accompanied the early explorers to new lands seeking to discover botanical treasures, including trees, for both aesthetic and financial benefit. Scots were to be foremost amongst these botanical explorers. In particular, they were to feature hugely in plant collecting in the western half of North America from the late 18th century onwards. Because of similar oceanic and climatic conditions to north western Europe, those tree introductions were to have a huge influence on tree growing in Scotland helping establish and underpin the Scottish forestry sector as know it today.

This short feature is about those tree introductions from North America and the Scots who were heavily involved in their introduction. Intriguingly, three of the most prominent - Archibald Menzies, David Douglas and John Jeffery – were born and raised in Perthshire all beginning as humble gardeners before becoming plant hunters and 'scientific explorers' and consecutively covering the period from 1792 until 1854.

Early Days in Eastern North America

Almost from the earliest 17th century days of European colonisation of North America, exploitation of the natural resources of the eastern part of that vast continent had been a principal activity of the early settlers. Given that much of this area was covered by a huge hardwood forest, the best timbers, including eastern white or Weymouth pine *Pinus strobus* and many oaks, were quickly identified, made useful and exported for profit.

In 1756 the 3rd Duke of Argyll, according to Estate records, planted some 29,657 trees which included a considerable number of introductions from the east coast of North America including:

'American larch, 80 red cedars….67 foreign oaks, 38 New England pines…55 Carolina cherry… and 17 tulip trees' for 'improving' his lands and estates using these new trees.'

Subsequently 'The Society for the Importation of Forest Seeds' was formed in Edinburgh in 1765 to import tree collections from eastern North America.

One of the earliest plant hunters was John Fraser (1750-1811) from Inverness-shire who botanised widely in north east America and introduced the Fraser fir *Abies balsamea* from the Appalachian Mountains. This is the same tree that is today a mainstay of the fresh Christmas tree sector in Scotland though it has never featured widely in forest planting. In fact, this was to be the story of most of the trees introduced from the eastern side of North America. Whilst many of the maples, oaks, birches, pines spruces and firs and many others make ideal specimen trees in our gardens, policies and arboreta, hardly any are grown as forest trees because their natural habitat is subject to a more continental climate than that of Oceanic Scotland. They do not perform well as forest trees in Scottish conditions and on the lower quality of land available for forestry in Scotland.

The Pacific Northwest and Archibald Menzies

The opening up of the Pacific northwest, however, proved to be a pivotal period for discovering new trees which would ultimately be successfully established in Scotland.

It did not take long once travellers started exploring the western shores of the continent in more depth. Captain Cook made his third great voyage to the Pacific northwest (1776-79) and made new ships' masts from the great trees growing there (probably Douglas fir). It was, however, the expeditions to the region by one of his acolytes, Captain Vancouver (1791-95), before a hint of the botanical treasures to be found there was offered to European interests. Of course, the native peoples of the region were well aware of what they had and made much use of the natural bounty, but it was Archibald Menzies (1754-1842) from Perthshire who first began to catalogue what might be found there.

Menzies started as a gardener at Castle Menzies moving on to the Royal Botanic Garden Edinburgh and thereafter qualified as a surgeon at Edinburgh University under the supportive eye of Professor William Hope, the Regius Keeper of the Garden. Joining the Royal Navy as a ship's surgeon he voyaged to the New Worlds of the Americas and Australasia, he continued his botanical interests and sought the patronage of Sir Joseph Banks at Kew Gardens. As a result of this he was selected to join Vancouver's voyage to explore and chart the Pacific northwest as the expedition's botanist.

Due to unplanned circumstances, Menzies was to take over as the expedition's surgeon as well as botanist.

Banks' instructions to Menzies give a good insight into the role of the botanical or scientific explorer:

- *To study, at all places, the people, soil, climate, animals, and vegetation*
- *To assess the possibility for settlement*
- *To collect live plants and arrange fresh water to keep them alive*
- *To collect dried material & seeds on behalf of King George III*

Over three summers from 1792-4, Vancouver was to sail up the coast from Oregon to Alaska and chart the coast and waters in detail. Such a remit allowed Menzies ample time to be dropped off to explore the natural world.

Due to a combination of latitude, oceanic influence, and variation of habitats, the area is rich in plants and, especially, trees. Such a range of habitats along with oceanic mist and rainfall means that the conifers found in the area grow to huge proportions, taller than any other forest type in the world.

Finding himself in such a spot, Menzies collected specimens of Douglas fir *Pseudotsuga menziesii*, Sitka spruce *Picea sitchensis* (originally known as Menzies spruce), western red cedar *Thuja plicata*, western hemlock *Tsuga heterophylla*, the coastal redwood *Sequoia sempervirens*, Lawson's cypress *Chamaecyparis lawsonii* and grand fir *Abies grandis* plus specimens of many other flowering shrubs and flowers.

Sadly, he was unable to bring home any viable seeds of these trees due to both the time away and the lack of support from Vancouver who did not like the secondary botanical objectives of his voyage leading to much material being subsequently lost. Ironically, the only tree seeds successfully introduced by Menzies were from the monkey puzzle tree *Araucaria araucana*. On the homeward leg of their great voyage, Vancouver and Menzies stopped off in Chile, visiting the Governor in Santiago. Legend has it that as part of an official banquet, Menzies was served with some nuts as part of dessert and, ever the curious botanist, he pocketed the nuts successfully sowing them in a tub on the homeward voyage before presenting the resultant seedlings to a delighted Banks in London!

Fig. 1. Archibald Menzies (Courtesy of the Linnean Society of London)

Fig 2. David Douglas around 1828 from a pencil sketch made by his niece, Miss Aitkinson. (Courtesy of the Royal Horticultural Society)

David Douglas

Menzies' discoveries and the promise of much more resulted in a great interest in the Pacific Northwest but war in Europe meant that naval exploration was both more hazardous and less of a priority. However, by the early 1820s, peace had been restored and the recently founded (Royal) Horticultural Society was champing at the bit for further plant hunting expeditions to the Far East and the Pacific Northwest.

David Douglas (1799-1834) was another young and ambitious gardener-cum-botanist from Perthshire. Apprenticed to gardening at Scone Estate, he progressed to a position at the Botanic Garden in Glasgow under the renowned and influential Professor Sir William Hooker who would subsequently, along with his son, Sir Joseph, rescue Kew and turn it into a world centre of horticultural excellence. Hooker recommended Douglas to the HS as a potential plant collector. After an initial expedition to eastern North America in 1824 Douglas, after meeting Menzies and being fully briefed by his fellow Scot on what to expect in the Pacific northwest, sailed in a Hudson Bay Company ship to the Columbia River where he landed near the site of Portland, Oregon.

Over the next two years, Douglas was to explore all along the waters of the mighty Columbia River and into the interiors of Washington and Oregon States. Douglas was meticulous in collecting seeds as well as specimens and in ensuring that viable seeds were sent back to the Society in London as well as to Hooker in Glasgow and even to his old patrons at Scone Estate. In this he was successful compared to his mentor and friend, Menzies. Douglas also tapped into the knowledge and expertise of the natives, regularly swapping tobacco for specimens and seeds.

The botanical and arboreal diversity of the area has already been explained and Douglas was to take full advantage collecting seeds of many plants including Douglas fir, Sitka spruce, Nobel fir *Abies procera*, grand fir, ponderosa pine *Pinus ponderosa* and various others. Such was his success that

he was to write back to the Horticultural Society 'You will begin to think that I manufacture pines for pleasure'.

