Society of Irish Foresters Study Tour to Austria

11th–15th October 2016

On Tuesday, 11th October, forty-four members of the Society of Irish Foresters departed Dublin Airport to begin our 73rd annual study tour to Austria. It was the Society's first study tour to Austria.

Austria, a federal republic, is a landlocked country with a population of just over 8.7 million inhabitants. It is bordered by the Czech Republic and Germany to the north, Hungary and Slovakia to the east, Slovenia and Italy to the south, and Switzerland and Liechtenstein to the west. Austria has an area of 83,879 km^2; the island of Ireland is slightly larger at 84,421 km^2. Austria's terrain is extremely mountainous; only 32% of the country is below 500 m, and its highest point (Grossglockner) has an elevation of 3,798 m.

Almost half of Austria's land area is forested. Private forest owners, with less than 200 ha, make up 49% of the total forest area and private landowners with more than 200 ha make up 21%. Only 16% of the forests are owned by the state. The remaining forests are owned by community groups and the church. Interestingly, many Austrian monks are trained foresters.

Austria's forests are 75% coniferous. Norway spruce is undoubtedly the most important species comprising just over 60% of the forest area. Scots pine is next at 7%. The main broadleaved species is beech which comprises almost 10% of the forest area, followed by oak at 2%.

Our tour leader was Michael Bubna-Litic, Managing Director of PAN Forst who compiled an interesting and varied programme for our tour. A knowledgeable and entertaining guide, he was ever willing to share his deep knowledge of forestry in Austria – and not just forestry; he took great pride in educating us on all aspects of Austrian life, from architecture to wine growing. On the final day of the tour, he and his family entertained us lavishly at their estate for which we are most grateful. We were based in the town of Krems an der Donau, approximately 70 km west of Vienna, for the duration of the tour.

Overnight – Hotel Unter den Linden

Pat O'Sullivan

Day two: Wednesday, 12th October

On the first morning of the tour we travelled south from Krems, climbing gradually through scenic, forested valleys to the village of Nasswald (Figure 1). There we met our host for the day, Werner Fleck, who is in charge of forest management planning in the district, and Peter Lepkowicz, head of the District Forest Management Unit. One of five forest districts in Lower Austria, Nasswald covers an area of 44,000 ha comprising 33,000 ha of "water protection" forests, 8,500 ha of urban forests, and 2,500 ha of agricultural land.

The district's primary management objective is to protect the pristine spring waters which supply drinking water to the city of Vienna, 100 km to the north east. During the 19th century, the Austrian government purchased large tracts of land to secure the forests in the "water protection" zone. Nasswald's forest management regime is adapted to protect the quality of Vienna's drinking water. For example, in order to prevent sedimentation and erosion, clearfelling is not allowed; thinning is permitted but heavy extraction machinery cannot be used and extraction is mainly by skyline. The use of chemicals is totally forbidden. Up until the late 1950s, large scale clearfelling followed by replanting with pure spruce was the norm. However, these plantations are now being transformed into mixed species forests. Bark beetle is not a major problem in this area but where outbreaks did occur, the affected trees were debarked either manually or by machine. This district has a staff of four foresters, six hunters and 35 industrial workers who are mostly contractors.

Annual timber production in the Nasswald district is 19,000 m^3; 10% of the

Figure 1: *The forested mountains of Nasswald supply pristine spring water to Vienna's 1.8 million inhabitants.*

extraction is whole tree harvesting and 90% of assortments are made in the forest in order to leave the biomass on site. The district's revenue is derived from timber sales and an annual payment from the city of Vienna for protecting its drinking water supply. Residents in Vienna (1.8 million) pay €2 per m^3 for water. The underlying geology of the district is karst limestone. The main species of wildlife found in the forests are deer (red and roe) and chamois. There are also very small numbers of bears, lynx and wolves. Later we were shown some vintage forest machinery, including a Timberjack skidder which is no longer used for timber extraction as it caused too much soil damage. It is now used to anchor a cable extraction unit!

Our next stop was at a fish farm which is owned by the district. It produces 2,000 kg of fish annually and also supplies young fish for restocking streams. Close to the farm is a small abattoir which processes about 30% of the animals that are culled each year. It is planned to franchise this enterprise next year as direct labour costs are too high. Before lunch, we visited a small forest museum which had an interesting display of tools, clothing and photographs of forest operations from the 18th and 19th centuries. The museum featured a scale model of an ingenious system of transporting logs by water which foresters in the 19th century had devised, as the steep valleys were poorly roaded at the time. This was to meet the burgeoning demand for timber to satisfy the smelting industry and the huge firewood market in Vienna. These resourceful foresters had even bored a tunnel through a mountain in order to transport the timber from an inaccessible but heavily forested valley beyond.

