CCFG 25th anniversary event and Wales field meeting to Llwynywermod and Bryn Arau Duon 29th & 30th September 2016

By Owen Davies

To celebrate the 25th anniversary of the founding of the Continuous Cover Forestry Group, members gathered for a series of events in September 2016 in and around Llandovery, Carmarthenshire. Celebrations started on Thursday 29th with an informal visit to Llwynywermod Park in the afternoon, followed in the evening by the AGM and a dinner with two invited speakers, Philippe Morgan and Jurij Diaci. These events were combined with the Wales field meeting on Friday 30th which revisited Bryn Arau Duon, last visited by the CCFG in 2009.

Llwynywermod Park

Llwynywermod Park, near to the village of Myddfai, is owned by the Duchy of Cornwall. A small group of around twenty CCFG members was welcomed to Llwynywermod by the Duchy’s Charlie Craven, Estate Manager at Highgrove, Head Forester Geraint Richards, and Forester Ed Clark.

The Duchy of Cornwall was founded in 1337 to provide income for the male heir to the throne; the birth of Prince George has meant that there is no urgent need to change the terms to include female heirs! While other titles may be bestowed on recipients, the title of Duke of Cornwall is received automatically as soon as an individual becomes heir. His Royal Highness the present Prince of Wales is the longest serving Duke.

The Duchy owns some 140,000 acres (over 56,000 ha) of land, largely in the south west of England, including the Scilly Isles. Llwynywermod was purchased in 2007 to provide His Royal Highness with a residence in Wales. The Park extends to nearly 78 ha, including a couple of small woods. Our hosts admitted that we would not see a great deal of forestry, but would see something rather different to most CCFG visits, and assured us that His Royal Highness was happy to host us as he is passionate about continuous cover forestry.

On our way to the first of two woods we had the opportunity to see evidence of two other passions – horticulture and historic apple varieties – in a walled garden.

Photo 1 (right): The walled garden
In the aptly named Oak Wood, a decision had been taken to manage the stands as high forest rather than reinstating coppice management. Thinning has been carried out every year for the last five years, with horse logging and secondary extraction by forwarder. Previously, sheep had access to the wood; now there is dense bramble. There are no deer, but there are grey squirrels.

Parts of the wood have been underplanted with hazel and sycamore as a first step towards diversifying the species composition. When asked whether he would consider introducing better genetic material, Geraint suggested that the oaks were neglected rather than maladapted. There was some discussion on increment and the ability of oak to respond after prolonged competition.

Geraint explained that this wood illustrated some common challenges faced by his team. Previously the Duchy woodlands team was only responsible for the main blocks of woodland; now they are also responsible for much smaller areas including farm woods and shelter belts.

Moving to CCF can be difficult in ageing stands, and there are issues with understorey competition on fertile sites. Potential solutions discussed included localised mulching of competing vegetation off racks or adopting a uniform shelterwood approach.

Walking to the next site, we had the opportunity to appreciate the wider landscape setting, including adjoining woods managed by Natural Resources Wales, some recently established woodland, and parkland plantings with impressive guards made of chestnut.
The second wood we visited was Penhill Wood. This was a very wet site. Originally composed of Norway spruce and grand fir, the wood had suffered windthrow and the conifers had been removed to leave broadleaves including ash, oak and birch. The site was also planted with species including ash, oak and sweet chestnut. The result was essentially a small group selection system.

The decisions about species composition were made before the threat of Chalara became evident. Ash regeneration on the site is now heavily infected. There was discussion of the relative roles of ash genetics, site conditions and treatment as determinants of Chalara susceptibility; it was noted that infected ash tends to die more quickly on wet sites as it succumbs to Armillaria. The attitudes of the Duchy team to birch have changed completely, and it is now seen as having a real role; one CCFG member observed that birch can usefully occupy the mid canopy while one waits for something more interesting to take its place!

This was certainly an unusual and interesting site visit. After admiring the cottage gardens and timber clad estate buildings, we expressed our heartfelt thanks to Geraint and his colleagues.

**AGM and after dinner talks**

After the informal visit to Llwynywermod, formal business began with the AGM, held at the Castle Hotel in Llandovery. Full minutes of the AGM may be found on the CCFG website at www.ccfg.org.uk/membersarea/committee/committee2.html. The AGM was followed by an excellent meal, enjoyed by nearly thirty members. Suitably fed and relaxed, we were then privileged to listen to the presentations of our two invited speakers, Philippe Morgan and Jurij Diaci.