Douglas returned back to Britain to great acclaim but voyaged back to the Pacific Northwest in 1830 to make more collections including travelling to California and sending back seeds of various pines including Monterey pine *Pinus radiata,* a tree subsequently to prove hugely important today to plantation forestry in the southern hemisphere and Mediterranean countries.

The life of a plant collector in those days was a hazardous one. The survival of Menzies until a ripe old age was the exception to the rule. Douglas himself was to die in Hawaii in 1834 just 35 years old, gored to death by a wild bull whilst traversing the mountain Mauna Kea.

Douglas' plant introductions were seized on with enthusiasm. For those interested in trees, this was a period of growing wealth and the establishment of designed landscapes and policy woodlands around both the established and improved estates of the gentry as well as the new houses built by the 'nouveau riche' from the cities – such as the area around Strathtay in Perthshire between Grandtully and Aberfeldy - who wanted to display their wealth.

There arose a 'Conifer Rage' around planting these new trees with prices for nursery stock rising to enormous levels. It was not uncommon for individual specimen trees to change hands for 15 guineas each, a substantial sum for the time and indicative of the frenzy. Some of these original introductions of Douglas firs can still be seen in Scotland on Scone Estate, at Dawyck near Peebles and at Drumlanrig Castle, all places with exceptional tree collections and a strong history of pioneering tree planting.

Figs 3 & 4 Old growth (left) and secondary growth Sitka spruce forest in Coastal Oregon (©Syd House)

John Jeffrey

The third of the great Perthshire/Scottish tree collectors was John Jeffrey (1826-54) though he is the least well-known of the three. Jeffrey followed the familiar pattern of training as a gardener at the RBGE before being selected by the Oregon Association to journey to the Pacific northwest and follow in the footsteps of Douglas and collect more plants and, especially, tree seeds and specimens.

The Association had been formed in 1849 under the auspices of the RBGE but with subscriptions and support from various landed estates, including Buccleuch, Roxburgh, Breadalbane, Falkland, Lovat and Fasque, and nurseries who would have first pick of any seeds sent back.

History has not been as kind to Jeffrey's efforts as those of Douglas. He was to travel Douglas' routes in reverse from Hudson's Bay to the Oregon Country via western Canada and Vancouver Island and sent back only a relatively small number of collections. Ultimately, he was to disappear in the Californian desert near Yuma (familiar to any Hollywood western *aficionado*).

Yet, Jeffery managed to make some important contributions and collections including western hemlock *Tsuga heterophylla*, Pacific silver fir *Abies magnifica*, Jeffrey pine *Pinus jeffreyi*, Lawson's cypress, lodgepole pine *Pinus contorta va. murrayana*, as well as more seeds of Sitka spruce, Douglas fir, western red cedar, grand fir and noble fir.

Specimens of the trees grown from Jeffrey's seed can still be seen at a variety of places including the estates of Glenalmond and Cairnies, and Murthly where the size, grandeur, and rapid growth of these new trees along with Douglas' original specimens were important factors in enthusing foresters as to their potential for growth in Scotland.

There were other, minor contributors throughout the 19th century. In the 1830s and '40s horticultural entrepreneurs such as the Edinburgh nurserymen Peter Lawson & Son (of 'Lawson's cypress fame) were enthusiastically collecting. In order to satisfy demand from potential purchasers Lawson's sponsored their own North American collector, William Murray, such was the perceived commercial worth of obtaining new species and seed.

One of the most intriguing of these minor introductions was the story of the giant redwood (*Sequoiadendron giganteum)* from the Sierra Nevada in California. The first introduction of these trees into Europe was in Perthshire in late 1853 from seed sent back from California by the gold-prospecting sons of landowner Patrick Matthew from Errol in Perthshire. Many of these original trees still survive and can be seen on a casual drive around the houses of the gentry between Perth and Dundee. The giant redwood was to prove hardy throughout Scotland and subsequently to become one of the most popular trees planted in policy woods and landscape planting, if of little value to the forester looking for timber.

Fig 5: An early picture by Magnus Jackson from the 1850s of Sitka spruce (here called *'Abies menziesii'*) at Keillour Forest, Perthshire. Image courtesy of the RSFS Archive

Fig 6: A Magnus Jackson picture from the 1860s of one of Douglas' original Douglas fir trees on Scone Estate, Perthshire. The tree still stands today.

Originally grown as specimens, foresters and others, encouraged by the formation of bodies such as the Royal Scottish Forestry (originally Arboricultural) Society in 1854, subsequently planted out groves and then plantations of the 'new trees'. By the time that the Forestry Commission was founded in 1919, aided by some experimental and imaginative trial species plantings on the deep peat around Loch Ossian on Sir John Stirling Maxwell's Corrour Estate in Inverness-shire from the 1890s onwards, there was a suite of trees and forest management techniques in place to guide and facilitate the large-scale expansion of timber producing forests in the highland and uplands of Scotland seen today.

Initially Douglas fir and the various *Abies* species caught the imagination due to rapid growth and good form, but it was to be Sitka spruce that proved to be the most useful, building on Douglas' shrewd observation that:

> *'It may… become of equal if not greater in importance (than Douglas fir). It possesses one great advantage by growing to a very large size…in apparently poor, thin damp soils…This unquestionably has great claims on our consideration as it would thrive in Britain where P.sylvestris (Scots pine) finds no shelter. It would become a useful and large tree … This if introduced would profitably clothe the bleak barren hilly parts of Scotland … besides improving the beauty of the country.'*

Today Sitka spruce now forms some 43% of all Scotland's forests (source: 'Forestry Statistics 2020', publ. by Forest Research 2020) and almost 60% of the productive conifer area. Some would argue, understandably, that this is an over-reliance on Sitka spruce but the circumstances leading to

that situation have been a function of the quality of the land available for establishing new forests and the ability of Sitka spruce to produce quality timber in conditions with few alternatives in proving raw material supplying an ever-burgeoning downstream timber products sector.

Intriguingly, potential alternatives to Sitka spruce for timber production invariably and predominantly feature other Pacific northwest species including Douglas fir on the better and lower ground, western red cedar, western hemlock and the two Abies species, grand fir and noble fir. Maybe their time will come.

References

This feature was edited down from the reference below, which was drafted principally by the author. For more details go to the original:

''A Nation of Planters': Introducing the New Trees, 1650-1900' by Syd House & Christopher Dingwall, Chapter 6 from Smout TC, (2003): *People and Woods in Scotland: A History.* Published by Edinburgh University Press, Edinburgh

To see examples of locations with early introductions and specimen trees see the website of the National Tree Collections of Scotland www.ntcs.org.uk

The Inventory of Gardens and Designed Landscapes

Julie Candy

Introduction

The Inventory is a list of nationally important gardens and designed landscapes compiled and managed by Historic Environment Scotland as part of our work to look after and promote the historic environment. Many of the sites on the Inventory are country estate landscapes with a significant woodland component, like the venue for this conference - Murthly Castle in Perthshire.

The gathering at Murthly in 2017 was an opportunity to introduce the Inventory – probably one of the lesser-known landscape designations - including its purpose and history, and to outline some current projects. Heritage can be a surprisingly fast-moving sector and writing up these notes provides a useful space for not only summing up, but to reflect on our work since then.

Recognising and protecting gardens and designed landscapes

The Inventory of gardens and designed landscapes in Scotland is one of five designations managed by Historic Environment Scotland. The others are listed buildings, scheduled monuments, the Inventory of historic battlefields and historic marine protected areas. Together, they identify some 55,000 sites, buildings and places that tell the story of Scotland from prehistory to the recent past and which range from the most remote islands to our busiest cities, and even under water.

