

# IRISH FORESTRY

JOURNAL OF THE SOCIETY OF IRISH FORESTERS

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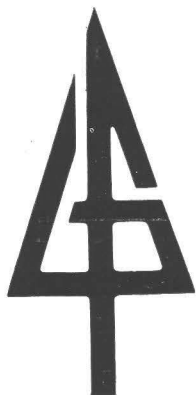
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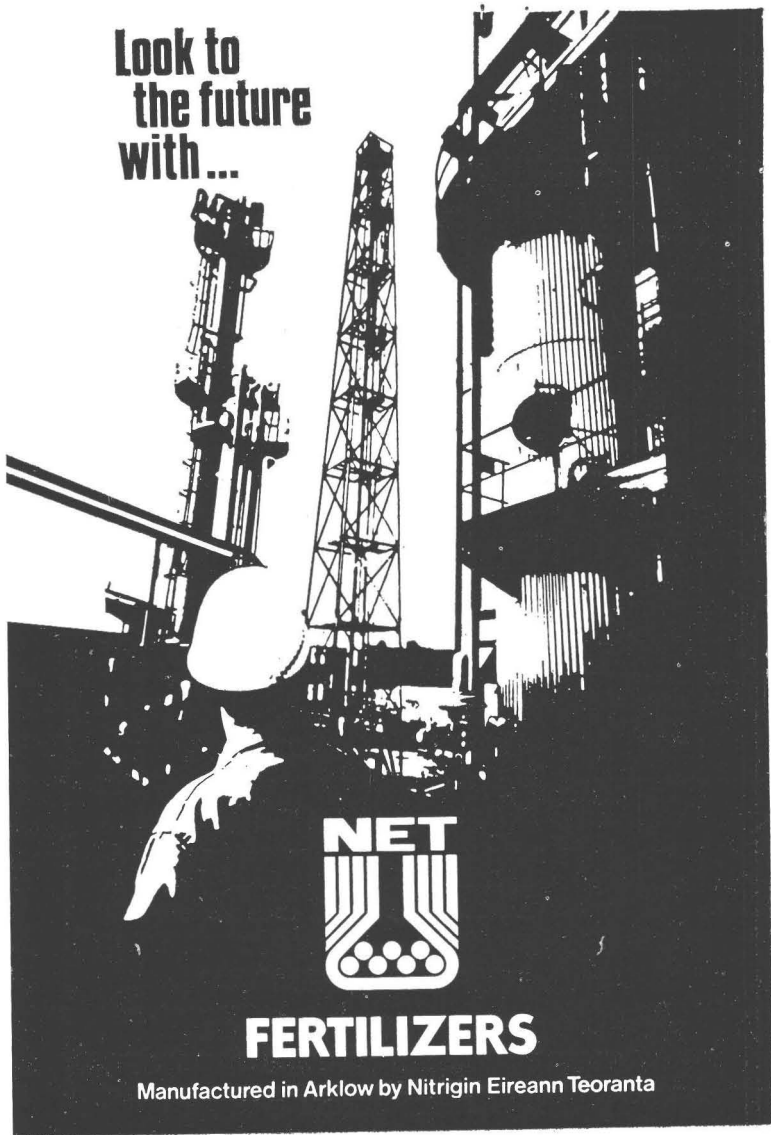
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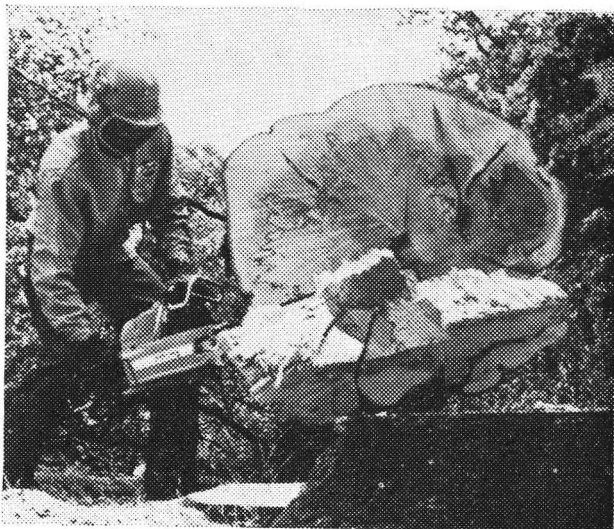
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*(Authors alone are responsible for views expressed)*

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# IRISH FORESTRY

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## EDITORIAL

### LANDSCAPE WITH PEASANTS

THE Scottish philosopher David Hume wrote in the 1730's:- "If we take in our hand any volume [of philosophy] let us ask: *Does it contain any abstract reasoning concerning quantity or number?* No. *Does it contain any experimental reasoning concerning matter of fact or existence?* No. Commit it then to the flames, for it can contain nothing but sophistry and illusion.

Two centuries later Professor A. J. Ayer put the same idea in different words when he wrote that a statement "is factually significant to any given person if, and only if, he knows how to verify the proposition which it purports to express — that is, if he knows what observations would lead him, under certain conditions, to accept it as being true or reject it as being false".

But what of either Hume's or Ayer's criteria is to be found in the modern accepted attitudes towards forestry and the landscape? A sagging boundary here; a promontory there; a thinning out of the edge somewhere else. A general blurring all round?

Apart from providing wood, what service does the forest afford to a member of the general public? The opportunity to indulge his fantasies. Just that. Whether he likes to imagine himself living in a primeval unpopulated past, or in Walden-like solitude, or a feudal nobleman with unseen vassals and peasants to do his bidding. Then, do we require all of our forests to provide this service as a matter of priority? After all, other spheres of human fantasy are confined to designated premises, where an appropriate fee may be payable.

On the other hand, from a purely aesthetic standpoint, it is possible to argue that beauty lies primarily in efficiency. Thus a forest which produces the maximum of wood will be beautiful, as a modern aeroplane undeniably is (at least to a deaf person). This equation of virtue with perfection of function goes at least as far back as Plato, while the current adoption of resemblance to nature as the criterion of beauty arose probably with the nineteenth century Romantics, a decadent influence as evidenced in the statement of one of its archetypal characters, Villiers de l'Isle Adam's Axel: "As for living? our servants will do that for us".



# Forestry Journey to New Zealand<sup>1</sup>

T. CLEAR<sup>2</sup>

OVER the years I have followed forestry developments in New Zealand particularly in regard to softwood afforestation. I had many discussions about New Zealand with Professor Denis Richardson when he was at Bangor. He argued that what was happening in New Zealand was important for Ireland and that Irish forestry would be affected by events occurring at the other side of the world. He also argued that the future will see an increasing replacement of currently used industrial timbers by synthetic materials, by timbers from developing countries and by produce from man-made forests growing on short rotations in regions or countries climatically better suited to plantation type forestry than most European countries. New Zealand had led the way in this regard and he convinced me that the experience of both State and private forest enterprise in New Zealand, where the management and approach was highly professional, would be worth examining and should have relevance to production forestry here.

In the early part of 1975 I had the opportunity to go to Australia, New Zealand and Malaysia on a 10-week study tour in connection with our Faculty curriculum development project. Each of these countries had something special to offer in the field of new developments in third level forestry education. The tour to Australia was financed by a generous grant from the Kellogg Foundation. A supplementary grant from the Forest and Wildlife Service enabled me to extend my trip and to have a special look at forestry and forest enterprises in New Zealand. It is, mainly, with this aspect of my tour that I propose to deal in this paper.

First Australia. I had an excellent opportunity to look at forestry and forest enterprises in Australia especially in Victoria. I will start with a brief account from there.

It is important to recognise that Australia is a very big country — 76 million hectares in size. "A giant desert fringed with Eucalypts and Australians".

There are however, high rainfall coastal belts with large areas of

1. Paper presented at the Thirty-fourth Annual General Meeting, Dublin, 13th March 1976.
2. Professor of Forestry, University College, Dublin.

forest land suitable for high yielding economic timber production and this resource will be of increasing significance in the future. The indigenous forest, mainly eucalypt, which comprises 99% of the total forest area produces about 10 million cubic metres of commercial wood annually. Exotic conifer plantations, mainly pine, which at 500,000 ha, account for 1% of the total productive forest area, produces 20% of the current total removals.

Plantation forestry is of increasing importance to Australia in general and Victoria in particular. Australia imports large amounts of conifer wood, perhaps 25% of its timber needs, in the form of sawnwood and woodpulp mainly from New Zealand and U.S.A. Federal policy in Australia encourages self-sufficiency in softwood timber production and to this end Canberra gives financial support to the State Forestry Services for their conifer planting programmes. These pine plantations are concentrated in the high rainfall regions particularly in New South Wales and Victoria, on selected accessible sites, on abandoned farmland and increasingly on cleared eucalypt forest. The agreed national area to be planted annually is 30,000 ha, and the target is  $1\frac{1}{4}$  million ha, by the year 2000. This large scale afforestation with *Pinus radiata* has been influenced by the success of plantation forestry in New Zealand and by the growing demand for industrial wood at home and in S. East Asia in general. The impact of this expanding exotic forest on the landscape is quite considerable and its critics are quite vocal. Foresters are increasingly exercised to ensure that landscape values, wildlife values and native vegetation reserves are preserved. Australia is one of the most highly urbanised societies in the developed world and issues such as the effects of forestry activities on scenery, wildlife, water-catchments and recreation can readily arouse controversy. The Australian Forestry Council, a Federal Body established in 1964, which seeks to co-ordinate forest policy and especially the exotic conifer production policy through grants and agreed programmes and the State Forestry Services are putting a great effort into public relations supported by excellent research and development work in the field of general conservation and recreation. There are well financed and staffed research programmes in hydrology and wildlife in each State. I was able to study these developments at first hand in the State of Victoria.

## FORESTRY IN VICTORIA

An extensive tour of Victoria was arranged by the head of the Research and Educational Division of the Forests Commission, Mr. John Jack. The tour covered aspects of harvesting and milling

of eucalypts, silviculture of indigenous forests and exotics, and forest based industrial development in the important timber areas of the State notably the eastern and north eastern regions. A tour to western Victoria included Creswick Forest College, near Ballarat, and the Grampian State Forest, an area of 200,000 hectares managed mainly for recreation, conservation and possessing many sites of historical value and unique wildlife features.

Over  $\frac{1}{3}$  of Victorian land of 24 million ha is still under forest. Some 2.3 million ha is declared as reserved forest. A further 5 million ha is classified as production forest and is the responsibility of the Forests Commission. Forested and cleared free-hold land is being purchased and added to the reserved forest land at an increasing rate.

Victoria's forests are administered territorially through District Forest Offices, each under the control of a District Forester. Districts are grouped into territorial divisions headed by a Divisional Officer.

The eastern and north eastern regions of Victoria are the most important from a production forestry aspect. There are still sizable areas of magnificent high yielding virgin mountain ash forests that once covered large areas of the rain-rich highlands east of Melbourne. There are also large areas of natural fast growing eucalypt (mountain ash) forest regenerated after the 1939 fires which devastated  $1\frac{1}{2}$  million ha in Victoria. In addition to these highly productive ash forests there are vast areas of sub-alpine woodland, shading into alpine scrub, grassland and heathland, which are of major interest from a water conservation, winter sports and also, from the wildlife and scientific aspects.

One of the main silvicultural interests in Victoria is the handling of the highly productive young stands of mountain ash. There are numerous thinning and spacing experiments for the guidance of foresters. There is also a substantial reafforestation and regeneration programme of or for the eucalypt forest, associated with clear-felling operations, particularly in the foothills and middle reaches of the mountains.

The main item of interest for me was the radiata pine plantation forestry.

The radiata pine was introduced to Victoria around 1860, mainly for shelterbelt purposes. These earlier efforts gave little idea of the commercial potential of this tree. Earlier efforts at large scale afforestation with radiata pine were often of a trial nature on difficult sites and were not always successful. A major project was undertaken in the depression years 1928 to 1938, on abandoned farmland and in mining areas to relieve unemployment. Some

30,000 ha were planted, of which 5,000 was burned in the holocaust of 1939. Some of these plantations were highly successful and are currently being harvested. Since 1966 Victoria has participated in the Australian Forestry Council's softwood afforestation programme\* and had already by 1971 completed its part of the first 5-year plan of 20,000 ha. A new 5-year plan, involving a contribution from Victoria of 5,000 ha/an. was nearing completion at the time of my visit and I had the opportunity of seeing large scale pine plantations and site preparation for new pine afforestation.

Radiata pine grows remarkably well in areas like the Ovens Valley and the Forests Commission is concerned to ensure that mainly high yielding sites are planted and that adequate, suitably located land is developed of sufficient magnitude to attract large permanent forest industries. The planned plantations are expected to yield an annual 6 million cubic metres in the year 2010. They will, by then, become the main source of commercial timber in Victoria.

The increasing pressures on native forest in Victoria for uses other than timber production give emphasis and urgency to a softwood programme geared to the timber needs of the future. There is strong opposition to the further depletion of the indigenous forest and this has tended to focus critical public attention on the Softwood programme. Foresters have responded by increasing their interest and commitment in indigenous forestry and in general environmental affairs.

This issue of indigenous forest conservation is also coming to the forefront in New Zealand. Greater production of wood and higher returns on investment have been put forward as a basis for the substituting of some indigenous forest by exotic forest. More recently however the case is being made on the basis that the substitution of some indigenous forest by exotic forest and better silviculture, will relieve the threat to indigenous forests and thereby ensure their conservation. It is important that Society in general be well informed and convinced in this regard.

The process by which this substitution of eucalypt by pine is achieved can appear destructive and ugly to the uninitiated. Vast areas are denuded of indigenous vegetation by fire and clearing machinery. Young radiata are very sensitive to competition and the native eucalypt and acacias, if not eradicated, can depress production of pine markedly. In the absence of a market for the native material the trees ripped out and burned during site preparation continue to lie for years like white skeletons among the

\* See p. 93.

emerging exotic pines. A recently developed industrial outlet for this waste wood heralded a welcome change, but this promising development seemed only to provoke the anti-exotic lobby in Canberra all the more. In this connection I was intrigued to observe, during my week long stay on the Canberra Campus of the N.U.A., how much the landscapers there have relied on exotics for Campus planting. European trees and North American trees such as oaks, maples and poplars seemed to predominate.