Phil Morgan will be familiar to many CCFG members. A forest manager based in Wales, he was present at the inaugural CCFG meeting and is a past chairman. He is currently president of Pro Silva, vice-president of the Association Futaie Irrégulière (AFI), and a member of the Wales Woodland Trust committee. Phil’s presentation is available for download from the CCFG website at www.ccfg.org.uk/events/downloads/2016/Phil_Morgan_CCFG_25th.pdf. He structured his talk around Gartner’s ‘hype cycle’, illustrating the changing perceptions of continuous cover forestry since the inception of the CCFG and into the future. The cycle began with a trigger, which Phil associated with the rise of organisations like CCFG and Pro Silva. This led swiftly to a ‘peak of inflated expectations’: the CCFG was not intended to be permanent, but was expected to establish a new culture of woodland management; the first version of the Welsh Government’s forestry strategy *Woodlands for Wales* included an ambitious target for 50 % of the public forest estate to be managed under continuous cover; and there was a flurry of research activity by the likes of Forest Research and the Tyfiant Coed project, and the establishment of Marteloscope plots.
Jurij Diaci is Professor of Silviculture at the University of Ljubljana, Slovenia. He is a member of Pro Silva Slovenia, and part of the board of a charity that manages a 560 ha Pro Silva demonstration forest. Jurij’s presentation is also available for download from the CCFG website at www.ccfg.org.uk/events/downloads/2016/Diaci_CCFG.pdf, and is worth exploring in full. He approached his subject of current and future challenges for CCF from the perspective of close-to-nature forestry (CTNF) as practised in Central Europe. He presented some principles of CTNF (such as the use of site adapted tree species, the maintenance of soil fertility, and reliance on natural processes), and asked whether there was a sound scientific basis or overarching theoretical framework for these principles.

CTNF in Central Europe sees the classical application of silvicultural systems such as group and single tree selection and irregular shelterwood, but also concepts such as ‘free-style silviculture’ (in which the likes of Engler and Mlinšek have advocated the adaptation of silvicultural tools to management goals), and potential natural vegetation. It is not without its problems, in terms of linking silviculture and forest ecology, the detrimental impacts of mechanical harvesting on soils, expenditure exceeding revenue, and urban populations losing interest in forests.

Jurij considered the future challenges of CTNF in terms of the combined effects of environmental change (including climate change, pollution, and invasive species) and non-management or non-adapted management. He singled out some specific challenges, such as the low tree species diversity in Europe due to ice age extinctions, and the fact that in Slovenia experimentation with exotic species is not permitted, so it is important for them to learn from experience in Britain and Ireland. He also noted the difficulties of competing with ‘fast food forestry’, the fact that economists seldom look beyond a twenty year time frame, and the need to take into account other functions of forests beside timber production, the importance of which is evident when we bring the public into the forest.
Jurij stressed the need to reconnect science and practice, noting the irony in the fact that Slovenia banned clearfelling in the same year (1949) that Finland banned selection forestry. In achieving this reconnection, it is necessary to understand that researchers and practitioners may be striving for different balances between functional realism, generality of application and precision of expression.

In conclusion, Jurij reiterated the need for a cohesive theoretical framework, to reconnect science and practice, to consider forest ecology, and to diversify silvicultural tools in response to environmental change. Above all, he urged us all to continue to learn!

Both presentations raised some interesting topics for debate; due to time constraints, we were obliged to adjourn to the bar for questions and further discussion! Both speakers were thanked warmly by CCFG Chairman Bill Mason and were presented with tokens of our appreciation.

**Bryn Arau Duon**

The second day of the anniversary event saw some forty members attend the Wales field visit. Sadly Huw Denman not able to join Phil Morgan in hosting the visit; instead, Phil was assisted by Andy Poore, who provided insights from Stourhead for comparison.

Bryn Arau Duon was bought in 1998 by Ilchester Estates. It was originally four separate properties, afforested from the 1960s to the 1980s. The property now extends to 702 ha, including some leased land, of which around 600 ha are productive. It was bought as a capital investment, but was ultimately expected to produce income.