We define gardens and designed landscapes as grounds laid out for artistic effect, and a total of around 360 are included on the Inventory at the time of writing (2020). Country estate landscapes of mainly 18th-19th century date are most commonly represented, but there are also botanical and horticulturalist's gardens, (like Branklyn, in Perth, with its Himalayan blue poppies), urban public parks, a couple of golf courses (St Andrews and Gleneagles), a reservoir landscape (Milngavie) and even a cemetery (the Necropolis, in Glasgow). They range in date from around 500 years old – like the 16th century garden terraces at Aberdour Castle in Fife, to the 20th century, including Ian Hamilton Finlay's Little Sparta in South Lanarkshire, with its unique blend of landscape, sculpture and poetry.

Inclusion on the Inventory means that a site is recognised as nationally important. Published online, the Inventory provides information on each site to inform the process of managing change. While we don't expect Scotland's designed landscapes to be 'frozen in time', we recognise that these places are a fragile and finite part of our environment - vulnerable to lasting damage and loss through adverse impacts from development and other processes such as climate change or tree diseases.

If a site is included on the Inventory, it means local authorities will take it into account when preparing local development plans and when making decisions on planning applications. Historic Environment Scotland is a statutory consultee for these cases and we routinely provide advice on the impact of proposals ranging from new houses and roads through to windfarms. We also offer advice on other land management processes affecting Inventory gardens and designed landscapes, including woodland management plans. For owners of Inventory sites, we manage a small grant scheme that assists with the costs involved in the preparation of a Landscape Management Plan.

The beginnings of the Inventory

The origins of the Inventory date to the early 1980s when staff at the former Countryside Commission for Scotland debated why people visited the countryside and questioned in particular the special attraction of gardens and designed landscapes. At this time, listing and scheduling were well established as mechanisms for the recognition of historic buildings and archaeological monuments. Could landscapes be identified and understood in a similar kind of way, and even protected in policy and law?

The conversations turned into a push for action. Working with the Historic Buildings and Monuments Division of the Scottish Development Department, the Countryside Commission engaged Land Use Consultants to begin a pilot project. This established the foundations of a system of assessment that took into account the multiple ways in which a landscape could be significant at a national level.

On this basis, the Inventory of gardens and designed landscapes was commissioned. From 1984–86, Land Use Consultants worked at breakneck speed to draw up lists, visit sites and undertake research. They considered a total of 854 gardens and designed landscapes across Scotland for inclusion. The result was "a systematically obtained record of 282 existing historic gardens and designed landscapes in Scotland as a basis for research and future policy formulation", with Inventory records for a total of 275 sites published in a set of hardback volumes in 1987 (Land Use Consultants *et al.* 1987).

Although sites have been added since then, most notably in a sequence of area-based surveys in the 1990s, and some have been removed or amended, the bulk of the present Inventory still consists of sites written up during that fast-paced campaign of reconnaissance and research in the mid-1980s.

The successor organisations of the Countryside Commission and Scottish Development Department (Scottish Natural Heritage and Historic Scotland) continued to jointly manage the Inventory until 2007, when Historic Scotland became sole custodian. An amendment to the law in 2011 means that we now compile and manage the Inventory under the terms of the 1979 Ancient Monuments and Archaeological Areas Act. Historic Environment Scotland assumed the former responsibilities of Historic Scotland in 2015.

Defining national importance

What makes a landscape special enough for it to be of national importance? The selection guidance we use today is a tweaked and expanded version of the original assessment system devised in the 1980s, and most recently revised in 2019 as part of a wider policy review (Historic Environment Scotland 2019).

To decide if a garden and designed landscape is nationally important, we examine its cultural significance under seven headings: Artistic interest, historical interest, horticultural interest, archaeological interest, scenic interest and nature conservation interest. For each of these, we decide whether a site has outstanding, high, some, little or no interest. Those that demonstrate more outstanding and high areas of interest are likely to be of national importance, although occasionally a site can be of such outstanding importance in only one area that it too merits inclusion.

An important part of the assessment is to consider the degree to which a site survives. The Inventory was never intended to identify lost or fragmented sites, and for us to designate, a historic garden or

designed landscape must have integrity – meaning that it should demonstrate coherence and legibility in the present landscape. To inform a decision about the integrity of a site, we look at the survival and condition of the garden or designed landscape as a whole, and of its main components.

Assessing sites with woodland

Of all the components that a garden and designed landscape might contain, from buildings, botanic collections, water features or landscaped garden grounds, it is quite often woodlands that contribute in the most varied way towards the cultural significance of a site, turning up as a factor in several areas of interest that we consider in our assessments.

This is particularly the case for country estate landscapes designed and planted for pleasure and profit in the 18th and 19th centuries. Distributed throughout Scotland but more concentrated in lowland areas, examples range from Paxton House, a few miles from the Scottish Border, through to Duff House on the Moray Firth in Aberdeenshire (Figure 1). Typically, these sites contain inner designed grounds around a castle or country house, within a larger expanse of parkland, fields, shelterbelts and plantations.

Figure 1: Duff House, Aberdeenshire © Historic Environment Scotland

The footprint of a surviving woodland structure is part of a site's overall legibility, helping us to interpret the designed landscape as a coherent whole. In these cases, the distribution of woods, avenues and belts of trees can tell us about the character and phasing of a designed landscape, including the intent and ambition of a landscape designer or landowner, especially if we can match an estate plan with other surviving documents. This informs our understanding of a site's historical and artistic interest.

Tree cover can contribute enormously to the scenic qualities of a landscape through sheer extent and visual contrast with adjacent landscape types (which might include settlements, suburbs and open agricultural land). Woodlands often form part of the setting of a historic building. If they also contain an arboretum with a variety of tree species, endangered specimens planted as part the International Conifer Conservation Programme, or individual champion trees recorded on the Tree Register, there will be enhanced merit for the site as a whole under 'horticultural interest'.

Healthy and diverse woodlands will have an innate value for habitat and biodiversity, contributing towards the nature conservation interest of a designed landscape. Areas of woodland within designed landscapes that are also identified and recognised for their natural heritage value through other local or national designations will also be factored into our assessment of a site.

Finally, our most recent revision of the selection guidance in 2019 also introduced greater emphasis on contemporary appreciation of a site, allowing us to consider concepts such as access, recreation, interpretation and education in our assessments. It stands to reason, therefore, that accessible woodlands, in a good condition, and managed for the benefit and well-being of people are now more likely to be factored into designation assessments.

The revision of the selection guidance in 2019 was part of a wider piece of work to review our historic environment policy, and our policy for designation and you can find out more from our website at www.historicenvironment.scot/advice-and-support/planning-and-guidance/historic-environment-policy-for-scotland-heps/

How we work with the Inventory

Anybody can ask us to assess a designed landscape for inclusion on the Inventory or for us to review or remove a site from the Inventory. We will also accept requests to correct information within records. All we ask is for the proposer to complete and send us a form, available from our website. The most recent gardens and designed landscapes to have been added to the Inventory *via* this process are St. Andrews Botanic Garden, Fife in 2016, Milngavie Reservoirs in East Dunbartonshire in 2018 (Figure 2), Blackhills House in Moray in 2018, and Lochnaw Castle in Dumfries and Galloway in 2019. At the time of writing, we are consulting owners and the Local authority on the proposed inclusion of Colzium House in North Lanarkshire (2020).

Figure 2: Milngavie Reservoirs, East Dunbartonshire

In addition to individual proposals, we also undertake thematic projects. From 2014–2018 Historic Environment Scotland carried out a nationwide review of 42 gardens and designed landscapes in response to feedback about the quality and consistency of the Inventory. The Inventory Gardens Review project gave us the opportunity to focus resources where needed and visit and assess sites afresh that had not been reviewed since their original designation on the Inventory up to 30 years ago. Out of a total of 42 sites, we removed 31 from the Inventory, and retained 11 sites, the records of which were updated.