Even in the early days of colonisation naturalists were conscious of the uniqueness of the flora and fauna of the country. Botanists and zoologists were to the forefront in exploring and documenting the attractions of the new continent. During the boom gold-mining years of the fifties of the last century and after, the magnificent eucalypt forest were heavily exploited and the feeling exists today that the 'exploiters' are still actively destroying, by bulldozer and fire, what was left after the major era of land-settlement when the prime foothill forests in Victoria were extensively destroyed by axe and fire to make way for sheep and wheat. The Forest Act requires that the Commission makes provision for public recreation and for the protection of native flora and fauna in State Forests. The Forest Recreation Branch and the Service generally are doing trojan work in this regard and I was able to see in the Stawell Forest District, which covers the Grampian Range, what the Commission is doing in the field of recreation and conservation. The Grampian State forests run to 150,000 ha only a fraction of which carries timber of commercial value. The main task is one of preserving this region as a water catchment area, of protecting its native flora and fauna which includes many ancient and rare species and which is world famous as an attraction to botanists and naturalists. In addition, the provision of recreational amenities, roads, trails, picnic and camping areas goes on apace in anticipation of the mass demand that it expected over the next decade.

## NEW ZEALAND

Up to the beginning of the present century the lowland indigenous forests of New Zealand were regarded as temporary occupants of land destined to be pasture. In the North Island most of the six million hectares of high quality grassland, the basis of New Zealand's famous dairying industry and the source of the country's well being, was carved out of the best areas of native forest. The process still goes on today. This policy dramatically changed New Zealand in the course of 100 years from a country rich in forest to a land of flocks and herds and naked rolling grasslands.

It comes as a surprise, therefore, to find that forestry in New Zealand ranks today as one of the most important of the nation's primary industries. More important still, from our point of view, is to recognise that this is based, not on the further exploitation of rich native forest, but on the systematic harvesting of man-made exotic softwood plantations arising from afforestation programmes on waste land in the 1920's and 1930's.

The Eastern central area of the North Island, the Kaingoroa plains region, is one vast pine forest with great forest products industries and flourishing new towns and cities. This is a worthwhile place to visit for anyone wishing to see the fruits of plantation forestry.

Within a 40-mile radius of Rotorua, a region famous for its volcanic features and Maori culture, a great exotic forest of 300,000 ha, mainly *Pinus radiata*, blankets the countryside. At the beginning of the present century this was a vast desolate expanse of wasteland covered with *Leptospermum scoparium* and bracken, an area shunned by stock farmers because of a mysterious bush sickness (now known to be caused by cobalt deficiency). This region was relatively free of native forest due to repeated bush fires and partially because of repeated volcanic eruptions which had covered the region with layers of volcanic ash.

Around 1900 the Forestry Branch of the newly established New Zealand Department of Lands started to experiment with tree planting in this region. The first efforts were puny and were mainly concentrated on abandoned farmland using European trees such as European larch and Corsican pine. Later, American species were increasingly used. This early planting was often done by convict labour. Already by 1913 the potential of *radiata pine* for shelterbelt purposes was recognised by farming interests and some small farm woodlots were laid down using this fast growing exotic.

From these small beginnings has grown one of the world's most remarkable forestry enterprises. By 1974 the region was yielding 70 million m<sup>3</sup> of commercial timber and supporting a remarkable array of forest products and industrial complexes rivalling anything to be found elsewhere in the world. This region and these forest industries account for 10% of the country's industrial production and is marked by flourishing communities in new towns with strange sounding names, such as Murupara, Taupo, Whakatani and Kaweru. The inhabitants of these towns are mainly forestry workers or employed in forest based industries or are in service of contracting firms. The new town population is mainly of Maori or Cook Island stock and I understand that without this excellent work force it would be most unlikely that the progress achieved

would have been possible. The town of Tokoroa, for example, which in 1975 had a population approaching 25,000 would shortly receive city status, was not on the map 25 years previously. The inhabitants of this well laid out town are largely recent immigrants from the Cook Islands, a New Zealand dependancy. The houses are built by, and on land owned by New Zealand Forest Products and their living is earned in the Company's vast Kinleith Plant nearby, and in the Company's extensive plantations which surround the town.

### THE FOREST PRODUCTS COMPANY

A visit to this remarkable private industry, New Zealand Forest Products Ltd., was one of the highlights of my tour. I learned that this company arose as a result of a remarkable forest bond selling effort in the 1920's and 1930's. The success of this promotion was influenced at the time by the almost unlimited availability of unoccupied and unallocated land which could be acquired for 50p per acre, and by the large pool of rural and suburban unemployed available in the early years of the 'hungry' thirties.

Between 1924 and 1934 some 250,000 ha were planted by State and Company effort on the Kaingoroa plains. An annual rate of 20,000 ha was reached in the peak years of the early thirties.

Early professional commentators condemned this "mad-cap" scheme. From a technical, silvicultural and long term management point of view the whole scheme left a lot to be desired. In the early days it would appear that the fears expressed in the worst prognostications would be fulfilled. Little in the way of regular post-planting tending, beating and clearing was provided. Very alarming outbreaks of *Sirex* occurred in the early pole stage and later massive attacks of fungus blight threatened when the talisman of real success was nearest and most inviting. The worst never happened.

At Kinleith, personnel of the Forestry Division of this remarkable forestry enterprise demonstrated their novel working plan system with its impressive information storage and retrieval facility and the massive use of aerial photography and computerisation for field management with instant availability to all concerned of each and every stand and operation. The future too is taken care of by the Forest Simulation System, which monitors the resources and forecasts the future states and patterns of the forest under different user patters and provides options and information on the source and nature of the future cut. These forecasts, based on the new simulation techniques, are used by the Management Board to help in long term planning, industrial and silvicultural.



There is much in common between Company and State Forestry in this part of New Zealand. The whole development is profoundly influenced by the dynamic management at Kinleith and by the work of the New Zealand Forest Service Research Institute at Canberra. The Institute not only carries out research but organises symposia at which all the ideas and experiences from all the regions practising this type of forestry, mainly New Zealand, Australia, South Africa, Kenya and so on are presented and discussed. The published proceedings are remarkable and are a mine of information.

### Kaingaroa Forest

No visit to this region is complete without a visit to Kaingaroa State Forest. This is the largest exotic State Forest in New Zealand and I am sure is the most important piece of forest real estate that exists today from many points of view. In this forest one sees the whole panorama of plantation forestry from the earliest penal plantations of European larch and Corsican pine planted at 1.5 m by 1.5 m by convict labour in 1910, to the large areas of *Pinus ponderosa* of bad provenance laid down in the 1920's, to the vast even-aged flourishing forest of *radiata* arising from the planting boom of the 30's. The present Kaingaroa forest originated from the planting carried out between 1901 and 1936. The great bulk of the area was planted by casual workers during the decade 1924 to 1934. In common with the Kinleith plantations, established at the same time, little in the way of follow-up treatment was possible until after 1946. Because of this, yields both in quantity and quality are said to be below the full potential of the site and the species. Nevertheless the allowed cut, based on mean annual increment of 20 cubic metres per hectare in Kaingaroa was 2.7 million m<sup>3</sup> in 1973/74 from 120,000 ha of plantation.

The timber harvest went as follows:

To the local State Sawmill at Waipa	— 11%
To the partially State owned integrated pulp/paper/ sawmill complex at Kawerau	— 54%
To other combines and local sales	— 22%
To log exports (Japan)	— 13%

Since 1967 log exports to Japan and China have been a feature and large scale port developments have resulted from this trade. Silviculture in Kaingaroa is bound up with industrial outlets and harvesting operations. The harvesting is done by commercial

companies except in special category areas. Thinning and clear-felling of unsatisfactory stands, mainly of poor provenance *Pinus ponderosa*, is done by 'forest' labour. This accounts for 25% of the harvest.

All work under State management is on an incentive bonus scheme which was introduced with the help of industrial consultants in 1961. This initially covered harvesting of thinnings and replanting. The work has been continued by the (Forests) Work Study Section, but their main task today is dealing with contractors. 'Contractors save costs and are marginally better from a supervision and quality point of view, but take more work study time'.

As might be expected, planting and harvesting are closely integrated. Afforestation is almost exclusively with *Pinus radiata* or Douglas fir. Plant supply is highly organised and specialised, from seed collection to the 2 year radiata seedling which is standard planting stock. The annual planting programme at Kaingoroa is 4,500 ha. About 1,000 ha of this is new planting. The rest is reafforestation after normal clear-felling or the clearing of unproductive stands. New planting is concentrated on areas passed as unplantable in earlier afforestation or is on tribal land leased from the Maori people.

Acquisition of land is slow and difficult. This is now prime dairy country and the scrub covered land of the twenties, its cattle sickness problems long since resolved by the agricultural scientist, is now capable of yielding 200 lbs. of butter fat per acre per annum. Nevertheless the competing claims of forestry are actively analysed and researched by economists and there is evidence that, under certain conditions, forestry can compete with or complement dairying in the Kaingoroa plains region.

Since the main silvicultural task is one of reafforestation, or the planting of scrub covered land, there is a major investment of machinery and research into land clearing since cheap and successful establishment involves the total removal of aggressive ground vegetation and the debris of the previous crop. Burning is the cheapest method but it has critics. More generally the brush and logging waste is windrowed by bulldozer and the ground is ploughed and disced before machine or hand planting.

In this context it is amazing and disturbing to see stands of inferior species like ponderosa pine with quite respectable, to my mind, volumes of merchantable timber being crushed down by giant rollers and burned to make way for the more productive *Pinus radiata*.

Natural regeneration which at one time was very profuse in maturing radiata stands and was an accepted method of restocking

is now being phased out completely. Trials are currently under way to discover the most efficient means of eliminating regeneration before planting. Planting is cheaper and tending of properly spaced trees can be mechanised. Nursery planting stock is better genetically and nursery trees are able to respond more rapidly and are more vigorous than the trees released from heavily overstocked regeneration.

The massive machinery used on the harvesting and extraction operations results in the compaction of large areas of ground. These compacted soils have to be ripped, fertilised and cultivated before planting, and specially selected vigorous trees used to ensure that growth on such damaged sites is consistent with the rest of the stand.

The most interesting and controversial aspect of radiata forestry in New Zealand is in the field of spacing, thinning and pruning. This can best be illustrated by the current (1975) conventional thinning schedule. (Table 1).

TABLE 1

CONVENTIONAL THINNING SCHEDULE—PINUS RADIATA  
Kaingoroa State Forest

Mean Crop Ht.	Approx. age years	Pruning schedule	Thinning	Comment
1.5 m.	2-3	—	53,000 S.P. ha	Nat. Reg. only
5 m.	5	500 S.P. ha. (to 2.2 m.)	1,500 S.P. ha.	„
9 m.	7	300 S.P. ha. (to 4m.)	—	—
12 m.	9	300 S.P. ha. (to 6m.)	600 S.P. ha.	All Stands
22 m.	15	—	300 S.P. ha.	1st comm. Thinning
44 m.	35		Clear-fell	

To judge from comments from research people and others and from the reports of discussions at recent Symposia held at Rotorua, there is a growing body of opinion, particularly among research people and economists, that harvesting thinnings at any stage in the life of a plantation is not a paying proposition. This raised a big question with regard to pulpwood availabilities and also with regard to the meaning of term thinning.

Recent research publications draw attention to the fact that the sawlog tree yields up to 50% of pulp quality material in top logs, slabs and off-cuts and that the widespread development of chipping ensures that the pulp mills' needs will be met. Indeed a new schedule for radiata pine underlines this approach. This schedule is designed to grow a quality sawlog crop on a 25 year rotation by a respacing and pruning regime calculated to produce a mean annual ring width at breast height of 25.4 mm.

The underlying idea of this tending regime is that the main effort should be directed towards the early selection and promotion growth wise and quality wise of the 200 (per ha) final crop trees and the shortening of the rotation length. Tree conversion studies indicate that 30% of the volume and 50% of the value of plantation grown sawlog type trees are represented in the lower six metres of the stem. The proposed schedules seek to maximise the value of saw log output by early espacement and pruning to 6 metres before the top height reaches 12 metres or when the crop is 8 to 10 years old.

Further high pruning of the final crop trees up to 11 metres is recommended in the case of a *trees and grass enterprise*, as much to enhance grazing prospects, as to improve quality of second and top logs. It is expected that this system which involves no thinning will yield up to 50% by volume of the harvested crop as pulp wood or chips in the form of round-wood from top logs and chips and waste from the sawmills.

The trends in radiata pine plantation forestry in New Zealand in the Spring of 1975 seemed to be towards:

- (1) Greater emphasis on quality and vigour in planting stocks.
- (2) Increased recognition of the effect of land quality and accessibility on the net returns from plantation forestry.
- (3) The reduction of the effects of competition from vegetation by use of herbicides, cultivation and fire.
- (4) The shortening of rotations by wider spacing and/or earlier spacing, to encourage maximum diameter growth on the selected final crop trees.
- (5) The encouragement of knot free timber production in the lower 10 metres.
- (6) Recognising that the major cost component in forestry in the future will be in harvesting and transport rather than in establishment and tending and that the need for and possibilities of cheaper harvesting systems should be kept under constant review.

Farmers were being urged to consider combining trees and grass on good pasture convenient to roads, near centres of high forest industrial concentration or in areas with good log export prospects.

From what I could gather the main impetus in furthering this proposition was coming from the big integrated wood products industries and not from the farming interests. It is recognised that cleared suitably located farm (pasture) land may prove to be the best prospect for maximum returns in forestry net of costs and that steep uncleared and scrub covered land is likely to yield poorer net returns.

### Forest Health

A large exotic forest such as exists in Kaingoroa must surely invite problems such as windthrow and epidemics of insects and fungus pests. While windthrow does not appear to be a major factor on the pumic soils round Rotorua, it is a problem in the South Island.