Management is driven primarily by financial objectives; the aim is to produce as much sawlog as possible, so it is necessary to thin, and the imperative to maintain the capital value means that clearfelling is undesirable. With a windthrow hazard class of 5, it was initially thought that clearfelling would be unavoidable but that coupe sizes could at least be reduced. However, much of the forest (suitably insured as a precaution) has remained stable after thinning; rather than just avoiding large clearfells, there are now lots of silvicultural options, and smaller coupes and better shelter mean that it is possible to move away from a dependence on Sitka spruce.
Despite the fact that Bryn Arau Duon stands at around 400 m in the Cambrian Mountains, only 12-13% of the area is on peat soils where it is necessary to manage as non-thin and clearfell.

Bryn Arau Duon is well roaded and has an extensive track network, thanks to grant aid; there is an average of 87 m of infrastructure per hectare.

At our first stop, Phil talked through the general approach to thinning and inventory. Changes in planting spacing between P60 and P79 stands have required different approaches to thinning. In the older stands, established at 1.8 m spacing, it was necessary to take out two rows in racks in delayed thinnings to allow machine access; high prices for posts, stakes and rails at the time helped the profitability of these operations. In these stands, selection may be possible in some places, but otherwise they will be managed through various scales of felling, generally keeping disturbances to the canopy to the smaller end – what Phil described as ‘constrained disturbance’. Management is linked to windthrow in a sort of reactive irregular shelterwood which mimics site type variations; a formal shelterwood is not being attempted because of the wind risk.

So that the approach to management can be readily explained to the owners, it has been rationalised into working circles, comprising biodiversity areas, a small proportion of clearfell areas, and areas managed as ‘continuous production’. On steeper ground, around 15% of the total area, these continuous production areas are managed as wedge shelterwoods.

After feedback from the last CCFG visit (in October 2009 – an account is available in issue 30 of the CCFG newsletter at www.ccfg.org.uk/membersarea/newsletter/downloads/CCFG_Newsletter_30/CCFG_Newsletter_30.pdf regarding the lack of natural regeneration, enrichment planting was carried out to increase species diversity and to get ahead of confidently predicted natural regeneration. Natural regeneration responds in different ways to different thinning, but does not drive thinning.

In some cases, the larger Sitka spruce are being removed to avoid developing oversize trees (over 70 cm butt); this observation led to the usual discussion of the timber properties and milling of large dimension timber – see the account of the previous CCFG visit! Otherwise, poorer quality trees are taken regardless of size. Thinning accounts for the vast majority of volume production in the forest.

To facilitate thinning control in irregular stands, the forest is inventoried with plots on a 200 m grid, with a total of 268 plots. These are permanent plots, marked with metal spikes, so that individual trees can be remeasured; this approach means that data can be gathered on removals without directly measuring removals. Andy noted that he uses the same method in England but focusses on specific well developed stands, then uses the information to guide the management of other stands.
Bryn Arau Duon is currently remeasured in one hit, which is expensive at the time but the cost per hectare or tonne is low. The inventory records stem quality, crown vigour, canopy class, natural regeneration and deadwood. Trees are measured by basal area factor, while pole size stems and natural regeneration are measured by fixed radius plots. Results are analysed using AFI software.

There was some discussion of wind risk assessments, given that the response to thinning in Bryn Arau Duon is not what might be expected at hazard class 5. Bill Mason noted that ForestGALES (recently updated) gave less rigid guidance on windthrow risk than the old Windthrow Hazard Class system. There was also a problem that the wind climate estimates for parts of upland Wales were rather pessimistic, resulting in an overestimate of the potential windthrow risk. This was a problem that had been previously noted in the NRW CCF trial area at Clocaenog. As for learning from Bryn Arau Duon and considering how far we might push the limits of thinning in the uplands, experience has shown that it is better to start in younger stands and on mineral soils with reasonable rooting depth.

Asked about his vision for the particular stand we were viewing, Phil said that he hoped to see cones of regeneration developing, and expected greater species diversity in ten years. Parts of the stand might start to look like a selection system, with the aim of harvesting trees at 45-55 cm dbh.