The reasons for removal were fragmentation of landscapes, often over a long period of time, loss of integrity (wholeness or coherence), and the loss of horticultural collections. The project highlighted the dynamic and sometimes ephemeral nature of historic gardens and designed landscapes, compared to other kinds of designated site. It showed how some gardens can be more resilient than others due to their components, such as long-lived species within woodland gardens and/or their long-term management arrangements. The project report can be downloaded from our website (Historic Environment Scotland 2019).

Looking forward, our next project in 2021 will focus on gardens and designed landscapes of the more recent past, from around 1945 up until the early 2000s. We think sites of this date are underrepresented both on the Inventory and also more generally in the National Record of the Historic Environment. If you know of a site that you think we should consider for recording and/or for designation on the Inventory, please contact us at designations@hes.scot.

If you'd like to find out more about the Inventory and our other designations, please check these sources of information or get in touch.

- The Inventory of Gardens and Designed Landscapes: www.historicenvironment.scot/advice-and-support/listing-scheduling-and-designations/gardens-and-designed-landscapes/

- Search for a designation – Historic Environment Scotland Portal www.portal.historicenvironment.scot

- Guide for Owners and Managers: The Inventory of Gardens and Designed Landscapes: www.historicenvironment.scot/inventory-gardens-landscapes

- Managing Change in the Historic Environment: The Inventory of Gardens and Designed Landscapes: www.historicenvironment.scot/archives-and-research/publications

References

Historic Environment Scotland 2019 *Historic Environment Policy for Scotland,* www.historicenvironment.scot/advice-and-support/planning-and-guidance/historic-environment-policy-for-scotland-heps/

Historic Environment Scotland 2019 *Inventory Gardens Review 2014–2018,* www.historicenvironment.scot/archives-and-research/publications

Land Use Consultants, Countryside Commission for Scotland, Scottish Development Department 1987 *An Inventory of Gardens and Designed Landscapes in Scotland Vols 1–5.* Glasgow: Land Use Consultants.

Big Tree-ring Country? Dendrochronology and its Potential in Perthshire[1]

Coralie Mills

Introduction

The 2017 Scottish Woodland History Conference offered an opportunity to consider the tree-ring record for Perthshire, and how it might be developed. There have been concentrations of dendrochronological work in south-west/south-central Scotland on oak (Baillie 1977; 1982; Crone & Mills 2002; 2012; 2015; Mills & Crone 2012), and also in north-east Scotland on both oak and pine (Crone & Mills 2011; 2015; Mills 2008; Mills et al 2017; Rydval et al 2017; Stell & Baillie 1993; Wilson et al 2011) but there are still considerable gaps in our national geographical tree-ring coverage as well as chronological and species gaps (Mills & Crone 2012; Mills et al 2017). Perthshire's central location (Illus 1), in the transitional zone between the Highlands and the Lowlands, the North and the South, means that it occupies a strategically important position with respect to the development of dendrochronology for native tree species in Scotland, potentially linking up the tree-ring chronology networks to the north east and to the south.

Illus 1: The 'Heart of Scotland': former extent of Perthshire before modern boundary changes

The potential for extending native oak, pine and ash chronologies in Perthshire is particularly strong; all of these species occur in Perthshire's historic building record and naturally in the varied landscape. Some other species, such as alder, also have potential here but mostly only in very specific circumstances. Alder is the primary building timber on most Scottish crannogs that have been investigated (Crone 2014) and is being used extensively for dating, *via* dendrochronology and

[1] This paper was updated in April 2021, including new research material not presented at the conference.

wiggle-match radiocarbon dating on the Loch Tay Crannogs 'Living on Water' project (www.livingonwater.scot). This paper concentrates on the potential for developing oak, pine and ash dendrochronology in Perthshire.

The date-spans and thresholds between archaeological periods follows a version of the Scottish Archaeological Periods and Ages (ScAPA) system to articulate with the evolving Perth and Kinross Archaeological Research Framework (http://www.pkht.org.uk/projects/current-projects/pkarf/). Consequently a few of the allocations of dendro-dated sites to periods have changed slightly since the conference presentation. The 'Prehistoric' period has very little Perthshire dendro-evidence so far, and so has been lumped into one era in the tables below, covering 12,700 BC to AD 400, from the start of the Late Upper Palaeolithic to the end of the Iron Age, although the limited extant data is largely from the first millennium BC. The Early Medieval period spans AD 400 to AD1100 and the Late Medieval spans AD 1100 to AD 1600. Post-Medieval spans AD 1600 to AD 1700. Early Modern spans AD 1700 to AD 1800 and Modern spans AD 1800 to present.

Oak dendrochronology in Perthshire

The existing oak dendrochronology record from Perthshire is summarised in Table 1, and some of the sites shown in Illus 2.

Table 1: Summary of oak dendrochronology records in Perthshire

Key: ***** sites now in modern Stirling council area but formerly in Perthshire
[#] dendrochronology applied but not dated

Period	Site	Date span	Native?	Analyst
Living trees	Rannoch oaks	AD 1836-2009	Native	Mills
	S Katrine oaks*****	AD 1814-2010	Native	Mills
Modern	NO DENDRO-DATED SITES			
Early Modern	NO DENDRO-DATED SITES			
Post-Medieval	NO DENDRO-DATED SITES			
Late Medieval	Perth High St	AD 949-1204	Native	Crone & Baillie
	Perth Museum Panels	*AD 1225-1499*	*Imported*	*Crone*
	Perth barrel	*AD 964-1121*	*Imported*	*Crone*
Early Medieval	Dundurn fort [#] – radially split planks	2 undated samples. C14 -608 ±15-30 cal AD	Assumed native	Measured QUB: See Crone 1998
Prehistoric	NO DENDRO-DATED SITES (dendrochronology applied in sites below)			
	Carpow logboat[#]	C14 date c2900bp	Native	Crone
	Oakbank crannog[#]	C14 date c2500bp	Native	Crone
	Loch Tay crannogs	Various C14 dates	Native	'Living on Water' project sites
	Submerged woodland Balnahanaid, Loch Tay	Dendro potential: multi-period C14	Native	See Andrian & Dixon 2008

Illus 2: Perthshire native oak sites

		
South Katrine oak maiden beside charcoal platform	Carpow logboat	Loch Tay crannogs

Oak is the tree species which has seen the most dendrochronological work in Scotland, including a small number of dated sites in Perthshire (Table 1). More generally, the historical oak tree-ring record in Scotland is dominated by imported timber from the late medieval period onwards (Crone & Mills 2012). Native oak timber is only well-represented in the Scottish record before about AD 1450, with dated sites mostly in the south and a smaller number in the north east (Mills & Crone 2012; Stell & Baillie 1993). However, this pattern may be misleading: because of the patchiness of the native oak reference data in Scotland, imported oak is actually much easier to date and provenance than native Scottish oak (Mills & Crone 2012). So far, in Perthshire, only the High Street excavations of medieval Perth have produced dated native oak tree-ring data (Table 1); they also yielded a re-used barrel with staves of imported oak (Crone & Baillie 2010). Finely-carved Baltic oak boards have been identified in Perth Museum (Table 1) and were probably from St John's Kirk in Perth (Crone et al 2000). While lowland medieval Perthshire may have had access to imported timber through Tayside ports like Perth and Dundee, much more reconnaissance and analysis is needed to ascertain the history of native oak use versus imported oak in the county. One might reasonably expect there to be a mix of native and imported oak in the lowland areas in the medieval and later periods, and probably a greater reliance on local native timber resources in the uplands, where transportation would be more difficult, other than down the main rivers. As we move back into earlier times, we would expect only native timbers to be exploited, and the potential for developing prehistoric oak chronologies in Perthshire is exemplified by the work on the Carpow Logboat (Strachan et al 2010) and Oakbank Crannog (Crone 1988), which produced floating oak chronologies and radiocarbon dates (Table 1; Illus 2). Oak is also one of the species being used for dating as part of the Living on Water project on the Loch Tay crannogs.