There have been a number of major scares in regard to insect attack — the most noticeable being the *Sirex noctilis* which threatened disastrous losses in the 50's. This pest caused widespread deaths in the plantings of the late 20's. In the final analysis since it was mostly sub-dominant and suppressed trees that succumbed, the results were more beneficial than harmful, resulting in a form of natural thinning in overstocked plantations at a time when silvicultural intervention was not possible. This pest was eventually controlled by parasites.

Fungal attacks have been more damaging and costly. The pine needle cast *Dothistroma pini* which swept through the plantations in the 60's threatened major losses until suitable spraying regimes were worked out. These problems must be constantly researched and the control systems rigidly adhered to — just as is the case with agricultural crops.

At the time of my visit worrying outbreaks of *Phaeocryptopus* on Douglas fir and *Armillaria* on pines were giving cause for concern.

Deer of various kinds and introduced vermin such as opossum and rabbits have caused, and continue to cause serious losses in plantations and in valuable reserves of indigenous forest. This is particularly the case in the South Island.

In the more intensively managed pine plantations the vermin situation seems to be well in hand. Deer are kept under control by shooting and provide attractive recreation for the forest labour force and a much appreciated perquisite in the form of venison or tourist revenue. There is a good market for venison and deer farming is becoming a recognised and acceptable rural enterprise in certain areas.

### Indigenous Forests

In little more than a century half the native forest of New Zealand has been cleared. There are still 6.2 million ha remaining. Most of this is classed as protection forest or is incorporated in National Parks and reserves and is, therefore, fairly well secured against the pressures for further clearance for agricultural purposes. There is strong opposition in many quarters to any further depletion of the indigenous forest for any purpose whatsoever. This has placed the State Forestry Service in a dilemma.

The Service has an area of 650,000 ha of merchantable indigenous forest — mainly *Nothofagus* (Southern) Beech which presents a great opportunity for sustained yield management along classical European lines. Selection felling and natural regeneration is expensive because of the intensive roading required. The timber of the Southern Beech is not readily marketable. The main opportunity for indigenous forest silviculture is on the West coast of the South Island. This whole region badly needed revitalisation and a forest products industry along the lines developed in the North Island would complement the growing tourist industry.

A special study was made of the forestry potential of the project area and a report was issued in 1973. This involved a major softwood development — the planting of scrub, cut-over open land and some indigenous Podocarp forest — running to 100,000 ha. This exotic softwood forest would eventually generate a flow of industrial wood sufficient to support a wood products complex which could absorb the production from the managed *Nothofagus* forest. It seemed a most worthwhile project from every point of view, but it ran into a storm of controversy from a 'Save the Beeches' pressure group, led by a Mr. Searle, founder of Friends of the Earth in Britain who had come specially to New Zealand to mount the campaign. In 1975 it looked as if the Southern Beech Forest Project would be shelved not because of the opposition from the Friends of the Earth, but because of the recession in Japan and Australia.

These countries currently take 86% of New Zealand's wood products exports and thus were a vital factor for the success of the west coast project. Already in 1975 signs of slow-down were evident in the existing big industrial plants. An accumulation of logs and great mountains of chips spoke eloquently of the Japanese failure to take up agreed quotas.

One thing is certain, plantation forestry in New Zealand has set a pattern for such projects all over the world. It is obvious, that the more indigenous forest is cleared or reserved the greater is the need for high yielding efficiently managed plantations.

What has happened in New Zealand's North Island will eventually, I'm certain, be reproduced not alone in the South Island, but in America, Kenya, Chile and in developing countries if one is to judge by the number of visiting foresters met there from such lands and the demands on New Zealand personnel for help in forest products industrial development.

New Zealand forestry and New Zealand foresters have a lot to offer to the world and a forestry journey to New Zealand is indeed worthwhile.

#### THE COMMONWEALTH STATE'S SOFTWOOD PLANTING PROGRAMME

The Australian Forestry Council sponsored an Agreement between the Commonwealth and States under which Victoria would plant 2,000 ha/an. between 1966 and 1971. The State was required to finance the first 2,200 ha planted each year and the Commonwealth the balance, with the latter's contribution of loan funds being interest free to the State for the first ten years. A second five year agreement, signed for the period to 1976, on similar terms to the first agreement. A Softwood planting programme of 6,000 ha/an. is calculated to make Victoria self-sufficient in softwood by the year 2,000 A.D.

This 'conventional' schedule, which is not rigidly adhered to generally in New Zealand or even in the Kaingoroa region, is designed to:

- (1) Produce a final crop of sawlog trees of 250 to 300 stems per ha on a rotation of 35 years.
- (2) To provide for a prime pruned, knot free butt log of 6 metres.
- (3) To allow for one commercial thinning at 15 years when the mean ht. of the crop is 22 metres. (All trees felled in previous thinnings except in exceptional favourable situations, e.g. where there is a demand from fencing concerns are allowed to lie and rot as the material is not considered worth extracting).

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# Tree Planting<sup>1</sup>

By LADY GREGORY

It was pleasant to read in the *Homestead* of January 15 that the number of trees planted in Ireland last year was considerably larger than the number of trees cut down; for trees vanish very quickly—"a bit of ash for the shaft of a cart", "a bit of spruce for the rafters of a shed", "a bit of larch for roofing", "a bit of firing on account of the turf being so wet", and a clump that has taken years to grow is gone in a day. And if woods, like friendships, are not kept in constant repair, the day will come when they will be but a memory. And Ireland, more than other countries, ought to be a country of trees, for the very letters of her alphabet are named after them. Perhaps with the revival of her old language they will be better called to mind.

Sir Walter Scott gave wise advice to his son when he said, "Put in a tree whenever you can; it will be growing while you are sleeping." And we should never be discouraged by thinking that the growth will be slow for the years pass all too quickly, and some day we find the little seedlings we had put down in faith are over our heads, and acting as our protectors. And even if we do not live to sit under their shade, yet none the less "they will grow while we are sleeping" that long sleep in which we may so easily be forgotten, and we are not likely to have more lasting monuments put over us, and we cannot have more gracious ones than the living, rustling trees that we had planted and that we had loved.

There are such monuments here at my home. There is an avenue of ilex trees planted by my husband's mother some where about forty years ago. When we come into their shelter from a windy drive we think gratefully of her as we note their evergreen compactness and their silvery upper shoots shining against the sky like olive boughs against the sky of Italy, for here also our sky is sometimes blue. And a childless member of the family, wishing to have his wife kept in remembrance, planted a wood in her name—the "Isabella Wood." So when descendants of the people whose friend she had been pass near it, or ask for timber from it, her name is on their lips. And there is a corner filled with larch, strong and straight, planted by a young garden boy, who was sent to do the work by a careless steward as best he could in faith and

1. From *The Irish Homestead*. February 12th and 19th 1898. Reprinted by kind permission of the Lady Gregory Estate, and Colin Smythe Ltd. publishers of the Coole Edition of Lady Gregory's works.

ignorance. He died not long afterwards, but the trees did well, and when his mother came crying and lamenting for his death I took her to see them, and told her how his name clings to them, and will long cling as only a name can do. My husband planted rare pines that now tower skywards, and many larch and spruce, for he believed in the future of home-grown timber. A little time ago my schoolboy son got hold of an axe, and cut down a tree—a deal one. But I told him that he must never cut one down without planting two in its place, so that very day he brought out an insignis and a silver fir from the nursery, and he planted them near a path that, if they thrive, he may see them all his life and remember their lesson.

We can't all have woods, nor is it to be wished that pasture or tillage fields should be turned into forests. But no one need be without even a few trees about his farm, to screen his house from storm, or to give shade and shelter to his sheep and cattle. In England it is said the number of trees about the country, in hedges or clumps, or by roadsides, is greater than the number in woods and enclosed plantations, and these trees give to fields and lanes a charm that we miss over here. I know of a district where many tenants have lately bought their holdings, and are already beginning to find a pleasure in planting on their own land. And as all good tenants will doubtless be in full possession of their farms sooner or later, they might well begin to plant in anticipation.

I wish that every Nationalist would plant at least one tree in this year of '98, and every Unionist in 1900, and every waverer or indifferent person in the year that separates them, and the face of the country would be as different in the new century from what it is now as is a head covered with soft waving hair from a head that is bald or close shaven.

"When Ulysses, after a ten years' absence, was returned from Troy, and coming home found his aged father in the field planting of trees, he asked him, 'Why, being now so advanced in years, he would put himself to the fatigue and labour of planting that of which he was never likely to enjoy the fruits?' The old man, taking him for a stranger, gently replied, 'I plant against my son Ulysses comes home'."\*

How many Irish homes there are from which a son has gone—another Ulysses—a salt sea voyage, in the hope of coming back some day, laden with spoils, to the old home. I would gladly think that each such wanderer could find on his return that his memory had been kept green by living green trees planted "against Ulysses comes home."

\* Evelyn's "Silva".

"Men seldom plant trees till they begin to be wise," says Evelyn in telling this story, so the sooner we begin to plant the sooner we shall give practical proof of our early wisdom.

As to the time for planting, November to March are the best months, so for this spring there is not much time to lose. The cold winds of March and the dryness we hope for—but don't always get—are against the little transplanted roots, and they don't get a fair start. But in a soft, wet February they will be quite safe.

When choosing the sort of tree to plant it is wise to look round and note what does best in the neighbourhood, for trees are capricious as to soil. Some will not thrive in clay and some in limestone. And it is best to choose those sure of finding food to suit them, for a sickly tree will never be an ornament, while a healthy one can never be anything but beautiful in its strength and vigour. If there is a nursery near it is an easy matter to choose what one wants, or where there are woods seedlings of many sorts may be had for the asking.

When the trees have been planted, either singly along walls or hedges, or in a little clump as a "screen" for shelter, there must be no delay in protecting them against cattle or goats or rabbits, or any other enemies from whose attack they may be in danger. An old poet has written:

"If cattle or coney may enter to crop,  
Young oak is in danger of losing his top."

The taller the sapling is the easier it will be to protect it, and where there is not a long journey or a delay in planting very good sized ones may be moved with a good ball without danger.

Ash is easily come by and easily moved, and its timber is useful in a hundred ways, but it should never be planted near tillage. Its rambling roots run along near the surface, and suck up the nourishment that should go to the crops. It is less hurtful to pasture, and its slight shade does not interfere with the undergrowth. Oak strikes deep, and its roots find their nutriment below the region of grass and crops, and no tree can be more beautiful where it does well. But it is a slow grower, and on light soils it will always be stunted and look like a poor relation of the great oaks of England. Beech will not let the grass grow well under it, so is impossible as a field tree, though planted closely in a row and kept clipped, it makes a good and useful hedge. Horse-chestnut kills all vegetation under it, and should only be admired from afar. Lime also hurts the grass, though its blossoms are the delight of bees. I am inclined to think that elm is the most satis-

factory hedgerow tree. It stands well in storms, it does not impoverish the land, and it gives a good, though not too dense a shade. And on land subject to floods it will stand up to its waist in water as contentedly as cattle do in summer time, but for weeks instead of hours, and with no ill results. Sycamore will stand wind where nothing else will, and makes a good nurse for more delicate trees, growing quickly and sheltering them in their early years. Plane is a very beautiful tree, with its smooth, clean stem and serrated leaves, and gives an example to farmers, hanging up its little dry bags of seed for the winter, and scattering them when soft spring days come. It is said not to bear a blast, but I know one that enjoys our Atlantic storms. Larch grows quickly, does no harm, and is of value even in its early years, but care should be taken not to put them, when planted singly, in too exposed a place. For a larch is nothing if not straight, and it is sad to see them as Usheen saw the trees near the coast:

“Dripping and doubling landwards as though they would  
hasten away,

“Like an army of old men longing for rest from the moan  
of the seas.”\*

Then for ornament no one need grudge a corner for the slight delicate mountain ash, the rowan, with its clusters of scarlet berries, or the black willow, with its plummy catkins bursting out to greet Palm Sunday, or the scarlet sallow with its twigs all ready for basket mending, or the laburnam with its golden rain, or the crab tree, with its snowy blossoms. Of the thorn bushes I need not speak; they are looked after and preserved by invisible powers.

Birch may be put under the heading either of use or beauty. Buyers come now to look for it, wanting its wood for clogs used in the North of England. When I heard this I planted a thousand or thereabouts, with a provident mind. But I hope such evil days will never come as will force my successors to cut down their shimmering quivering beauty to be trodden under foot by the British workman.

If evergreen is wanted, there is the spruce, hardy, substantial, handsome, and there is also the evergreen oak, a little difficult to start, for it does not like its roots moved, but once started it flourishes happily in our mild moist winters. Yew is dangerous to plant, except among the dead. It takes sudden freaks of poisoning, and is not to be trusted. Scotch fir is hardy and brave, and so is Austrian, but Scotch is the more beautiful. Its red stem lights up a

\* W. B. Yeats.

landscape when the sun shines on it. And when the sun is hidden and all is grey the gleam of the silver fir, like the silver lining to a cloud, keeps depression away. But the silver fir is gentle and likes shade and safety; it is with the Scotch, the sycamore, the elm we must hold the heights.

But whether the holding be large or small, tillage or pasture, there is not one that would not be the better for ever so small an orchard upon it. Apple trees are easy to cultivate, they don't take up much room, crops and vegetables grow happily under them, they are beautiful in their spring blossoming and in their autumn ripening, and the profits they bring in are quick and certain. I know a man who had planted some apple trees near his house, and after a time the old house, small and inconvenient, disappeared, and a new one took its place, with slates on the roof instead of straw, and an upper story. It was built with money borrowed from the Board of Works, and the interest has been paid from year to year with the money the apples bring in. The debt will soon be paid off, and the orchard and its profits will remain.

When Wolfe Tone was in France, a hundred years ago, he noticed how the people there planted orchards, and their children looked after them, and he wished the example might be followed in Ireland. "But", he says, "he who can barely find potatoes for his family is little solicitous about apples; he whose constant beverage is water dreams neither of cider or mead. Well, if we succeed we may put our poor countrymen on somewhat a better establishment. We shall see."