After lunch, we travelled to the nearby Kaisebrunn Water Museum where we were introduced to Hans Tobler, general manager of the Kaiserbrunn waterworks (Figure 2). He showed a film on the history of supplying drinking water to Vienna from these alpine valleys. The original 102 km-long tunnel was completed in 1873 after four years of construction. As the city of Vienna expanded, a second, 194 km-long tunnel was built between 1900 and 1910. There are also some spring groundwater systems within 30 km of the city which are its third source of supply. No water filtration is needed in the Kaiserbrunn area because of the high quality and purity of the springs. Here, the water quality is constantly monitored and if a particular spring drops slightly below the quality threshold, the water from that spring is temporarily discharged into a local stream. The drinking water supplied to Vienna is stored in 30 reservoirs around the city which have a combined storage capacity of 1.8 million m^3. Hans Tobler explained that water is also pumped up to the high-altitude skiing lodges and that the sewage from those lodges is pumped 2 km downhill to treatment plants in order to ensure the purity of the spring waters. After a very long and interesting first day, we then travelled back to our hotel in Krems.

Overnight – Hotel Unter den Linden

Eugene Griffin

Figure 2: *The water quality monitoring station at Kaiserbrunn, Nasswald. The water collected from the mountain springs in this area is so pure that no filtration is required before it flows through 100 km of tunnels to the Austrian capital, Vienna.*

Day three: Thursday, 13th October

On Thursday morning, we headed north towards the town of Rastenfeld, accompanied by Michael Bubna-Litic, our leader for the remainder of the tour. On the journey to Rastenfeld we passed through prosperous farmland and fine vineyards. This is the main wine producing area of Austria and it is particularly well regarded for its white wines.

In this part of Lower Austria the impact of a warming climate is becoming noticeable and is beginning to impact on the forests. Annual rainfall has dropped to 400 mm and mean temperatures have increased by 3 ^{o}C over the past few years. These changes have already had an adverse effect on the health of the region's pine and spruce forests.

In Lower Austria, the forests are 16% state owned, 50% farmer owned and the remaining 34% is owned by a mix of large private estates, investors, forestry companies etc. The average forest size is 5.7 ha. The main species is Norway spruce (60%) while pine, birch, oak, and other minor species comprise the remaining 40%. The area's pine forests are starting to suffer badly from the effects of a drier climate and Douglas fir is being assessed as a replacement species for pine. Norway spruce is also under pressure from the spruce bark beetle as it is pre-disposed to attack by the

debilitating impact of climate change. The average yield class of spruce is 10 $m^3 ha^{-1} yr^{-1}$, while the average yield class of pine is 6 $m^3 ha^{-1} yr^{-1}$.

Our first stop of the day was at a biomass power plant on the outskirts of the town of Rastenfeld. The complex comprises a sawmill and a wood pellet production plant with a combined heat and power (CHP) plant which is operated by Nawaro-Energie GmbH. The combined heat and power plant was the focus of our visit. Our host was Gunther Eggenberger and we also met with Hans Scherzen and Wilhelm Berger, who acted as guides and interpreters for our tour of the facility. The Nawaro-Energie CHP plant supplies power and steam to both the sawmill and the wood pellet mill and sells any excess power to the national grid. The plant has two 5 MW generators and an additional 2 MW energy equivalent is extracted as steam from the pellet plant and sawmill.

The chips for the mill are generally sourced within a 70-km radius of the plant, but when supply becomes scarce, chips can be imported from as far away as western Romania. There are four quality grades for chips; the top grade is chips from round-wood and the lowest grade of chips comes from branches and bark. Each grade has a different calorific value and ash content so they are mixed thoroughly in the yard before being fed into the furnace. As each truck enters the yard (Figure 3), its load is sampled at the weighbridge. The sample is dried and a dry tonne conversion and quality grade is then calculated for the load. On average, the mill pays €18 - €20 per m^3 of product delivered. The average moisture content of the delivered material is 37%. However, this ranges from 40% in the winter to 26% in the summer. The plant uses approximately 700 dry tonnes of material per week.

After a fine lunch at the Ottenstein Hotel near Rastenfeld, we headed further up into the hills to visit an IUFRO thinning experiment near the village of Döllersheim. This was the village where Adolf Hitler's paternal grandmother lived. However, after the 1938 annexation of Austria, Hitler ordered the evacuation and destruction of Döllersheim and surrounding villages to make way for a large Wehrmacht training camp.