It should be possible to extend the living oak tree-ring record for Perthshire back much further than has so far occurred (Table 1). The living oak work has so far concentrated on investigating woodland history, particularly of relict wood pasture and oak coppice woods at South Loch Katrine (Mills et al 2009; Mills 2011), which area was historically within Perthshire before modern boundary changes. A limited amount of work on living oak was done at South Loch Rannoch, for the Woodland Trust (Mills 2010a) to assess the longevity of veteran trees there. Elsewhere in Scotland, living oaks have attained great ages, extending back as far as the 15th or 16th centuries and usually in remnants of medieval Parks (at Cadzow and Lochwood, Baillie 1977; 1982; at Dalkeith Park, Mills 2015). There were of course medieval parks and forest areas in Perthshire, some of which survive, but their tree-ring records are yet to be explored. They do have great potential for both dendrochronological dating and woodland history objectives.

Pine dendrochronology in Perthshire

The pine dendrochronology record from Perthshire is summarised in Table 2, and the only native pine building so far dated in Perthshire, Castle Menzies (Mills et al 2017), is shown in Illus 3. Castle Menzies was dated through the NERC-funded SCOT2K pine project, led by PI Professor Rob Wilson at the University of St Andrews, in which 20 pine historic buildings and sites were dated against the developing network of native Scottish pine tree-ring chronologies (Mills et al 2017).

Table 2: Summary of pine dendrochronological and related records in Perthshire

Period	Site	Date span	Native?	Analyst
Living trees	Rannoch pine	AD 1703-2010	Native	Mills & Wilson
	Meggernie East (330-360masl)	AD 1763-2017	Native	Wilson & Ross
	Meggernie Lower (West, 280-320masl)	AD 1718-2017	Native	Wilson & Ross
	Drimmie pine	AD 1824-2010	Planted	Hughes (1987), Schweingruber, Wilson
Modern	NO DENDRO-DATED SITES			
Early Modern	NO DENDRO-DATED SITES (dendro assessed or applied to sites below)			
	Glen Fender cruck	Undated, c 1800	Native?	Mills
	Blair Castle	Undated, 18thC	Native?	Mills
Post-Medieval	NO DENDRO-DATED SITES			
Late Medieval	Castle Menzies roof	AD 1486-1572	Native	Mills
Early Medieval	NO DENDRO-DATED SITES			
Prehistoric	NO DENDRO-DATED SITES			

Illus 3: Castle Menzies, 16th century roof of medieval native pine

Castle Menzies exterior

Castle Menzies 'lang garret' pine roof

The SCOT2K native pine dendrochronology project also assessed pine timber in a couple of other Perthshire buildings (Mills et al 2017), namely some probably 18th century sarking boards retained after roof repairs on Blair Castle at Blair Atholl, and the Glen Fender small cruck frame reconstructed in the Atholl Museum of Country Life, probably 18th or 19th century based on dates for small pine crucks elsewhere (Mills et al 2017). The ring counts in the Blair Castle samples were borderline and did not date, while the Glen Fender crucks were built from really young timber, circa 30 years old, far too young to date through conventional dendrochronological methods. Very

probably both sites used local native pine, but in the absence of dating it is not possible to dendro-provenance them. These two sites reflect the situation more widely in the Highlands, where most post-medieval pine buildings, and some of the earlier ones, are dominated by young, fast-grown pine, and we continue to assess the evidence as to whether this preponderance of young pine reflects long-term selective felling practices or perhaps early use of plantation-grown timber. While there are many buildings with very young pine, there are datable sites in the built heritage too, like Castle Menzies: it just requires extensive reconnaissance to find them, and SCOT2K undertook relatively little of that in Perthshire, its main focus being further north. The documentary record of the 18th century use of timber from the Black Wood of Rannoch, researched by Lindsay (1974), shows that the great majority of the timber was sold locally, including some being floated down river. We should expect to find this local native pine timber in Perthshire's built heritage, around Rannoch and downstream as far as Perth.

Native pine probably has the greatest potential of all native tree species in Perthshire for developing long chronologies for dating; there are already long well-replicated living tree records (Table 1) from the South West Pinewoods group including Black Wood of Rannoch (Mills 2010a) and Meggernie Wood, and even longer records from Glen Falloch just to the west of the Perthshire border (Wilson et al 2017). There is potential, including at Rannoch and Meggernie, to extend and strengthen the living pine records for Perthshire, and just to the west of the county border, in the Glen Orchy-Rannoch area and at Coille Choire Chuilc near Tyndrum (Wilson pers comm). Further north, the SCOT2K project has extended the living record using sub-fossil pine trees preserved in lochs, to reconstruct both climate and human impacts (Rydval et al 2017; Wilson et al 2011), and the potential for this in Perthshire has yet to be fully explored. Given the long planting history in Perthshire, there is also potential to obtain tree-ring records from long established pine plantations; similar sites have been used to fill in some of the gaps in the geographic coverage of living native pine further north within the SCOT2K project (Rydval et al 2017). Between the living tree, sub-fossil and built heritage, it might reasonably be expected, with sufficient investment of effort, to obtain native pine tree-ring coverage in Perthshire for the last thousand years, and quite possibly longer. Besides the usefulness of such work for cultural heritage dating, it would also have benefits for the reconstruction of climate history and woodland dynamics in Perthshire.

Ash dendrochronology in Perthshire

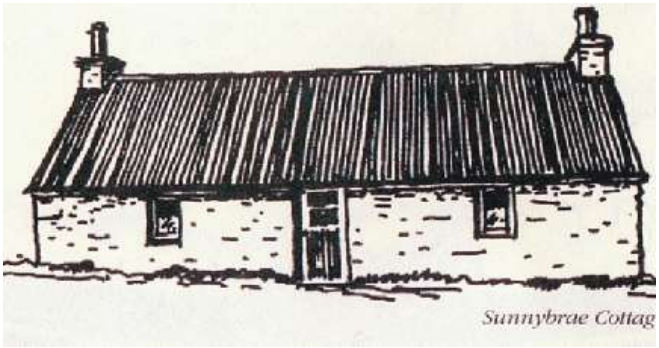
The existing ash dendrochronology record from Perthshire is summarised in Table 3, and some of the sites shown in Illus 4.