But fruit trees are not so easily come by as forest trees, and where there is no good nursery in the neighbourhood the I.A.O.S. will have to come in, and a co-operative order will have to be sent to one of the best growers. For a tree of a poor sort takes as much care and manuring as one of a good sort, and only brings disappointment in the end.

So we must think again of the old father of Ulysses, and plant orchards for our sons, that they at least may not have to stoop to see how their only fruit is ripening, the "earth apple," the potato. They will then be able to look upwards as well for their crops, and to see them not only taking strength from the earth beneath, but sweetness, and savour, and colour from the sun in heaven.

# Knockrath Woodlands:

## A 20 Year Review

P. M. JOYCE<sup>1</sup> and LORD ARDEE<sup>2</sup>

### Introduction

The changes in growing stock and species composition of Knockrath Woodlands have been monitored by repeated inventories over a period of 20 years as part of working plans prepared by forestry students from University College, Dublin. The summarised results of these inventories, as presented at a Seminar on Management of Woodlands in April 1976, are reproduced here to illustrate the changes which have taken place under a management plan which had as a main objective the application of the principle of sustained yield.

### Location and historical background

The forest known as Knockrath Woodlands forms part of the estate of the Rt. Hon. the Earl of Meath and lies in the valley of the Avonmore river north of Rathdrum in Co. Wicklow. The area by land use is given in Table 1.

TABLE 1  
AREA BY LAND USE

Type	Area
Coniferous High Forest ... ..	195.5 ha
Broadleaved High Forest ... ..	24.8 ha
Pasture ... ..	20.8 ha
Felled, unplanted ... ..	12.1 ha
Scrub ... ..	10.8 ha
Fish Farm ... ..	8.0 ha
TOTAL AREA =	272.0 ha

The property when acquired by the Estate in 1887 consisted of 139 ha of conifers, 127 ha of oak coppice and 17 ha of mixed broadleaved species. Since then the total area has varied as a result of acquisition and disposal of land.

1. Department of Forestry, University College, Dublin.
2. Knockrath, Co. Wicklow.

The older coniferous stands were planted during the period 1905 to 1935 when the woodlands were managed by a Scottish forester named Macintosh. These consist of Scots pine and European larch mixtures and stands of Douglas fir established on former grazing land. The oak woods of Knockrath are remnants of the once widespread indigenous sessile oak woods of Wicklow. These woods provided charcoal for iron smelting in the 17th century and evidence of smelting still exists in Knockrath Woodlands, at Furnace Bridge. Management practice from 1677 to 1890 was to manage the areas of oak as short rotation coppice. After 1890 this was allowed to grow into high forest.

In 1956 the woodlands came under the provisions of a working plan with the object of managing the woodlands profitably and improving the growth potential by introducing high yielding conifers while working on a sustained volumetric yield basis so as to insure sustained income. Further objectives included the conservation and enhancement of amenity in woodland areas bordering the public road.

### Site Factors

Most of the forest lies between 100 to 250 m above sea level. The aspect is generally north-easterly and fairly well sheltered from the prevailing wind. Rainfall is approximately 1100 m.m. per annum. Late spring frosts occur frequently on the flat areas along the river and are sufficiently severe to cause damage to young Sitka spruce plantations.

The bedrock in the area is comprised predominantly of Ordovician shales and slates. Occasional igneous intrusions of quartz also occur. Three major soil groups have been identified in the forest (Carey 1970). Brown podsolics with good drainage account for over 90 per cent of the forest area. Soil depth varies from 25 to 75 cms, but it is usually up to 60 cms in depth. pH averages 4.8 for this soil group. Peaty gley occurs in one area. It is characterised by a surface peaty layer varying from 7 to 60 cms in depth which is extremely acid in reaction. The underlying mineral horizons have a relatively high content of silt, with poor structural properties, and are very compacted. The third group are alluvial soils which occur in close proximity to the Avonmore river. The alluvium varies from 60 to 90 cms in depth overlying ordovician shale drift. These are highly productive soils except in local conditions where drainage is impeded.

The natural climax vegetation for the area, which was sessile oak (*Quercus petraea*) with associated *vaccinium myrtillus*, *Luzula sylvatica* and *Pteridium aquilinum*, has now largely been replaced by

coniferous plantations, grassland, furze and bracken, but some 22 ha of indigenous woodland still remain.

### The Growing Stock

The woodlands at present consist of even-aged high forest with Douglas fir, Scots pine, European larch and oak stands predominating. Species distribution by area and age-class is illustrated in Fig. 1. Although the histogram may give the impression that

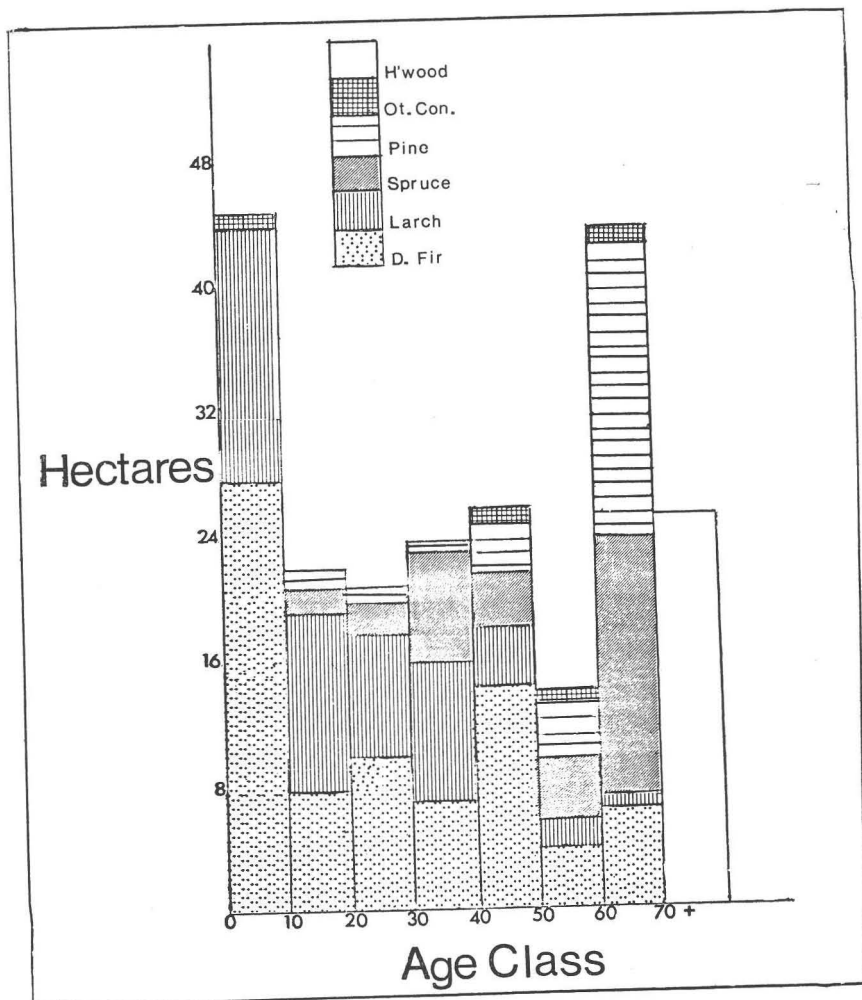


Figure 1: Species by Age and Area Classes, 1975.



all species grow in pure stands most of the older stands are of Scots pine and European larch growing in intimate mixture. In contrast Douglas fir stands are mainly pure as are the spruces. The oak occurs as pure stands of coppice origin.

Although the oak is only yield class 4, the growth potential of conifers is reasonably good. Scots pine and European larch range in yield class from 8 to 12 and Douglas fir from 12 to 18.

The growing stock as shown in Table 2 has remained at an almost constant level since 1956. This is consistent with the policy of sustained yield.

TABLE 2  
GROWING STOCK AT PERIODIC INTERVALS

Year	Growing Stock (m <sup>3</sup> )		
	Conifer	Broadleaved	Total
1956	29,511	8,633	38,244
1965	28,791	7,364	36,155
1970	32,763	8,042	40,805
1975	33,502	5,855	39,357

It will be observed that, while the total volume shows little change, there is an increase in the coniferous growing stock and a corresponding decrease in the broadleaves.

The development of the growing stock and the species composition by volume and age is shown in Figures 2 to 5. Apart from the preponderance of Scots pine and European larch in the older age classes, the main features of interest are the decrease in volume of oak during the period 1970-75 and the relative weakness in volume in the middle age group. This latter feature shows where the forest deviates from the ideal of a normal forest. This is also apparent in Table 3 which shows an area below average for the pole stages.

TABLE 3  
AREA OF DEVELOPMENT CLASSES

Development Class	Area (ha)
Unplanted ... ..	51.7
Establishment and Thicket ... ..	49.3
Small pole ... ..	34.3
Large pole ... ..	24.8
Young timber ... ..	31.7
Mature timber ... ..	56.3
Mature broadleaved ... ..	23.9

Fig. 2 Growing Stock

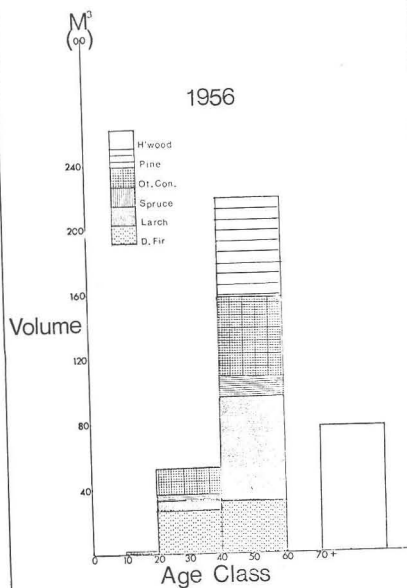


Fig. 3 Growing Stock

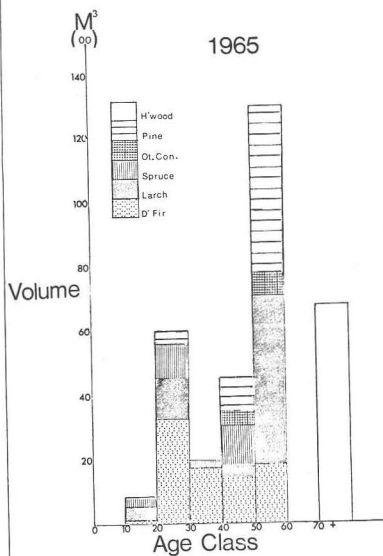


Fig. 4 Growing Stock

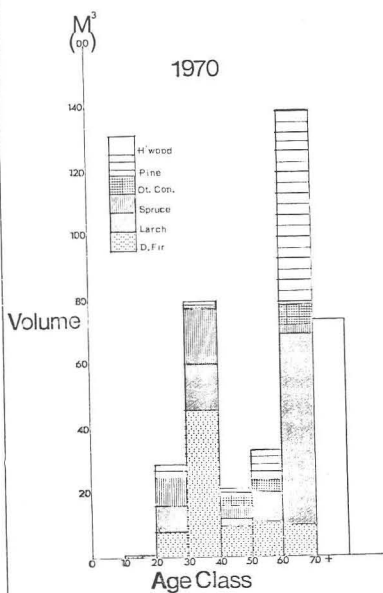
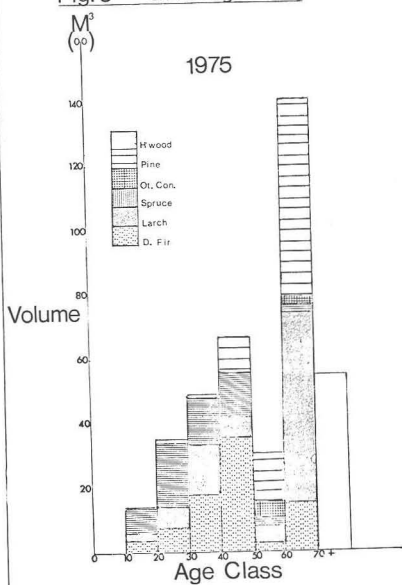


Fig. 5 Growing Stock



In the long term the differing growth rates within age classes may be used to help mould the growing stock towards normality.

### **Yield Regulation**

The growing stock is essentially the same today as it was in 1956 (Table 2). This implies that the volume harvested is equal to the volume increment over the period. Table 4 shows the volume recorded as harvested over two time intervals for both conifers and broadleaves.

TABLE 4  
VOLUME HARVESTED

Period	Conifers (m <sup>3</sup> )	Broadleaves (m <sup>3</sup> )	Total (m <sup>3</sup> )
1956-1966	9,702	1,119	10,821
1967-1975	6,151	2,015	8,166
TOTAL	15,853	3,134	18,987

On the basis of the data in Table 4 the yield per year from 1956 to 1975 was approximately 1000 m<sup>3</sup>, giving a mean annual yield per ha of 3.5 m<sup>3</sup>. About half the annual yield was from normal clear felling of mature Douglas fir, Scots pine and European larch. One-tenth of the yield has come from the supply of some 80 transmission poles per year. Oak has contributed one-sixth of the yield on average, while the remainder consists of coniferous thinnings.

An interesting feature arising from the above data is that the mean annual production per ha would appear to be 3.5 m<sup>3</sup> despite the fact that the average yield class for conifers is three times this figure.

While it is generally accepted that harvested yield falls short of yield table forecasts due to various factors, including unstocked areas, sub-normal stocking and dead, dying and broken trees not listed for sale, the magnitude of the discrepancy at Knockrath requires further comment. For the period under review a large part of the area harvested had been stocked by broadleaved species of which only the commercial volume would normally be recorded and many trees would be classed as firewood. This and the possibility that the usual allowance of 15 per cent of yield table felling forecast yield had not been adequate in the case of Knockrath could explain a large portion of the volume discrepancy. As the newly planted areas reach the thinning stage and harvesting concentrates on the coniferous stands the difference in volume between harvested yield and yield table forecasts can be expected to diminish.