Our next stop was at the IUFRO European Stem Number Experiment in Norway spruce (Figure 4). Our host was Thomas Ledermann from the Austrian Research and Training Centre at the Department of Forest Growth and Silviculture (BFW). The forest is privately owned but it is managed by BFW. This stop was particularly interesting for our Chairman, Dr. Gerhardt Gallagher, who was a member of the original IUFRO Working Party that established the research programme across 14 European countries in 1967. The trees on this site were planted in 1959 using three-year-old plants. The spacing was 1.3 m to 1.4 m resulting in 5,200 to 6,000 plants ha^{-1} after planting. Due to varying growth rates across the 14 European countries selected, top height was used to determine the time of thinnings. Accordingly, stocking was reduced to 2,500

Figure 3: *A truck load of steaming chips arrives at the Rastenfeld biomass power plant which is operated by Nawaro-Energie GmbH. As loads will vary in calorific value and ash content, the chips are mixed thoroughly in the yard before being fed into the furnace.*

stems ha^{-1} at a top height of 5 m. The longevity of the experiment led to discussion on the appropriateness of the old yield tables given the many changes in treatments since 1967 – a period of almost 50 years. In addition, there is the possibility of a vegetative impact on Norway spruce due to an increase in the length of the growing season as a result of climate change. Despite its age, researchers at BFW continue to acquire valuable information from this experiment, for example on the impact of climate change on species selection. The second discussion centered on the value of long term research and also the protection and storage of experimental results. This is a debate which is occurring in Austria and it is also one of great relevance in Irish forestry.

Our final stop was at a nursery - Landesforstgarten Ottenstein. Our host was Heinrich Anibas. The nursery area is 25 ha in extent and produces 1.25 million plants per annum; 50% of the plants are bare rooted and the remainder are potted. The nursery also produces semi standards (2 m tall) and standards for markets such as parks and motorway landscaping.

Overnight – Hotel Unter den Linden
Pacelli Breathnach

Figure 4: *Gerhardt Gallagher and Thomas Ledermann, research forester with the Austrian Research Centre for Forests (BFW) in the IUFRO thinning trial near Döllersheim. Dr. Gallagher was a member of the original IUFRO Working Party that established this research programme in 14 countries across Europe in 1967.*

Day four: Friday, 14th October

The group headed 60 km southwest from Krems an der Donau, following the Danube to the Stora Enso sawmill at Ybbs an der Donau (Figure 5). The mill, located on a 25-ha site at the confluence of the rivers Ybbs and Danube, is one of more than twenty Stora Enso production units in Europe.

Although Stora-Enso was formed as recently as 1998 when the Finnish company Enso Oyj merged with Stora Kopparbergs Bergslags Aktiebola, the company has a long tradition in forestry and mining going back to 1288. It eventually sold its mining operations to concentrate on forestry, pulp and paper in the 1970s. Today, Stora-Enso employs 27,000 people in 35 countries and has annual sales of €10 billion. The Ybbs plant was established in 1983 by Holzindustrie Schweighofer and was acquired by Stora Enso Wood Products in 1999. The annual intake of logs at the Ybbs plant reached one million m^3 in 2015. While the forests of Austria have a diverse range of species, this sawmill, like most Irish processing mills, relies mainly on spruce. In Austria, Norway spruce provides 90% of Stora's log supply with pine species forming the remainder.

Figure 5: *Society members receive comprehensive safety instructions before being taken on a guided tour of the Stora Enso sawmill at Ybbs an der Donau. Accident-free for more than 500 days, the mill is justifiably proud of its safety record.*

The mill at Ybbs produces 562,000 m^3 of sawn material, or a sawn recovery rate of 57%, which is an excellent return bearing in mind that 51-53% is normal for UK and Irish mills. The bulk of sawn timber is sold for construction and joinery, along with 58,000 m^3 of fencing material and 50,000 m^3 going into the fast expanding cross laminated timber (CLT) market. The CLT unit at Ybbs was set up 2011. In addition to sawn material, fencing posts, and CLT, they also produce high quality joinery timber. To meet burgeoning demand, Stora Enso built a third joinery plant on the site in 2015.

CLT is an engineered wood building system comprising layers of boards glued together under pressure with the grain of the boards in one layer running perpendicular to the grain in adjoining layers. It has high strength and dimensional stability and can be used with, or as an alternative to, concrete, masonry and steel in many building types (Figure 6). Austrian architects, engineers and builders are leaders in CLT construction but other countries are also well advanced. Buildings up to 50 m high have been constructed using CLT in Norway and Canada.

In Austria and elsewhere in Europe, Norway spruce is the preferred timber for CLT, although NUI Galway is conducting research trials exploring the suitability of Sitka spruce for CLT. Our guide points out the advantages of building in CLT as wooden houses need less heating than a brick or concrete building. “CLT provides

nearly unlimited possibilities in architectural styles and construction," he said. "It has perfect compatibility with other building materials and can be used in exterior or interior walls, floors and roofs."