Table 3: Summary of ash dendrochronological and related records in Perthshire

Key: ***** sites now in modern Stirling council area but formerly in Perthshire

Period	**Site**	**Date span**	**Native?**	**Analyst**
Living trees	S Katrine ash*	AD 1728-2008	Native	Mills
	S Loch Tay ash	AD 1804-2000	Native	Crone & Mills
Early Modern to Modern	NO DENDRO-DATED SITES (dendrochronology applied to sites below)			
	Moirlanich longhouse*, nr Killin	Undated, 19th C	Native	Crone & Mills
	Sunnybrae Cottage, Pitlochry	Undated, 18th/19th C	Native	Crone
Post-Medieval	NO DENDRO-DATED SITES			
Late Medieval	NO DENDRO-DATED SITES			
Early Medieval	NO DENDRO-DATED SITES			
Prehistoric	NO DENDRO-DATED SITES			

Illus 4: Cruck cottages with ash timber

	
Moirlanich Longhouse near Killin	Sunnybrae Cottage, Pitlochry

There is a concentration of native ash in upland Perthshire, especially around Loch Tay. Ash timber has been identified and analysed dendrochronologically in two buildings in that area, in Moirlanich Cottage near Killin (Mills & Crone 1996) which was in Perthshire historically, before modern boundary changes, and in Sunnybrae Cottage in Pitlochry (Crone 2001). Informal reports of ash in other cruck frames in this region have also been received but not checked out. At the time of these historic building projects, the first attempt was made to build local ash chronologies from trees cored in a number of woods along the south side of Loch Tay and around Fincastle, Strath Tummel, producing a native ash chronology spanning AD 1804-2000 (Mills & Crone 1996). This proved not long enough to give sufficient overlap to date the ash timbers in either Moirlanich or Sunnybrae cottages. However, more recent work at South Loch Katrine (Mills et al 2009) has demonstrated the potential longevity of upland ash in Scotland, with some living ash trees there originating in the late 17th century, with samples spanning AD 1728-2008, (Table 3, cores did not quite reach centre). This dataset just requires some additional replication in the earlier part to create a robust ash reference chronology, then dating should become possible. The ability to build well-replicated ash chronologies has been demonstrated further north in Scotland, at Rassal NNR, Wester Ross, where the information was used to reconstruct the history and the age structure of the wood (Cooper 2010; Mills 2010b). The current threat to our ash trees from *chalara* (ash dieback) lends an additional impetus to developing ash records.

The vernacular buildings of Perthshire may contain other local historic timber resources as was the case at both Sunnybrae Cottage (Crone 2001) and Moirlanich Cottage (Mills & Crone 1996); they both have pine cabers in the roofs from young, probably local native pine, and at Moirlanich the timbers used in the cruck frame also included elm and sycamore. Elm timber is occasionally found in historic buildings in Scotland and would be another species worth developing further dendrochronologically.

Conclusion

Perthshire occupies a strategically important situation between the Highlands and Lowlands, and between concentrations of tree-ring reference data further north and south in Scotland. Perthshire truly is Big Tree Country in terms of the diversity and heritage of its woodlands, and this is reflected in the range of native tree species which have been exploited for timber historically. Yet the historic timbers preserved in Perthshire's rich built heritage have so far been little studied for dendrochronology and represent a unique resource which could yield important information, not only for heritage dating, but also for climate science and woodland history. In particular, Perthshire's pine, oak and ash all have great potential for further tree-ring research. Opportunities

will be sought to develop Perthshire's dendrochronological record further, alongside studies of adjacent areas which used to be in the greater territory of the historic county of Perthshire.

Acknowledgements
The author is grateful to the many collaborators who have contributed to the various studies on which these observations are founded, including Anne Crone, Colin Edwards, Peter Quelch, Mairi Stewart, Richard Thompson, Rob Wilson and Jonathan Wordsworth. The many owners and bodies who have offered their woods, trees and timbers for study are also warmly thanked, as are those organisations who have funded and supported the projects mentioned here, including Forestry Commission Scotland, Historic Environment Scotland, Loch Lomond & Trossachs National Park Authority, the National Trust for Scotland and NERC (SCOT2K Pine Project Grant: NE/K003097/1).

References

Andrian, B & Dixon, N 2008 'Prehistoric woodland in Loch Tay', *History Scotland* magazine Sept-Oct 2008, 9-11.

Baillie, MGL 1977 'An oak chronology for South Central Scotland', *Tree-Ring Bulletin* 37, 33-44.

Baillie, MGL 1982 *Tree-Ring Dating and Archaeology.* London: University of Chicago Press.

Cooper, T 2010 'Rassal Ashwood NNR: Exploring the cultural dimension', In C M Mills (ed) Woods as working and cultural landscapes: Past and present, *Scottish Woodland History Discussion Group: Notes XV,* 29-34.

Crone BA, 1988 *Dendrochronology and the study of crannogs.* Sheffield Univ: unpubl PhD thesis. http://etheses.whiterose.ac.uk/1841/

Crone, A 1998 'The development of an Early Historic tree-ring chronology for Scotland', *Proc Soc Antiq Scot* 128, 485-493.

Crone, B A 2001 *Analysis of the roof timbers from Sunnybrae Cottage*. Unpublished report for Historic Scotland.

Crone, A 2014 'Dendrochronological studies of alder (*Alnus glutinosa*) on Scottish crannogs', *J Wetland Archaeol* 14, 22-33.

Crone, A & Baillie, M 2010 ' Appendix 5; Perth High Street dendrochronological studies'. *In* Perry, D, Murray, H, Beaumont James, T & the late Nicholas Q Bogdan *Perth High Street Archaeological Excavation 1975-1977. Fascicule 1, The excavations at 75-95 High Street and 5-10 Mill Street, Perth,* pp221-5. Perth: Tayside and Fife Archaeological Committee.

Crone, A, Fawcett, R & Hall, M 2000 'A group of late medieval carved wooden panels in Perth Museum and Art Gallery – their provenance and date', *TAFAJ* 6, 189-199.

Crone, A & Mills, CM 2002 'Seeing the wood **and** the trees; dendrochronological studies in Scotland', *Antiquity* 76, 788-94.

Crone, A & Mills, C 2011 'The Native Oak and Pine Project – some observations on timber and woodworking in Scottish buildings circa AD 1600 – 1800', *Vernacular Building* 34, 19-42.

Crone, A & Mills CM 2012 'Timber in Scottish buildings, 1450-1800: a dendrochronological perspective', *Proc Soc Antiq Scot* 142, 329-369.

Crone, A & Mills, C 2015 'List 279: Dendrochronologically dated buildings from Scotland: the native oak and pine project', pp 125-8, *in* Alcock, N & Tyers C (2015) 'Tree-Ring Date Lists 2015', *Vernacular Architecture*, 46:1, 89-128, DOI: 10.1080/03055477.2015.1123415.

Hughes, M K 1987 'Dendroclimatology of *Pinus sylvestris* L. in the Scottish Highlands', in Ward, R G W (ed) *Applications of tree-ring studies*. Oxford: BAR International Series 333, 91-106.

Lindsay, JM 1974 *The Use of Woodland in Argyllshire and Perthshire between 1650 and 1850*. PhD Thesis, University of Edinburgh.

Mills, CM 2008 'Historic pine and dendrochronology in Scotland', *Scottish Woodland History Discussion Group: Notes XIII*, 9-14.

Mills, CM 2010a *A dendrochronological analysis of living trees, South Loch Rannoch, Perthshire.* Report for Woodland Trust Scotland.

Mills, CM 2010b *A dendrochronological analysis at Rassal Ashwood NNR, Wester Ross.* Report for Forest Research and Scottish Natural Heritage.

Mills, CM 2011 *Old oak coppices, South Loch Katrine: their dendrochronology and history.* Report for FCS (Cowal and Trossachs District) & Loch Lomond & Trossachs National Park Authority.

Mills, CM 2015 *SESCO-DEN: Technical report on chronology development from the Dalkeith Old Oaks.* Report for Historic Scotland and The Buccleuch Estates.

Mills, CM & Crone, BA 1996 *Dendrochronology of timbers from Moirlanich Longhouse, Killin, Perthshire*. Report for the National Trust for Scotland.

Mills, CM & Crone, A 2012 'Dendrochronological evidence for Scotland's native timber resources over the last 1000 years', *Scottish Forestry* 66, 18-33.