### **REFERENCE**

Carey, M. L., 1970. Reconnaissance Soil Survey of Knockrath Woodland, Co. Wicklow. (Unpublished).

# Forestry Operations and the Problem of Noise

C. H. KERR<sup>1</sup>

ALONG with air and water pollution, the problem of noise is becoming increasingly important in all of the industrialised societies of the world. As a result of the developments of industry and transport, there has been an increase in the number and power of sources of noise, which have led to what may be called an acoustic pollution of many workplaces.

Until very recently little had been done to control the high levels of noise to which industrial workers are exposed throughout their working lives. Noise has tended to be accepted, both by Management and workers, simply as part of the job. Noise has an adverse effect on human health and working capacity. Prolonged exposure to loud noise has been known for many years to cause irreparable damage to the hearing, but now recent research has produced evidence that harmful psychological effects can result. General fatigue is a common experience, the power of concentration can be reduced and mental reactions can be slowed down. Loss of communication can impair safety standards. All these can be contributory causes of accidents and reduced productivity.

## Effects on the ear

Most people realise that a noise can harm their hearing if it is sufficiently loud, but they usually think in terms of some quite exceptionally violent sound. In fact deafness can be produced in a much more insidious way. The noise we 'get used to' and endure for many years is just as likely to damage our hearing as the high level noise we instinctively avoid. Damage develops slowly, and it may take years of exposure to a noise before the effects become serious. By that time the victim may well have forgotten what it was like to hear as well he did in his youth, or if he does notice any difficulty in hearing, he may put it down to his age. He hears conversation at normal loudness, but it sounds distorted, and he thinks that people are not speaking clearly.

## The Nature of Noise

Noise measurements are relatively simple to make with a sound level meter. To rate the possible effects of noise on hearing, three

1. N.D.F., Safety Officer, Forest Service, Cookstown, Co. Tyrone.

things must be known: level of intensity, frequency range and duration of exposure.

Absolute values of sound intensity can only be expressed in long and cumbersome numbers, but the use of a logarithmic scale reduces these values to convenient limits. The unit of measurement on this scale is called the bel, and in practice, for the sake of being able to work with whole numbers, and to avoid the use of a decimal point, the value in bels is multiplied by ten, and so the sound level of intensity is expressed in decibels (dB).

The following typical values in decibels should make this term more understandable :-

20	Whisper	70	Manual typewriter
40	Quiet part of the forest	85	Power saw idling
55	Office with three persons	95	Tractor operating
65	Normal conversation	98	Discotheque-Amplified music

The sound level depends on the frequency, i.e. the number of vibrations within a given unit of time. The higher the frequency, the sharper will be the note, e.g. a train whistle, and the lower the frequency the lower down the scale the note will be, e.g. a low hum.

Frequency or pitch is expressed in cycles per second or Hertz (Hz). The ear of a healthy young person is sensitive to frequencies between about 20 Hz and 20 000 Hz. The average individual is particularly sensitive in the range 500 Hz to 4 000 Hz. This fact is very important when measuring noise, since two sounds of equal intensity, but of different frequency, may appear subjectively to be of different loudness. We can tolerate more low frequency noise than high frequency noise. When hearing is impaired the ears become less sensitive at first to the higher frequencies, such as the consonants in normal speech. This is similar to what happens at 'old age deafness'.

When measuring or analysing a noise, the frequency range is broken down or divided into slices usually octave bands, and these are conveniently designated by their approximate mid frequency. Thus the 125 Hz band covers the frequency range 90 to 180 Hz. The standard range of octave bands commonly used are 63, 125, 250, 500, 1000, 2000, 4000, 8000 and 16000. Octave band analysis provides useful information for Noise Engineers.

### **Weighted Sound Level**

It is more important to know about the human reaction to sound than to investigate sound as a purely physical happening, and sound levels, as measured by most instruments, do not agree well

with the levels perceived by the human ear. This is why frequency weighted networks or scales have been introduced in noise meter measurements. Scales were designed to approximate to the characteristics of the ear at various levels of loudness. Those in common use are designated A, B, C and D. By reducing the influence of low sounds, a more valid measurement is obtained, and this is achieved by the A scale which discriminates severely against very low frequencies. This scale is commonly used for industrial noise measurement, and the value or noise level obtained is called dB(A). It is also most nearly the subjective response of the human ear.

### **Danger Levels of Noise**

Some workers are more liable to noise-induced hearing loss than others, and until recently knowledge of the effects of noise exposure was limited. However it is now possible to provide a table of permissible daily noise dose limits (Table 1). It should be noted that these limits are maximum acceptable levels and not desirable levels, so some residual risk is implied.

The maximum level allowed in current Noise Regulations is 9 dB(A) for continuous exposure in an eight hour day.

TABLE 1  
PERMISSABLE DAILY NOISE DOSE LIMITS

Max sound level dB(A) at ear	Exposure duration per day (Hrs)
90	8
93	4
96	2
99	1
102	$\frac{1}{2}$
105	$\frac{1}{4}$

### **Multiple Noise Sources**

Logarithmic numbers cannot be added together in the same way as ordinary numbers. If for example two sound sources have a level of 80 dB(A) each the total value when both sources are working at the same time will not be 160 dB(A). The correct answer is 83 dB(A). When a sound level is increased by 3 dB(A)

the intensity is doubled and therefore exposure duration should be halved.

### **Risk of injury in Forest Industry**

A joint FAO/ECE Committee in collaboration with the ILO has for many years, through its various study groups dealing with Forest machinery, been concerned with the problem of noise. The results of investigations carried out in various countries show that all types of power saw have a loudness level considerably in excess of the permissible limit, and are therefore prejudicial to the workers' hearing. The intensive mechanisation of forest produce extraction and preparation of ground operations, has led to a noise problem that has been steadily growing in recent years. A general solution has been hampered more by ignorance than by neglect, since the necessary scientific knowledge was lacking. In the UK the Department of Employment's 'Code of Practice for reducing the exposure of employed persons to Noise', published by HMSO in May 1972, gives a positive approach, and as a result, in N. Ireland certain steps were taken by The Forest Service to apply the requirements of this Code. One of these was the purchasing of a Noise Dosimeter, and some of the readings taken by this instrument are shown in Table 2.

TABLE 2  
EXAMPLES OF NOISE LEVELS

		Noise level operator's ear	Permitted exposure time in any day (mins.)
Operation	Machine	operator's ear	day mins()
Timber extraction	Ford County Forwarder	93	240
	Highland County	94	200
	Highlander Half Track	93	240
Ploughing	International	98	80
	County	93	240
	Super six	97	110
Fell/sned	Husqvarna 280	104	15
	Jonsred 621	105	18
Broadcast fertiliser	Muskeg	103	20
Load stones	Excavator 22 RB	96	120
Load soil	J C B	93	240
Drain maintenance	Poclain digger	93	240
Grass mowing	Flymo Contractor	91	400
Quarrying	Manual Jack Hammer	113	1

Since the noise from these machines fluctuates over fairly wide limits, and has a continually varying pattern, a conventional sound level meter will be virtually useless in assessing the hazard. The Dosimeter is a light compact unit designed to fit a worker's top pocket with the microphone worn on the lapel. The instrument will register the noise exposure throughout either a complete working day, or a sample period of the day, and then calculate the percentage of the permitted noise dose that has been consumed. This figure set against the duration of the measurement or sample period on a conversion slide rule gives what is known as the Equivalent sound level. This can be defined as a level of steady noise that has the same energy content as the complex pattern of noise being measured.

It is important that the sample period is truly representative of the complete work period. The figures in Col. 3 of Table 2 are Equivalent sound level values. It has been found that nearly all machine operators are regularly exposed to noise levels, which if no precautions are taken are high enough to cause hearing impairment over a period of years.

### **Control Measures**

Management is responsible for ensuring that the best practical means for noise reduction are applied. Four kinds of measures can be taken: reducing the noise at the source, preventing its propagation in the vicinity, soundproofing objects and using personal protective equipment. Not all of these measures are practicable in the Forest Industry. Power saws and tractors are purchased from various manufacturers, and must be fully utilised for economic reasons, even though the noise produced during operating is above the acceptable limit.

### **Power saws**

The modern power saw achieves its high performance when used at the speed of maximum power and for years manufacturers have been engaged in intensive research to incorporate silencing without loss of power output and an increase in weight. A new American saw features a special "reed" silencer which "tunes out" harmful and annoying sound frequencies and recently one from Europe has a large front mounted muffler for quiet running.

Research on power saw noise in European countries shows that medium and high frequencies which have the most harmful effect on the human ear are predominant in the noise produced. The use of protective equipment is the best practical measure and this can be in the form of ear plugs, disposable ear down, plugs or



ear muffs. Valuable guidance is given in the Code of Practice. The first two are not recommended as being suitable for forestry conditions, since it is almost impossible to prevent them from becoming dirty. Hygiene is important to avoid risk of ear infection. The wearing of ear muffs is the best practical and effective means of giving hearing protection and for power saw operators they can be attached to a safety helmet. This also makes it easy for supervisors to check that protection is being worn. It is important to know the noise level for each octave centre frequency from 31.5 Hz to 8000 Hz when a saw is working at maximum power since this can help in deciding which type of muffs to use.

Only two types of power saw are used by Northern Ireland Forest Service operators and the results of recent testing of the noise level of these machines is shown in Table 3 and graphically in Fig. 1.

TABLE 3  
NOISE LEVEL OF POWERS AWS

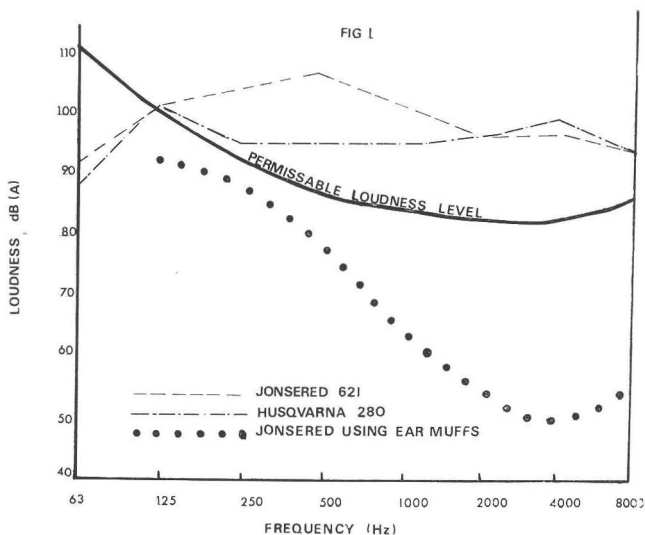
Mid Frequency Band (Hz)	Sound Pressure Level dB(A)		Ear muff attenuation*	Sound Pressure Level at operator's ear dB(A)	
	Jonserved	Husqvarna		Jonserved	Husqvarna
64	92	88	—	—	—
125	102	102	9	93	93
250	105	96	15	90	81
500	107	96	26	81	70
1,000	103	96	38	65	58
2,000	97	97	42	55	55
4,000	98	100	50	48	50
8,000	95	95	40	55	55

\*A recommended type used by the Forest Service.

These confirm earlier measurements (Table 2) and indicate that not only is one saw 'noisier' than the other but the loudness level of each penetrates well beyond the permissible 90 dB(A) level contour. In fact it is on average 32 times higher than the recommended level (Table 2).

Most manufacturers of ear muffs supply full information on the sound reduction likely to be provided for the various frequency levels and these figures subtracted from measured sound levels gives the sound pressure level at the operator's ear.

The example given in Fig. 1, shows that there is adequate



attenuation for both types of saw. The aim should be to provide the wearer with enough sound attenuation to reduce the noise to an acceptable level. Comfort, ease of cleaning, durability and availability of spare parts should also be considered.

## Tractors

In the UK the Agriculture (Tractor Cabs) Regulations require that from 1 September 1977, in safety cabs fitted to tractors, the noise level at the driver's ear must not exceed 90 dB(A). As in all cold climates almost all tractors were fitted with cabs to protect drivers from the weather. These were often crude, and fitted as cheaply as possible. They acted as sound boxes for the noise emitted by the engine and other components so that the noise level was higher than it would have been if there were no cab. It was therefore necessary to introduce legislation to cover cab design.

With existing machines noise level can be reduced by the fitting of simple sound proofing and information is being gathered on the best types of material and methods of fitting. One of the biggest problems is sealing areas where the various controls enter the cab. Until a new machine is purchased suitable ear protectors must be worn. As with power saws, muffs are recommended preferably with neck or head bands. The Code of Practice recommends that a warning notice should be attached to a noisy machine, e.g. the caption "Use ear protectors when operating this machine".