Stora places strong emphasis on renewable energy all the way through from design to construction. Most of the 43% mill residue is used as an energy source in its own mill and in products such as wood pellets which it also produces in the Ybbs plant. The Stora vision is: "Everything that's made with fossil-based material today can be made from a tree tomorrow." Replacing construction materials and fossil fuels with wood and wood products sounds like an extravagant boast. However, like the Austrian government and forestry stakeholders, Stora-Enso is committed to its corporate vision as Austria aims to become a totally green economy by 2050. With 41.6% of its land under forest cover, Austria is well positioned to maximise the use of wood in construction, design and energy.

The EU has set a goal of increasing the share of energy from renewable sources to 20% by 2020. While Ireland is unlikely to achieve 14% renewable energy, Austria had already reached 31% by 2010 and expects to achieve a level of 34% by 2020. In addition to hydropower, the most important renewable energy source in Austria is biomass, with a share of over 45% of the country's renewable energy programme.

Figure 6: *Demonstrating confidence in their product! Note the absence of any intermediate support structure on a CLT footbridge which spans a four-lane highway beside the Stora Enso sawmill at Ybbs an der Donau.*

In the afternoon, we drove north east for approximately 60 km to the forest and farm of our guide Michael Bubna-Litic and his family at Haitzendorf-Donaudoff. On the way, Michael spoke about the farmers and their interest in forestry, which is active throughout the forest cycle from planting to harvesting.

To describe Michael's approach to land and forest management as "biodiversity driven" tells only part of the story. "Our main objective, like past generations, is to secure the estate's forest stands for future generations," he said. "In achieving this goal, we have several departments including forestry, agriculture, viniculture, and nature protection as well as an engineering section to take care of harvesting and other work."

His estate (1,079,500 ha) employs a staff of seven and comprises the following land use categories:

- Forest - 943,365 ha
- Agriculture - 85,315 ha
- Vineyard - 7,502 ha
- Water area - 37,950 ha
- Other - 5,368 ha

The forest has 40 tree species comprising poplar (33%) – mainly hybrid, black and white – ash (13%), sessile oak (8%), beech (2%), maple (1%), robinia (2%), Scots pine (10%), larch (5%), Douglas fir (7%), Norway spruce (4%) and grand fir (3%), with 12% diverse conifers and broadleaves forming the remainder of the forest.

Michael Bubna-Litic, like Irish foresters, is also dealing with forest protection. For example, 15 years ago a beaver was marooned in a section of his forest, causing damage to 50 ha of woodland, mainly hybrid poplar. "Since beavers are a protected species, we had no choice but to accept the damage," he said. However, he believes that it is reasonable that his company "demands clear regulations, regarding the reduction of the beaver population".

His 122,600 ha of ash is also under threat from Chalara, ash dieback disease, caused by the fungus *Hymenoscyphus fraxineus*. As Irish foresters and forest owners search for a replacement for ash, Michael has a rich palette of broadleaves to select from. He is an enthusiast of black walnut because it produces a high quality, distinctive wood as well as edible walnuts which are cultivated for their desirable taste. Unfortunately, walnut is susceptible to canker disease which is causing a decline in walnut production in Austria. Income from game including deer (mainly roe but also fallow and sika) and wild boar provides a lucrative source of revenue for the estate.

He manages the forest in accordance with strict environmental, social and economic standards and is proud that this has been the case since the Bubna-Litic family acquired it through marriage in the early nineteenth century. These standards

are higher than those required by certification bodies. In fact, he harbours a robust suspicion of certification schemes in general. He views such schemes as merely "money making ventures" which cause him much additional and unnecessary expense while delivering few benefits. He resents having to pay an annual subscription to certification bodies for adhering to standards which have been part and parcel of the Bubna-Litic estate management policy for generations.

Overnight – Hotel Unter den Linden
Donal Magner

Day five: Saturday, 15th October

We headed for Vienna and completed a tour of the city with our bus driver as a guide. We then headed south to Vienna International Airport to begin our journey home to Dublin.

Tour Participants

Pacelli Breathnach, Daniel Burns, Hugh Cawley, Brian Clifford, Philip Comer, John Connelly, Robert Dagg, Padraig Dolan, Declan Egan, Niall Farrelly, P.J. Fitzpatrick, Jerry Fleming, Gerhardt Gallagher, Tony Gallinagh, John Galvin, Seán Galvin, Eugene Griffin, Marcus Hanbidge, George Hipwell, Mark Hogan, Kevin Kenny, Gordon Knaggs, Daragh Little, Donal Magner, John Mc Loughlin, Aiden Maguire, Jim McHugh, Eugene McKenna, Willie McKenna, Padraig McMahon, Paul McMahon, Gerry Murphy, Liam Murphy, Frank Nugent, Benny O'Brien, Michael O'Brien, P.J. O'Callaghan, Kieran O'Connell, Owen O'Neill, Pat O'Sullivan, Martin Regan, Barry Rintoul, Richard Romer, Trevor Wilson.