Mills, CM, Crone, A, Wood, C & Wilson R 2017. 'Dendrochronologically dated pine buildings from Scotland: The SCOT2K native pine dendrochronology project', *Vernacular Architecture* 48, 23-43**.** DOI 10.1080/03055477.2017.1372674

Mills, CM, Quelch, P & Stewart, M 2009 *The evidence of tree forms, tree-rings and documented history around Bealach nam Bo, Loch Katrine.* Report for Forestry Commission Scotland.

Rydval, M, Loader, NJ, Gunnarson, BE, Druckenbrod, DL, Linderholm, HW, Moreton, SG, Wood, CV and Wilson, R 2017 'Reconstructing 800 Years of Summer Temperatures in Scotland from Tree Rings', *Climate Dynamics*, 1-24. DOI 10.1007/s00382-016-3478-8.

Stell, G & Baillie, M 1993 'The Great Hall and roof of Darnaway Castle, Moray', in Sellar, W D H (ed) *Moray: province and people*, 163 – 86. Edinburgh.

Strachan, D, Cook, G & Crone, A 2010 'Chapter 6. Dating the boat', *in* Strachan, D *Carpow in context: a late Bronze Age logboat from the Tay*, 89-95. Edinburgh: Soc Antiq Scot.

Wilson, R, Loader,N, Rydval, M, Paton, H, Frith, A, Mills, C, Crone, A, Edwards, C, Larsson, L and Gunnarson, B 2011 'Reconstructing Holocene Climate from Tree Rings – The Potential for a Long Chronology from the Scottish Highlands, *The Holocene* 22, no.1, 3-11. DOI: 10.1177/0959683611405237.

Wilson, R, Wilson, D, Rydval, M, Crone, A, Büntgen, U, Clark, S, Ehmer, J, Forbes, E, Fuentes, M, Gunnarson, BE, Linderholm, HW, Nicolussi, K, Wood, C and Mills, C 2017 'Facilitating tree-ring dating of historic conifer timbers using Blue Intensity', *Journal of Archaeological Science* 78, 99-111.

500 Years in the Making: a Brief History of the Designed Landscape at Murthly Castle

Tom Christian

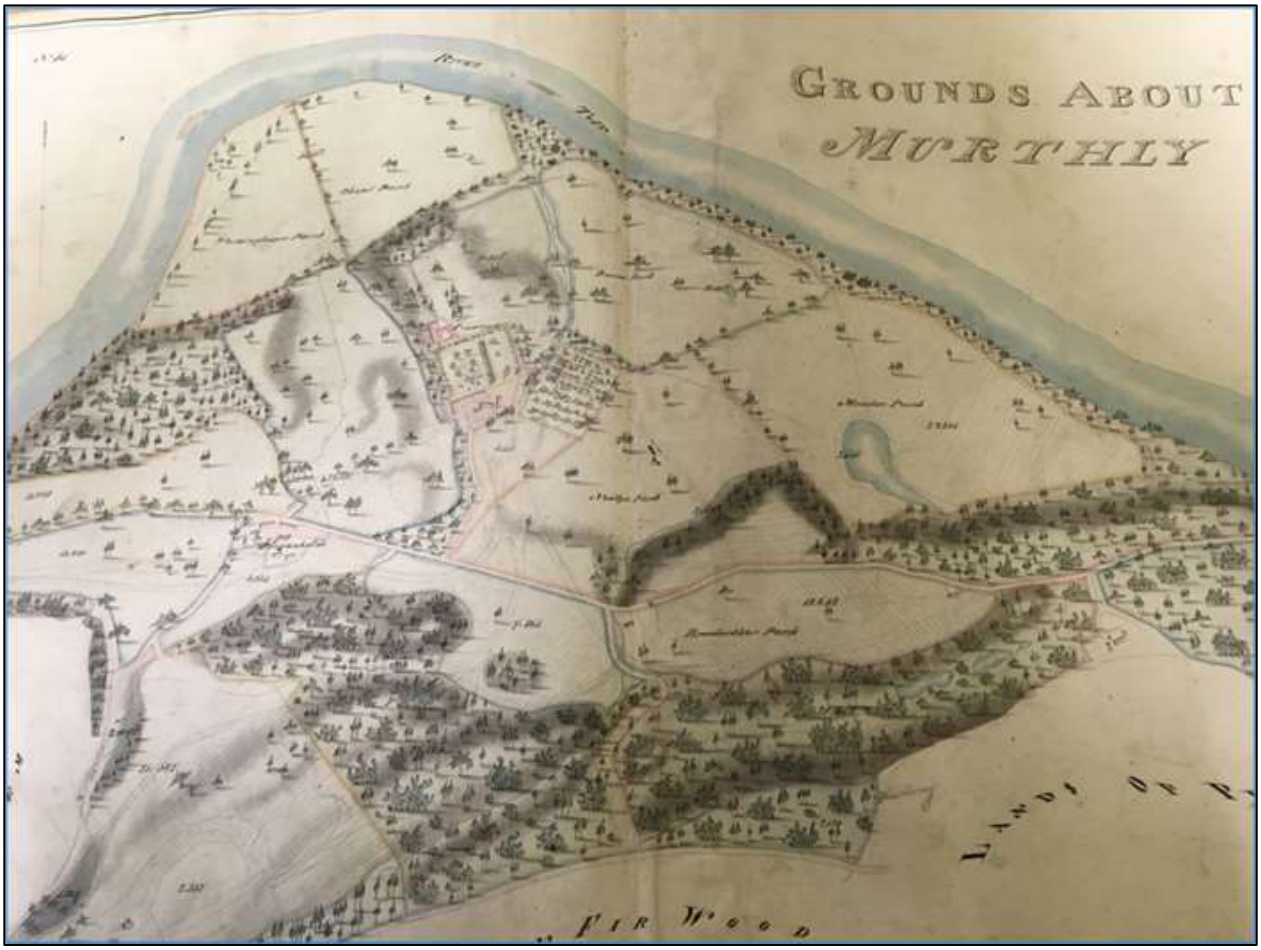
Murthly Castle sits at the centre of a designed landscape, which – according to the official designation – still extends to over 2,100 acres. This changing landscape has dominated the southern bank of the Tay east of Birnam for hundreds of years. At its height it extended from Birnam village in the west, taking in parts of Birnam Hill and Rohallion Loch, as far as Gellyburn village to the east. A great bend of the Tay marks the northern boundary, and the southern extent has been variably and sinuously demarcated in the high ground to the south that gives rise to the Gelly Burn.

The first major fracturing of this enormous area took place in the 1850s, when the Perth-Dunkeld railway was built to the south of the Castle, effectively dividing the best low-lying ground around the house from the higher, by now afforested moorland to the south. There are charming stories of the railway engineers eyeing up the perfectly flat drives that run east-west through the landscape, and which would have made excellent railway foundations and several miles of extremely easy building, but the Laird of the day said 'nae chance', and the route was pushed back. Landowners did not enjoy such influence by the 1970s when the A9 was built, and the so-called Bankfoot-Birnam section of dual carriageway skirted beneath Birnam Hill and then sliced through the (old) west drive, narrowly missing one of the best groups of Atlas Cedar (*Cedrus atlantica*) in Scotland, and permanently amputating the westernmost section of this drive which, though abandoned, is still lined with layering Western Red Cedar (*Thuja plicata*).

What is left, though, still ranks as one of the finest designed landscapes in Scotland, and one of the most important assemblages of trees in the country. Murthly has been famous for its trees ever since Birnam Wood marched to Dunsinane, but it is perhaps only in the last 150 years that is has attracted the regular attention of foresters and dendrologists. The landscape we all flock to see at every opportunity has evolved in its current form since the mid-18th century, but we can trace its history back further, to the period c. 1583-1614, when Pont's map clearly showed a defensive building and a significant assemblage of trees.