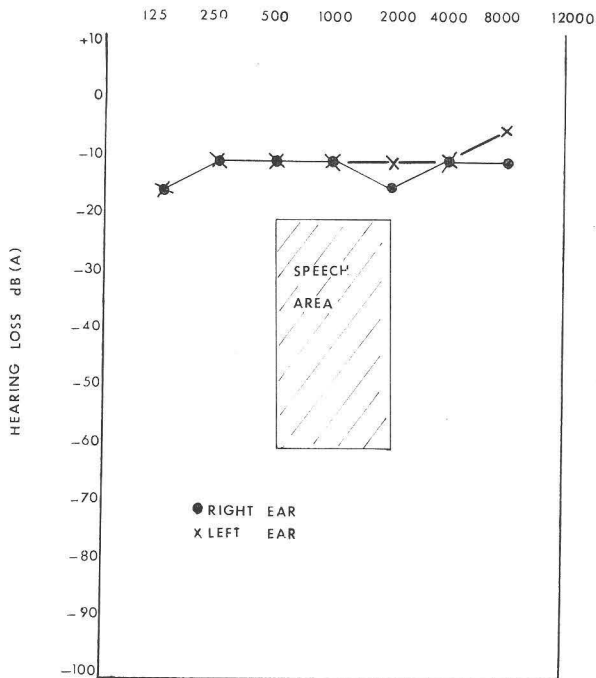


FIG 2

AUDIOGRAM SHOWING NORMAL HEARING OF A YOUNG PERSON

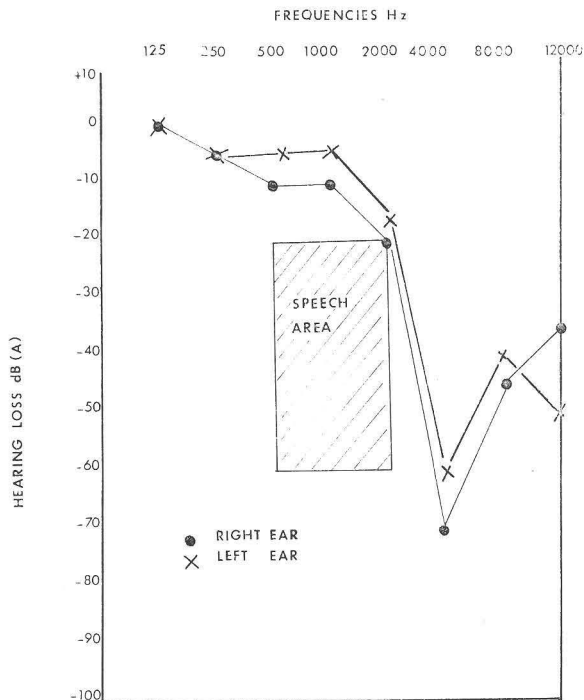


FIG 3

AGE 44 YRS EXPOSURE TO FACTORY NOISE 5 YRS

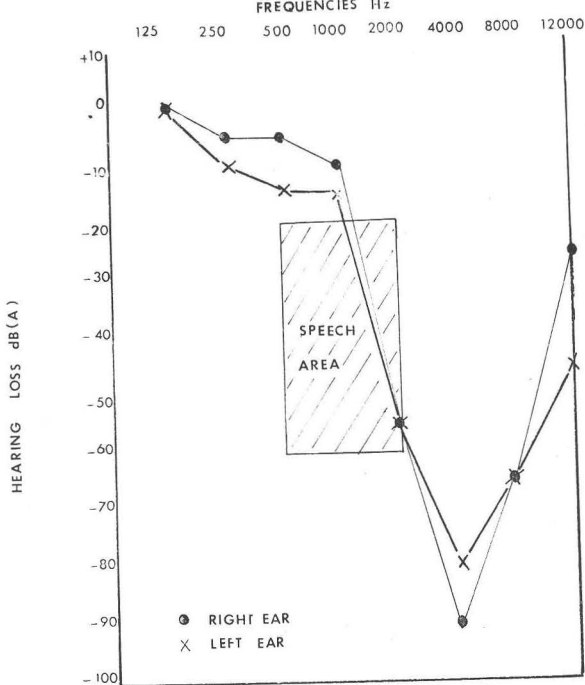


FIG 4

AGE 44 YRS EXPOSURE TO FACTORY NOISE 17 YRS

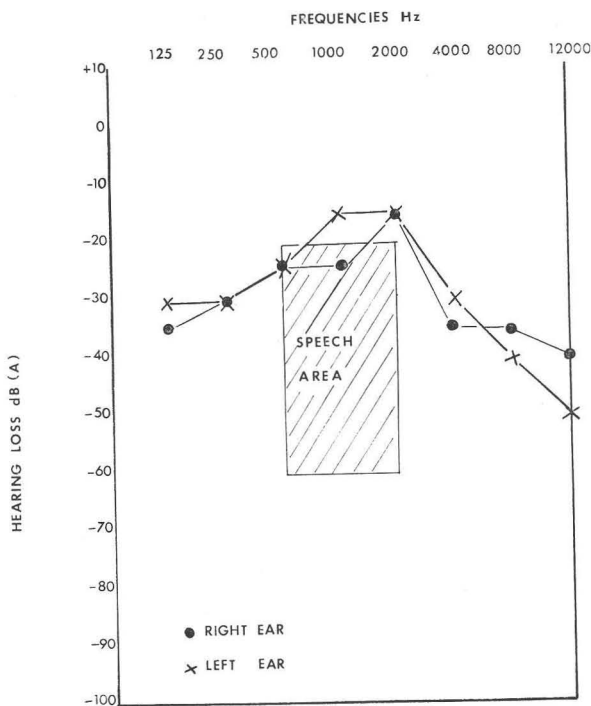


FIG 5

CHAIN SAW OPERATOR AGE 52 YRS  
EXPERIENCE 15 YRS (NOT CONTINUOUS)

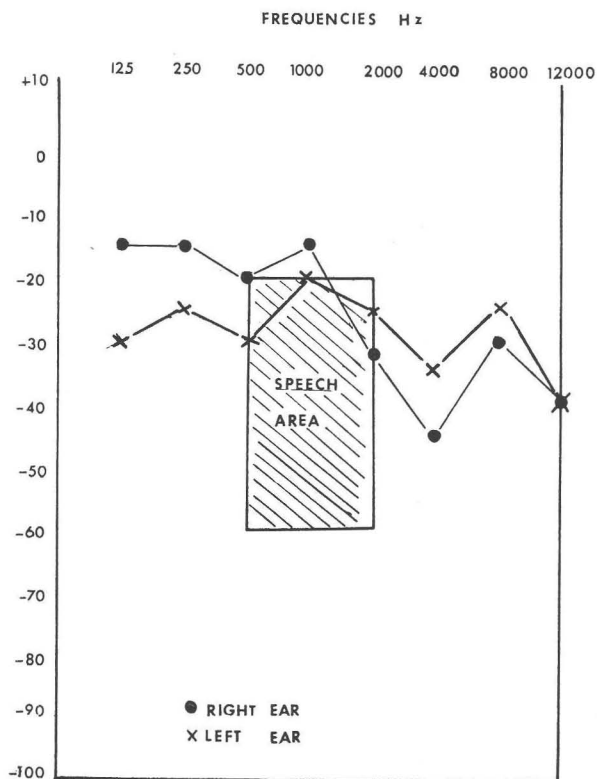


FIG 6

CHAIN SAW OPERATOR AGE 50 YRS  
EXPERIENCE 8 YRS (NOT CONTINUOUS)

### The role of Audiometry

In a hearing conservation programme audiometric screening plays an important part both for pre-employment and periodic follow-up checks for employees, especially those who are noise sensitive. This can detect at an early stage individuals whose hearing has been impaired possibly through being exceptionally susceptible to noise or failure to use hearing protectors. It is also possible to identify those workers with ear ailments which might cause problems in the use of protective devices.

Audiometric results are plotted on suitable graph paper and are called audiograms. The aim is to find the lowest audible level at each frequency in controlled conditions. The test is performed separately for each ear at a selected number of frequencies and

the subject is asked to indicate the noise level at each frequency which he can just detect. Examples are given in Figs. 2 to 6.

The hearing loss shown in Fig. 3 would be considered not unusual. Hearing is still reasonable between 500 Hz and 2000 Hz, which is referred to as the speech area. However it is adversely affected in the mid and high frequencies. Fig 4 is an example of severe impairment, since the hearing loss extends far enough to lower the understanding of speech.

Ten Forest Service power saw operators volunteered to undergo hearing tests. Experience ranged from one year to fifteen years, and the age range was from 23 years to 52 years. We were pleased to find that there was no evidence of hearing damage which could be attributed to exposure to power saw noise. In Fig. 5 the lines are similar to those that would be expected for a man of this age, who had not been exposed to excessive noise levels. As people grow older the ears gradually become less sensitive, especially at first to the higher frequencies.

In Fig. 6 both ears showed an 'acoustic dip' at 4000 Hz frequency. It was discovered that this man was a keen sportsman, and a life-time hobby was hunting with a shotgun, which may have been responsible for the slight hearing damage.

### **Temporary Hearing Loss**

The first physiological effect of exposure to excessive noise is auditory fatigue. This is manifested by a slight dulling in the hearing at the end of the exposure period, and is often accompanied by a ringing in the ears. This effect is usually temporary, and the loss, from which the ear eventually recovers, is called the Temporary Threshold Shift. The extent of this shift depends on the noise intensity, and is, for chain saw operators, not as great as might be expected, since hearing can recover to some degree during periods of interruption.

Research in the Forestry Commission and in the U.S. Forest Service has shown that in an eight hour day, even with incentive working, the total noise exposure time for chain saw operators is not more than four and a half hours. Industrial Research in the U.K. indicates that recovery from a temporary threshold shift is usually complete sixteen hours after a continuous two hour exposure. In America an evaluation of damage risk was made by monitoring the morning hearing thresholds of power saw operators to determine if the hearing levels at the end of the working day had recovered by either the morning of the following day, or after a free weekend. It was found that such a recovery did take place,

but it was stressed that this conclusion could only apply to sawyers involved in thinning operations.

It could be hypothesised that these research findings explain why there was no evidence of hearing damage to the ten Forest Service operators, especially those with long experience. However in any year a considerable amount of the working time is spent both in clear felling and salvaging windblow. Therefore it is recommended that ear protectors should be worn in all sawing operations.

Occupational deafness has now been included in the list of prescribed industrial diseases which carry the entitlement of compensation. Legal actions between employer and employee are increasing in number, and several successful claims have already been heard. Others have been settled out of Court, and there is a large number awaiting a hearing. Damages ranging from £7,500 to £30,000, less contributory negligence, have been awarded in Northern Ireland.

In the Forest Industry it is not always practicable to apply the control measures, suitable in Factory conditions, to combat the harmful effects of noisy machines, but a Noise Control Policy should be formulated, based on the recommendations of the Code of Practice. This will require constructive co-operation between Management, Trade Unions and employees. Operators are often reluctant to use hearing protectors. It is therefore not enough to make these available. Encouragement and persuasion are needed, and an Education programme, aimed at both Management and workers, is vital to implement Policy. The effects of noise above a certain level are real, and every precaution should be taken to minimise the risk of permanent deafness, to control inefficiency and to provide a congenial working environment.

#### REFERENCES

1. "Code of Practice for reducing the exposure of employed persons to Noise". HMSO 1972.
2. "The Protection Handbook of Industrial Noise Control", by Peter Sutton, B.Sc., M.I.Mech.E.

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# Trees, Woods and Literature

## NOTE ON LOCAL FLORA

*There is a tree native in Turkestan,  
Or further east towards the Tree of Heaven,  
Whose hard cold cones, not being warts to time  
Will leave their mother only for good cause;  
Will ripen only in a forest fire;  
Wait, to be fathered as was Bacchus once,  
Through men's long lives, that image of time's end.  
I knew the Phoenix was a vegetable.  
So Semele desired her deity  
As this in Kew thirsts for the Red Dawn.*

*Note.* *That image* : the forest fire is like the final burning of the world.

From *Collected Poems*, by William Empson, reprinted by kind permission of Chatto and Windus Ltd.

William Empson was born in Yorkshire, England, in 1906. He studied mathematics at Cambridge, and after teaching for some years in the Far East returned to England as a Professor of English Literature. His poetry is sometimes regarded as "difficult" which may partly explain why he supplied his own notes.

The tree of the poem (Turkestan is partly in Russia and partly in China), with its serotinous cones, resembles our familiar *Pinus contorta* which also depends on fire to open its cones in its natural habitat.





# Notes and News

by Wood Kerne<sup>1</sup>

## Getting Rid of Stumps

In *Irish Forestry*, Vol. 26, No. 2, (1969), p. 79, we printed an abstract of a report from the University of Illinois, U.S.A., which recommended a particular chemical mixture, and how to use it to promote combustion in tree stumps. We are indebted to Mr. L. J. Gillick, of the Forest and Wildlife Service, Merrion Street, Dublin, for a report on a private trial of the process on the stump of an elm tree. The holes were bored with a 2 inch diameter hand auger. Because of the difficulty in penetrating the stump the holes were not bored to the full 6 inch depth nor kept to 4 inches apart, centre to centre. "Had I done so I would probably have got a better destruction of the butt, particularly on the outer edges. The butt smouldered for about four days and burned to a depth of about 12 inches from the original stump level. The burning actually took place at the end of June after a prolonged dry sunny spell of weather. I bored the first hole in the centre and worked

1. Standish H. O'Grady in the introduction to his *Silva Gadelica* (1892) quotes the chronicler Holinshed (1583) who, under the heading "The disposition and manners of the meere Irish, commonly called the wild Irish", writes:- "They observe diverse degrees, according to which each man is regarded . . . Of the third degree is the Kerne, who is an ordinary soldier using for his weapon sword and target. Kerne signifieth (as noble men of deepe iudgement informed me) 'a shower of Hell', because they are taken for no better than for rakehels, or the divell's blacke gard, by reasing of the stinking sturre (*mod. hassle*. — W.K.) they keepe wheresoever they be".

The text includes a tale entitled "O'Donnell's Kern". In the course of this, O'Donnell and his retinue, having eaten and drunk well, see coming towards them "a kern that wore narrow stripes: the puddle-water plashing in his brogues, his lugs through his old mantle protruding both, a moiety of his sword's length naked sticking out behind his stern, while in his right hand he bore three limber javelins of the holly-wood charred". After the customary greetings and small-talk O'Donnell invites the kern to sit down, eliciting the reply:- "I'll sit or I'll not sit; for nought do I but that which may be pleasing to myself".

outwards. It is possible that a better destruction of the shell would have been obtained had the first series of 2 inch diameter holes been bored close to the rim and continued inwards.

"It took about three hours to bore twelve holes. About 3 lbs. of the chemical mixture was required, which cost slightly over £6.00 (early 1976). The process is effective".

### **Wetlands Booklet**

The Forest and Wildlife Service of the Department of Lands (Dublin) has published a booklet entitled "Wetlands Discovered" (price 35p) as part of its contribution to the European Wetlands Campaign, 1976. The objective of the Campaign is to focus attention on the importance of wetlands, both natural and man-made, and the need for their conservation and management in the interests of wildlife. Wetlands include all three classes of bog, blanket bog, raised bog and fen, and are therefore of great concern to Irish foresters who depend so much on bog to provide a substrate for their forests.