At the second stop Phil described his use of Graduated Density Thinning to create irregularity in the overstorey. Racks in early thinnings having been cut at 1 in 6 rows, Phil moved to cutting 1 in 8 so that there was less systematic removal and greater stability. Brash management is very important on a wet upland site. Systematic first and second thinnings lead to increased tree size and more brash; one rack eventually becomes permanent, while the other is abandoned. From the third thinning, there are issues with insufficient brash in some places and wetter areas are worked in the summer months. Phil was asked whether the lack of brash might lead to a longer thinning interval, with consequences for output and returns to the owners; he replied that in some cases it may be necessary to move towards a shelterwood rather than attempting to achieve a permanent irregular structure everywhere.

Phil was also asked about unwanted undergrowth. There is not too much competing vegetation, although there is some grass. The aim is not to have uniform natural regeneration, but rather patches, managing the overstorey to avoid overstocking and suppressing natural regeneration; natural regeneration will be controlled by the stand, rather than vice versa. The site is certified and there is a chemical reduction strategy, so herbicides are not used. Bramble is not an issue here; in the more fertile lowlands, mechanical intervention may work in place of herbicides. Low bramble can be useful – restricting browsing and grass growth – but limits the light available to natural regeneration if too high.

At lunch, in addition to our own supplies, we enjoyed the food and drink very generously provided by Phil and Catriona.
Our third stop was at a 2 ha area cleared in response to windthrow in 2014. Here enrichment planting has been carried out with Norway spruce, western red-cedar, Douglas-fir, and improved Sitka spruce, and with Scots pine at the edges of the coupe. These plantings are not necessarily expected to result in quality timber, but are intended to provide a seed source for the future. In such open conditions, the combination of natural and artificial regeneration will probably have to be respaced, something the managers try to avoid in closed stands by using the canopy to control regeneration. The pines are important for the local red squirrel population.

![Photo 8: Phil describing the enrichment planting in an area cleared in response to windthrow.](image)

Phil was asked by John Weir from Forestry Commission England whether he had considered planting western hemlock. At Stourhead it can be useful, for example for bramble control; at Bryn Arau Duon it could be useful, but is not considered essential. John mentioned that the role of western hemlock is being rethought based on economics – fencing mills will now take hemlock so there is no longer a price penalty – and natural regeneration of Douglas-fir and western hemlock in monocultures is leading FC England staff to think that CCF is achievable.

For the fourth and final stop, we visited a stand of P78 Sitka spruce growing at yield class 18. This had been low thinned by the previous owners; the removal of only small trees had done nothing to improve the quality of the stand. Phil had originally considered an early clearfell, but the stand has since been thinned three times and underplanted with western red-cedar in gaps. Unlike natural regeneration, it is important for trees to be in the right place if you are paying for them. It is relatively complicated to get grant aid for underplanting because it is less easy to regulate on an area basis than restocking.
The western red-cedar were flat planted with no ground preparation. Deer numbers are currently low, with only one seen in the forest so far, although there are sheep. Deer will increase, however, and will have to be controlled if the desired species mix is to be maintained. Fencing is not a realistic prospect; the entire forest would have to be fenced, as regeneration is not localised. A stalker would have to be found with the right sensitivity to this sort of woodland, someone who would put the needs of the forest ahead of sport.

Asked about the optimal structure of the stand, Phil explained that he has overall objectives for where the stand should be after intervention in terms of basal area and the distribution of basal area between trees in small, medium and large size categories. Having to have a relatively low dbh limit due to markets does impose some limitations and also increases harvesting costs. Harvesting in the future may be complicated in terms of assortments from different cohorts, but the economics will be improved by including larger trees; Phil and Andy hope to learn more from harvesting work studies carried out at Stourhead.

Finally, conversation turned once again to the issue of ‘oversized’ trees. The stand is close to maximum mean annual increment, and there will inevitably be oversized trees in 10-20 years. Some of these large trees will form part of the permanent structure of forest. Where they are felled, it may only be necessary to sacrifice the butt length, or it might be possible to explore export markets for the larger dimension timber. Or of course it may be possible to make group fellings of larger trees before they become oversized.

It was a real pleasure to return to Bryn Arau Duon, and to see how the management has developed in response to the particular challenges of the uplands. While the same approach may not be possible everywhere, it is heartening to see what is possible with willing owners and committed managers, and it is particularly important to note that the motivation for avoiding clearfelling at Bryn Arau Duon is not ideological but economic. We thanked Phil for a fascinating and enjoyable day in his company.

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Photographs courtesy of Owen Davies