The Castle's history, unsurprisingly, is better documented than that of its landscape. We know that the oldest parts still extant date to the 15th century, but these replaced an even earlier structure, a 12th century royal hunting lodge build by David I when the surrounding area would have been dominated by a forest modified and managed for the purpose. Besides a conspicuous preponderance of trees, Pont's maps offer no clue as to the nature of the planting in the late 16th and early 17th centuries. The first such clue is offered by General Roy, whose military maps of 1747-1752 show an intricate network of avenues dissecting a very large area in north-south and east-west orientations (see p2 above). The southernmost of these approximates to the position of the east drive as seen today, and the oldest Limes (*Tilia* sp.) on this drive could, conceivably, be approaching 300 years of age, but there is no proof, and many of the original stems have died out leaving a ring of layered trees. Roy's maps also show plantations to the south, which at that time may have included newly introduced species such as European Silver Fir (*Abies alba*), Norway Spruce (*Picea abies*) and Larch (*Larix decidua*).

The east drive lined by an avenue of veteran limes (©Tom Christian)



Plan of the Grounds of Murthly, 1825, courtesy of Murthly Estate.

The next cartographic evidence for landscape development lies not in the public domain, but in the Castle archives, where a book of maps drawn up in the early 19th century covers the full extent of the family estates at that time. The sheet that covers the area around the Castle is dated 1825, and this offers a precious snapshot of a pastoral landscape just before it was altered, almost beyond recognition, from 1828-1838 when

Sir John Steuart commissioned John Wallace to lay out the dramatic winding terraces and formal avenues all still in evidence today. The magnitude of the change can be judged by comparing the 1825 map, with its well-spaced parkland trees and policy woods in a style akin to that of Capability Brown, with the first edition Ordnance Survey map (1864) showing a strongly geometric network of avenues, winding terraces, and formal plantings superimposed on the knoll atop which the Castle sits.

Another important development at this time was the construction of the 'new' Castle, which Sir John commissioned as his entry in a so-called 'Palace Race' which pit three Perthshire landowners against one another in an attempt to build the grandest house. The Breadalbanes were the only family to see this bizarre challenge through to completion, building Taymouth Castle near Kenmore. The new Castle at Murthly was completed structurally, but never furnished nor occupied, and it was finally demolished in the late 1940s. A magnificent double avenue, intended to frame it, was planted early on, of Lime (*Tilia* x *europaea*) interplanted with Yew (*Taxus baccata*). This is a most effective combination, especially in autumn when the limes turn butter yellow, but the yews remain as sombre as ever.

One half of the 'double avenue' of yews and limes planted in the early 19th century to frame the new castle (©Tom Christian)

In 1838 Murthly changed hands when Sir John's brother, Sir William, inherited. Sir William had spent many years in North America, including on the western frontier, and his return to Murthly coincided with the first plantings of David Douglas' discoveries from the Pacific Northwest that now dominate so many designed landscapes – and commercial forests - in Scotland. The winding and step terraces were planted up with a huge number of Douglas Firs (*Pseudotsuga menziesii*)

following Sir William's return, an astonishing number of these remain in situ and have caused several people to suggest that this is the finest, certainly the most picturesque, stand of Douglas Firs in cultivation anywhere in the world outside their native range.

Douglas firs planted during the 1830s (© T Christian)

As the interest in botanical exploration grew through the 19th century, many new trees, especially conifers, were added to the policies at Murthly. During the 1850s the Oregon Association – a collective of principally Scottish landowners and nurserymen – commissioned John Jeffrey to recollect many of Douglas' earlier discoveries which were still highly sought after, but now in short supply. Among Jeffrey's comparably meagre consignments were several gems, including the Mountain Hemlock (*Tsuga mertensiana*). Although this is a beautiful tree it was found to be somewhat sensitive and difficult to please, and there are very few places where it really excels, but Murthly is home to the finest individual examples of this species in Britain, all raised from Jeffrey's seed and planted c.1864. It was at about this time that the aforementioned Atlas Cedars on the west drive were planted, and for many years some of the largest examples that may be seen in Scotland have been trees in this avenue. Sadly, it is now suffering from *Sirococcus* blight, and several have already died.

1897 saw the next significant change, when the north-east quadrant of the river terrace was planted to celebrate Queen Victoria's diamond jubilee. (As a family of avid tree-collectors, this was likely seen as a convenient excuse to create some much-needed new planting room). The main feature of this expansion was a new avenue of Noble Fir (*Abies procera*) planted along the same axis as the step terrace. Several rarer, new introductions were planted on the so-called Jubilee Terrace, including Serbian Spruce (*Picea omorika*), Sakhalin Spruce (*P. glehnii*), and Sakhalin Fir (*Abies sachalinensis*). The Noble Fir avenue had to be felled due to disease in the 1950s, but of the other species, some of the finest specimens of Serbian and Sakhalin Spruces that may be seen anywhere still grow here from the 1897 plantings.

The avenue was replanted with Beech (*Fagus sylvatica*) in 1977, to coincide with another Jubilee, and several other plantings were made at about this time and through the 1980s, including many more Beech along the riverbank and east drive, an avenue of grand fir along the 'new' west drive (necessitated by the A9 construction) and a new oak avenue and new parkland trees, too.

Some of the most important plantings to have taken place at Murthly in well over a century, though, have been made since 2009. It was at this time that the estate began to collaborate with the Royal Botanic Garden Edinburgh's International Conifer Conservation Programme (ICCP), which raises threatened conifers from wild-collected seed and plants them in a dedicated network of 'safe-sites'. Murthly is an ideal example of such a site, it has a long history of tree planting and enjoys continuity of management, and in situations such as this there is a dual benefit: rare trees are given appropriate homes where they can be conserved as part of a global *ex-situ* conservation programme; and the trees themselves make an important contribution to the conservation of the landscapes into which they are planted.

Serbian Spruce planted 1897 (©Tom Christian)

Since 2009 a large range of rare conifers has been planted, far too many to list, but including Alerce (*Fitzroya cupressoides*), Chilean Plum Yew (*Prumnopitys andina*), Chilean Cedar (*Austrocedrus chilensis*), Moroccan Fir (*Abies pinsapo* var. *marocana*), Japanese Umbrella Pine (*Sciadopitys verticillata*), and Cilician Fir (*Abies cilicica*). This partnership has also offered the opportunity to plant the next generation of species that are inextricably associated with Murthly, including Serbian Spruce and Mountain Hemlock. This sort of successional planting is essential if landscapes such as this are to be sustained, and their potential role in plant conservation is an important new element.

For further information about the International Conifer Conservation Programme see:
https://www.rbge.org.uk/science-and-conservation/genetics-and-conservation/conifer-conservation/

Walk around the Murthly Policies

Noel Fojut

The Conference concluded with a fascinating walk through parts of the Murthly policies, guided by our host, Thomas Steuart Fothringham, and accompanied by Tom Christian, who worked on the ICCP. Key surviving features of different periods of the designed landscape were visited, as were many of the magnificent individual trees and groupings mentioned in the papers of this volume. Participants enjoyed the opportunity to hear at first-hand about the ongoing management of the policies, including the need to reappraise priorities in the context of available resources and practical experience. The national and international importance of Murthly's estate woodlands, as well as their continuing evolution, were emphasised particularly in on-site discussion of recent additions including the estate's Jubilee plantings and its new role as a home for the globally rare conifers of the ICCP.

Young trees, planted in well-chosen locations with adequate protection (©Tom Christian)