In introducing the booklet the Minister for Lands, Mr. Tom Fitzpatrick, T.D., took the opportunity to refer to the national network of wildfowl sanctuaries being set up by the Forest and Wildlife Service, which now amounts to 51.

### **More on the Killarney "Scotchmen"**

Following our printing in Vol. 33, No. 1, of a passage wholly uncomplimentary to Scots pine, both in its appearance and utility, Mr. H. M. FitzPatrick draws attention to the fact that A. C. Forbes refers to the same trees in "Tree Planting in Ireland". (R.I.A., Vol. XLI, Sect. C, No. 6).

"Sir Richard Colt Hoare in a 'Journal of a Tour in Ireland' published in 1807, remarks on a general lack of trees. He regrets that a colony of Scotchmen were being planted at the base of Torc Mountain but was informed that they were intended only as nurses. It is interesting to note that those same Scotchmen were cut down in 1917 together with some fine larch beside them, and probably of the same age, for war purposes, and consisted of some of the finest timber ever produced in Ireland".

Mr. FitzPatrick adds that Forbes (later Director of Forestry) was "Timber Controller" in Ireland during the 1914-18 war.

### **Rules for Chain Saw Users**

A new leaflet containing operator instructions for chain saw users has been produced by the British Agricultural and Garden Machinery Association, Church Street, Richmansworth, Herts, England.

The illustrated leaflet deals with how to get the best from the saw — and how to avoid accidents before, during and after use. It is available from BAGMA at a cost of £3 per 100 copies.

### Elegant Variation

A famous phrase in forestry circles in these islands was M. L. Anderson's comment on the selection of species for *Calluna* — or *Sphagnum* — moor sites: "The species which die most slowly are mountain and lodgepole pines, with Scots pine a poor third". (*The Natural Woodlands of Britain and Ireland*. Oxford, 1932). When he came to expand this into a book, however, he adopted a more "objective dead-pan" kind of style in which that striking phrase became watered down to: "If planted with the hardiest and least exacting species, such as Scots pine, shore pine and mountain pine, the trees linger on hopelessly until they die off in the order given". (*The Selection of Tree Species*. Oliver and Boyd, 1950). Some writers need to be protected against themselves.

### Where Are They Now, The Polyhists of Yore?

"At a recent meeting of Cairde na Gaedhilge, held at the Club Rooms, 66 O'Connell Street, Mr. Thomas O'Carroll, B.Agr.Sc. (For.), District Forestry Inspector, Department of Lands, delighted a large audience with his very enlightening paper on the Munster Poet of Penal Times, Aodhgan O Rathaille. The lecturer gave a vivid picture of the conditions of the country at the beginning of the eighteenth century, and said that it was impossible to evaluate the poetry of O Rathaille without a knowledge of the history of the gloomy period in which he lived.

"Mr. O'Carroll compared Aodhgan O Rathaille's poetry with that of Dante, Milton and Shakespeare in its gloom, its rolling music and apt phrasing. He recited in a beautiful, soft, full and musical Munster dialect some of the more famous pieces and did credit to every line and syllable of O Rathaille's famous 'Visions' or 'Satires'.

Mr. Downey, Inspector of National Schools; Mrs. A. Riordan, B.A.; Messrs Sean Daly, B.A.; G. Duggan, Inspector of Taxes; Sean O Mathuna, Gaelic Organiser, and F. Glasgow, also spoke. (*The Limerick Leader*, 30th March 1945)

### Envoi

"Writing is regarded as a pleasure. It is not. The intellectual activity that precedes writing may be. But the mechanical task of driving a typewriter is just as monotonous as minding looms or screwing bolts on a motor chassis, whatever that is".

(A. J. P. Taylor)

# Reviews

## *INTERPRETING THE ENVIRONMENT.*

Edited by Grant W. Sharpe. John Wiley & Sons, Inc. New York, London. Hardback : 566 pages : Illustrated. £10.80.

THIS book should be essential reading in any University or school that professes to teach a course in forest recreation. It should be a book of prime importance to those who manage or who interpret the environment of recreation lands. Why?

To date this is the only comprehensive work published on this illusive subject. The information offered is comprehensive, practical and lucid. It comes, not from the mind of one man, but from the collective experience of many in the field. Above all the presentation is fresh, never mundane and never violates the sound philosophic principles on the subject as laid down by Freeman Tilden. (*Interpreting our heritage*, Univ. N. Carolina Press).

The book divides itself into five sections.

(a) The interpretive process : This section introduces the reader to the origins and development of wild land interpretation and concludes with thoughts on the production and management of interpretive plans.

(b) The techniques of interpretation : By far the most important and most difficult aspect of interpretive work. Ten chapters in all grapple with the problems involved. The difficulty with proper interpretation is that it is based on solid scientific knowledge yet this knowledge must be presented in a form suitable to the understanding and experience of the park visitor. Satisfactory interpretation is an art which depends for its level of success on the individual skill of the interpreter.

This block of ten chapters is the red meat next to the bone. Collectively they have successfully confronted this most difficult aspect of interpretation. If this section had fallen down in its deliberations on this central core of the subject matter I would have rejected the total book as irrelevant.

(c) Supporting activities : This section I feel is not too important for our present needs. However, there are two chapters that I would draw attention to — one deals with aspects of marine interpretation, and the second interprets the sky (astronomy). Both subjects are usually ignored by interpreters. Due no doubt in the main to lack of knowledge in these areas, but also I feel that

traditionally interpretation has commonly had a forest setting, and things of the stars and of the dark trenches of the sea are not quite forestry!

(d & e) The last two sections conclude the text with thoughts on education in the field of interpretation and introduces the reader to interpretative processes in several countries. The chapter here which examines the personal attributes of a good interpreter is note worthy: It removes a lot of misconceptions and sheds light on the personality requirements of an interpreter. Interpretation is not a science but an art imbedded in the personality of the interpreter.

In reviewing books it is customary for the reviewer to find some faults or omissions, if for no other reason than to suggest that he himself is a fine astute fellow who, if he had not so many other pressing commitments, could himself sit down and turn out a book superior to the one under review. For this review I can find no fault. At best I can offer our readers a caution — the tone and temperament is North American in outlook. The historic past and the prevailing disposition of a people produce a national attitude towards wild things. In my view, Ireland is a country of small scale geography, of gentle hills and forest and lonely bog — to interpret these lands for forest visitors this book of ideas will be invaluable as long as one is conscious of, and does not incorrectly portray this mood of our wild places.

P. Mac Oskair

*THE NATURAL HISTORY OF TREES.* Herbert L. Edlin.  
Weidenfeld and Nicholson; The World Naturalist Series.  
£10.00 (plus tax).

*TREES AND BUSHES OF EUROPE.* Oleg Polunin with drawings  
by Barbara Everard. Oxford University Press. £5.25 (plus tax).

One might begin by asking who these two books are intended for. Neither author is specific on this point. Edlin covers the whole of forestry and a number of related subjects in 260 pages, plus 66 monochrome photographs. The compression required, while done with the greatest of skill, has led at times to excessive generalisation, and at times apparently to despair: "Altogether the restriction of water loss is a complex requirement for which varied solutions have been found". The rapid succession of concentrated factual information would be quite undigestible to the general reader, and would be of little use to a forester, except perhaps as a handy *aide-memoire* to material which might have faded in his memory since student days. The book can, however, be

recommended to students of second level education in search of material for those interminable "projects" (which seem now to be as integral a part of education as mitching was a few decades ago).

On the whole Edlin maintains an objective attitude, rarely allowing his personal opinions to come through, as in his reference to "some obscure long-haired or densely bearded *researcher*" (Would he be any better at his job after a haircut and shave?) "on his way to speedy promotion to a professional chair". He seems to regard forestry as a rather static enterprise, and makes no attempt to look into the future. On two separate occasions he refers to the "trifling" amounts of nutrients removed in timber harvesting, whereas current trends in technology suggest that these removals may become quite significant in the near future.

Polunin's preface claims to "enable the user (not defined) to identify all the native trees and bushes that grow wild in Europe to over two metres". It will — up to a point; that is, provided the user is satisfied to have *a* name for his specimen but is not too fussy about 100% botanical exactitude.

Initial choice is based on leaf shape, 14 classes. From this you decide on your genus or species. In the latter case you check your choice against the illustrations and text. One might for instance wonder, though, whether it is helpful to read that the lemon (*Citrus limon*) is "unmistakable when bearing ripe fruit". If you decide on a genus you may be faced with a dichotomous key. Right; we decide we have a pine and turn the key to *Pinus*. First question: leaves in clusters of two or not? Clusters of two. O.K. Next question: seeds wingless or with well-developed wings? *Seeds?* Wow!

The colour photographs, though small — up to eight to a page, are quite superb, and in themselves make this book worth having.

Wood Kerne

#### OTHER PUBLICATIONS RECEIVED

*Northern Ireland Agriculture, 35th Annual General Report of the Department of Agriculture, Year ended 31 March, 1976.* Belfast: HMSO, £2.00.

(Yes. 1976! — Ed.)

*Report of the Director-General of Forests for the year ended 31 March, 1976.* Government Printer, Wellington, New Zealand. 45c.

(Yes. Again 1976! — Ed.)

## Forestry Commission Publications

## BULLETIN

54. *Aspects of Thinning*. Proceedings of a meeting of a IUFRO Project Group on Economics and harvesting of thinnings, Edinburgh, October 1974. Edited by G. J. Hamilton. £2 50.

## FOREST RECORDS

106. *Mushrooms and Toadstools of Broadleaved Forests*, by Roy Watling. £1.00  
107. *Mushrooms and Toadstools of Coniferous Forests*, by Roy Watling. £1.00  
108. *Tests on Round Timber Fence Posts*, by J. C. Clarke and R. C. Boswell. £1.70

## LEAFLET

65. *Group Dying of Conifers*, by D. H. Phillips and C. W. T. Young. 30p

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Letter to the Editor

The Editor,  
Irish Forestry

Dear Sir,

Without wishing to labour the points raised in our correspondence (Vol. 32, No. 2, 1975) we nevertheless feel obliged to comment briefly on the reply by Dickson and Savill, (last issue).

Our aim was simply to underline the dangers inherent in adopting vegetation as a sole criterion for site classification. We regarded it as unfortunate, (and we still do), that the authors rejected soil characteristic as an index of forest site quality on the basis of results obtained by analytical methods designed for agricultural crops. That was it, no more and no less. As stated in our original correspondence we find it "encouraging" that the authors were "successful in relating site vegetation to fertiliser needs on both deep peat and gley soils". Thus our comments should not be construed as criticism of Dickson and Savill's research or findings, but rather as a reminder to readers that there is another viewpoint, which in our opinion is a valid one.

Yours faithfully,

R. McCarthy  
M. L. Carey

# Society Activities

## ANNUAL GENERAL MEETING

### COUNCIL REPORT FOR 1975

#### Council Meetings

Six Council meetings were held during the year. Attendance was as follows: D. McGlynn, F. Mulloy, J. Prior, C. Tottenham and J. Dillon, 6 meetings; Miss L. Furlong, P. M. Joyce and M. O'Brien, 5 meetings; T. Clear, N. O'Carroll and M. O'Donovan, 4 meetings; W. Luddy, J. Mackin, P. Savill and T. Wilson, 3 meetings.

#### Society Meetings

Three successful mid-week field visits were held in West Fermanagh (Belmore Forest, Ballintempo Forest and Florencecourt Estate), in Knockdrin and Tullyally Estate, Co. Westmeath and in Edenderry Forest (including Trench 14 of Clonsast Bog). Indoor meetings included talks on "Need for Forest Recreation — and how it is being met" and "Oceanic Forestry". The Society is grateful to the field leaders and indoor speakers. Special thanks are due to the owners of the estates visited during the year.

#### Guided Forest Walks

Over 5,000 persons participated in the Walks which were held at 38 centres last September. President O'Dalaigh officially opened the Walks at Avondale. The Society wish to thank the Forest and Wildlife Service, Dublin and the Forest Service, Belfast for their assistance, and those members who acted as Walk leaders at the various centres.

#### Annual Study Tour

Co. Clare hosted the Annual Study Tour which was held in June with headquarters in Ennis. A summary of tour events is reported in Vol. 32, No. 2 of "Irish Forestry". Our thanks are due to Mr. M. O'Donovan and Mr. E. Larkin, tour leaders, and staff who assisted with the organisation in conjunction with the Meetings sub-committee.

#### Annual General Meeting

The 33rd A.G.M. was held on Saturday, 22nd March, 1975, at the Shelbourne Hotel, Dublin, the minutes of which were printed in "Irish Forestry", Vol. 32, No. 2. Under public business Professor M. Van Miegroet of the University of Gent, delivered a paper on "Fundamental Options in Silvicultural Management" (also published).

#### Society Publications

Numbers 1 and 2, Vol. 32 "Irish Forestry" were published and a revised "Why Forests" was issued with other literature in conjunction with the Guided Forest Walks publicity drive.

The Index covering Vols. 26-30 of "Irish Forestry" has been printed.

The draft of the second (revised) edition of "The Forests of Ireland" is approaching completion.

An updated map showing the present forest estate, which was compiled with the co-operation of the Forest Services has been printed.

#### New Members

During the year 69 new members were elected to membership of the Society. This exceptional increase includes 45 technical, 12 associate and 12 student members.



**Examinations**

The Preliminary Certificate examination has been held but results are not available at time of printing. The Foresters Certificate examination to be arranged shortly.

**Elections**

Three positions of Technical Councillor for the period 1976-1978 were filled by election.

**Membership Fee Increase**

Due to increasing costs the Council has decided to raise membership fees, as and from 1st January, 1977, the new fees will be as follows:- Technical, £4.00; Associate, £3.50; Student, £2.00.

Council regrets having to take this action but points out that the last increase took place on 1st January, 1972.

**Miscellaneous**

Requests from the general public for literature on forests and forestry are ever increasing in number. Most of the requests come from school-children and students who are doing projects on the subject. The Council feels that this is a healthy indication of a greater awareness by the public towards forestry.

Signed: JAMES DILLON  
(Hon. Secretary)

**MINUTES OF THE 34th ANNUAL GENERAL MEETING, SATURDAY  
13th MARCH 1976, IN THE SHELBOURNE HOTEL, DUBLIN**

The President, Mr. D. McGlynn in the Chair, present were Misses L. Furlong and M. Robinson; Messrs P. M. Joyce, J. O'Driscoll, T. A. Barry, D. Mangan, O. V. Mooney, T. Clear, C. B. Tottenham, H. Kerr, T. J. McCarthy, P. S. Savill, J. J. Prior, F. Mulloy, M. O'Brien, J. A. Mannion, N. O'Carroll and J. Dillon. Apologies were received from Messrs W. H. Jack, T. McEvoy, D. A. Dickson and D. M. Craig.

**Secretary's Business:** The minutes of the 33rd Annual General Meeting having been published in *Irish Forestry*, Vol. 32, No. 2 were taken as read and duly signed. Council Report for 1975 was read to the meeting and its approval was proposed by Mr. O. V. Mooney and seconded by Mr. M. O'Brien.

During the discussion that followed it was reported that the three midweek day tours were most successful with attendances between 70-100 persons on each occasion. There was general agreement that these mini study tours should be continued for the coming year. It was also reported that two indoor talks had been held. The Annual Study Tour held in Co. Clare attracted a very large attendance and proved to be a great success. After much discussion on the increased attendances at day meetings and study tours it was agreed that if any restrictions on numbers was necessary it would be left to the discretion of the Meetings Committee.

In reporting on the Guided Forest Walks held in September, 1975,

Mr. Mulloy pointed out many of the problems associated with the organisation of the event. It was difficult to obtain adequate publicity on this occasion, and where numbers in excess of 100 turned up at venues it created problems of communication. The President commented on the growing awareness of the population towards forestry and in particular he mentioned the Young Scientist Competition where a Co. Cork group won an award for a project on their local forest.

The Editor reported on the "Forest Booklet" and stated that he was still awaiting material from some contributors and was hopeful that the booklet might be ready towards the end of 1976. Dr. O'Carroll regretted the very poor response received to his questionnaire on the format and future of *Irish Forestry*. Only 21 replies had been received to date from a membership of almost 600.

**Abstract of Accounts:** The Treasurer elaborated on the increases in membership fees which would function from January 1st 1977. He stated that if the increases were to follow the Consumer Price Index system the fee for technical membership would be £4.78 on January 1st, 1976. Instead, technical membership fees would be held at £4.00, associate at £3.50, and student fees at £2.00 from January 1st, 1977.

The adoption of the Statement of Accounts was proposed by Professor T. Clear and seconded by Mr. O. V. Mooney.

Examinations Convenor, Mr. J. Prior, explained to the meeting our affiliation to the Central Forestry Examinations Board. He also reported that a special subcommittee was considering the updating of the present examinations syllabus.

**Elections:** The 1976 Council elections were confirmed as follows: President, P. M. Joyce; Vice-President & Treasurer, F. Mulloy; Secretary, J. Dillon; Editor, N. O'Carroll; Business Editor, M. O'Brien; Honorary Auditor, H. Jack; Councillors, Technical, E. Joyce, J. Prior, P. Savill; Councillors, Associate, L. Furlong.

**Presidential Address:** Before handing over the Chair Mr. McGlynn stated that the time was now ripe for a long term forest policy plan. We are now entering an era where home-grown timber is about to make its biggest impact on the utilisation market. He warned that the forest interest must be protected on all fronts and recalled the Society's recent and successful representation to the Minister for Lands, in having certain amendments made to the Wealth Tax Bill, in order to protect the private forestry sector.

He added that the Society was again seeking to have amendments made to the Capital Gains Tax Bill, on behalf of the private forestry interest, but he regretted the lack of response shown by the Minister. In conclusion, he felt that the EEC Draft Directive on forestry might be encouraging provided that no 'watering-down' of the proposals occurred. Finally, the President thanked the Society and Council for their assistance during the past year.

**Programme for 1976:** Annual Study Tour; arranged for late May-early June with headquarters at Tramore.

4 midweek day tours: (1) Omagh area, April; (2) Cloosh Valley Forest, July; (3) Tyrone/Fermanagh, September; (4) West Cork, September.

2 Sunday meetings: (1) Cavan/Monaghan, Private Estate; (2) Wicklow region.

3 indoor meetings: Two for Dublin area, and one talk for a country venue.

As a mark of respect to deceased members, Mr. T. Donovan, Mr. W. B. McGuinness and Mr. M. Boland, one minute's silence was observed.

The meeting concluded at 17.50 hrs.

**SOCIETY OF IRISH FORESTERS**  
**STATEMENT OF ACCOUNTS FOR YEAR ENDING 31st DECEMBER, 1975**

RECEIPTS				PAYMENTS			
1974		£		1974		£	
1,899.95	To Balance from last Account		2,912.10	16.43	By Stationery and Printing		159.86
	" Subscription received			910.29	" Printing of Journals & Reprints		1,019.56
	Technical 1975	938.50		297.70	" Postage		303.00
	Technical 1974	17.00			" Expenses re Meetings		
	Associate 1975	231.00			A.G.M.	122.46	
	Associate 1974	2.00			Annual Dinner	42.90	
	Student 1975	28.00		11.81	Other	29.71	195.07
	Other arrears	11.50					
1,250.13	Advance payments	97.36	1,325.36	—	" Presentation to Mr. D. M. Craig		56.00
	" Interest on Investments			7.50	" Bank Charges		9.00
	Dublin Corp. 9 $\frac{3}{4}$ % Stock	20.10		220.91	" Secretarial Expenses		298.55
210.09	Savings Account	209.76	229.86	43.03	" Value Added Tax		71.25
	" Journal			—	" Examination Expenses		54.92
	Sales	166.83			Honoraria		
1,038.33	Advertising	745.35	912.18		Secretary	20.00	
	Contribution from Forest			50.00	Treasurer	20.00	
	& Wildlife Service				Editor	20.00	
	Promotion of Forest Walks	675.34			Business Editor	20.00	80.00
911.52	Publication of				" Forest Walks		
	"Why Forests"	458.88	1,134.22		Outstanding 1974 Account	63.88	
	" Examination Fees		2.50	847.89	Promotion of Walk	675.34	
7.65	" Book sales				Publication of		
	" Donation		8.50		"Why Forests"	458.88	1,198.10
					Balance		
					Current and No. 2		
					Account overdrawn	(63.32)	
				2,912.10	Savings Account	3,142.73	3,079.41
5,317.66			6,524.72	5,317.66			6,524.72

I have examined the above account, have compared it with vouchers, and certify same to be correct, the balance to credit being £3,079.41 which is on Current and Savings Accounts at the Ulster Bank Ltd. less uncashed cheques totalling £195.03. There is also a holding of £206.19 Dublin Corporation 9 $\frac{3}{4}$ % Stock.

Dated 9th February, 1976

W. H. JACK,  
Honorary Auditor

**One-Day Study Tours**

**Cloosh Valley Forest, Co. Galway.** Friday, 9th July, 1976.  
Leader : M. Cassidy.

The group (of about 100) visited first a 13-year-old spacing trial with coastal lodgepole pine, growing at a rate indicating yield class 18, under optimal nutritional conditions. Then to a 15-year-old crop of Monterey pine where the survivors by their height and girth indicated a high potential for this species on western blanket bogs if the problems associated with its establishment and early mortality could be overcome. The silvicultural treatment of a crop of Lulu Island lodgepole pine was discussed, and the tour ended with a visit to an area of fertiliser experiments and a demonstration of the beneficial and lasting effects of pre-planting reclamation, including the addition of granite gravel, on 24-year-old Sitka spruce.

**Ballyvourney Forest, Co. Cork.** Friday, 17th September, 1976.  
Leader : John F. Ryan.

The subject of study was the harvesting of sawlog and pulpwood. Demonstrations included extraction and piling of sawlogs by Highland Skidder; line and chevron extraction of pulpwood by Holder skidder; extraction of line and chevron and line thinning of pallet and pulpwood by Sky-line; and extraction of line thinnings by Drabant.

**Sunday Meetings**

**Hilton Park, Clones, Co. Monaghan.** 16th May, 1976. Leader : Major J. W. R. Madden.

**Avondale, Co. Wicklow.** 10th October 1976. Leader : O. V. Mooney.

**Forest Walks**

The annual guided forest walks for members of the general public, organised with the co-operation of the Forest and Wildlife Service, Dublin, and the Forest Service, Belfast, were held on Sunday, 12th September, 1976. The details of the individual walks are given below.

**Ard na Geeha, Cong, Co. Mayo:**

Scenic walk by Lough Corrib through mixed woodland. (P. Campbell, M. Cassidy, C. Hanley.)

**Ballinalee, Co. Longford:**

Tree production from seed to sawdust. (L. Diffley, K. McLoughlin.)

**Ballyfarnon Forest, Co. Roscommon:**

Scenic walk through broadleaf and conifer woodland. (M. Donnelly.)

**Ballykilcavan, Stradbally, Co. Laois**

*By kind permission of Mr. P. Walsh-Kemmis:*

Broadleaf and conifer plantations various stages of development. (S. R. Fyfer.)

**Ballyshannon, Co. Donegal:**

Scenic walk through conifer woodlands with views of lake and mountains. (K. F. Quinlan).

**Baronscourt, Newtownstewart, Co. Tyrone:**

Deer centre and enclosure. Silvicultural research and management. (W. J. Bryan.)

**Baronstown, Ballinacarrigy, Co. Westmeath:**

Afforestation with a variety of broadleaf and conifer trees. (J. Naughton, M. J. Sheridan, J. Quinlivan.)

**Bishopswood, Dundrum, Co. Tipperary:**

Mature exotic conifer and broadleaf species, wildlife and amenity interests. (J. Hanly.)

**Carns, Co. Sligo:**

Diverse broadleaf and conifer forest. (C. C. Crowley, T. Gallen, T. Tunt.)

**Carrickbyrne, Co. Wexford:**

Scenic woodland at various development stages. (J. Vaughan.)

**Castleshane, Co. Monaghan:**

Mixed broadleaf and conifer woodland. Waterfall and castle ruins. (M. Dooley, J. Finlay.)

**Clonegal, Co. Wexford:**

Forest nursery with ten million trees. Poplar cultivation and wildlife interest. (P. J. Cotter G. Murphy, J. J. O'Reilly.)

**Cratloe, Co. Clare:**

Mature conifer forest with natural oak woodlands. (E. Larkin, M. O'Donovan.)

**Cullaun, Tulla Forest, Co. Calre:**

Conifer and broadleaf trees on limestone soils. Amenity, historic and wildlife interests. (J. Stapleton, P. J. O'Sullivan.)

**Demesne, Mountbellew, Co. Galway:**

Mixed conifer and oak plantations, museum, wildlife and amenity interests. (J. Cronin.)

**Devil's Glen, Ashford, Co. Wicklow:**

Scenic walk through Devil's Glen. Amenity and commercial forest. (H. M. FitzPatrick.)

**Donadea, Co. Kildare:**

Diverse broadleaf and conifer forest. Restoration of lake. (J. P. Connelly, P. Crowe, E. Fitzpatrick.)

**Galtee, Co. Limerick:**

Scenic riverside walk through mixed broadleaf and conifer forest. (J. M. Moloney.)

**Glenbeigh, Co. Kerry:**

Wide variety of tree species and their management. Panoramic views of coastline and mountains. (J. Costelloe, D. Walsh.)

**Glencree, Co. Wicklow:**

Scenic walk through mature conifer woodlands. (S. Hayes, A. P. Higgins.)

**Headford, Virginia, Co. Cavan:**

Interesting variety of conifer and broadleaf species. (A. McGinley, M. Ryan.)

**Island Wood, Newmarket, Co. Cork:**

Amenity walk through conifer forest. (P. J. Hayes, J. O'Mahony.)

**Killakee, Co. Dublin:**

Wide variety of broadleaf and conifer trees overlooking Dublin city. (J. Fennessey, F. Mulloy, M. O'Brien.)

**Kylebrack, Loughrea, Co. Galway:**

Mixed coniferous woodlands, wildlife interests. (P. Giblin, E. McGuinness.)

**Ravensdale, Dundalk, Co. Louth:**

Commercial and scenic aspects of established conifer and broadleaved forest. (T. J. McCarthy.)

**Thomastown, Kilfinane, Co. Limerick:**

Mixed forest of broadleaf and conifer trees. (L. O'Connor.)

**Tollymore Forest Park, Co. Down:**

Forest plots and arboretum of native and exotic broadleaf and conifer trees. (S. Harris, D. Fitzpatrick, R. T. Sherwood.)

**Tourmakeady, Co. Mayo:**

Forest at variety of development stages, wildlife and amenity interests. (T. DeGruineil, R. O Cinneide.)

**Warrenscourt Wood, Kilmurray, Co. Cork:**

Conifer woodlands interspersed with broadleaf trees. (T. Galvin, P. Verling.)

**Woodquarter, Milford, Co. Donegal:**

Scenic walk through mixed woodlands. (N. Foley.)

**Annual Study Tour**

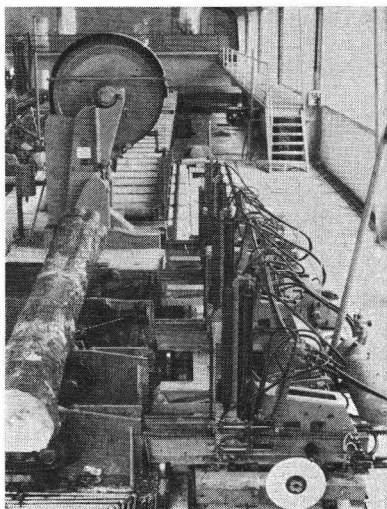
A report on the 1976 study tour, centred on Tramore, will appear in the next issue.



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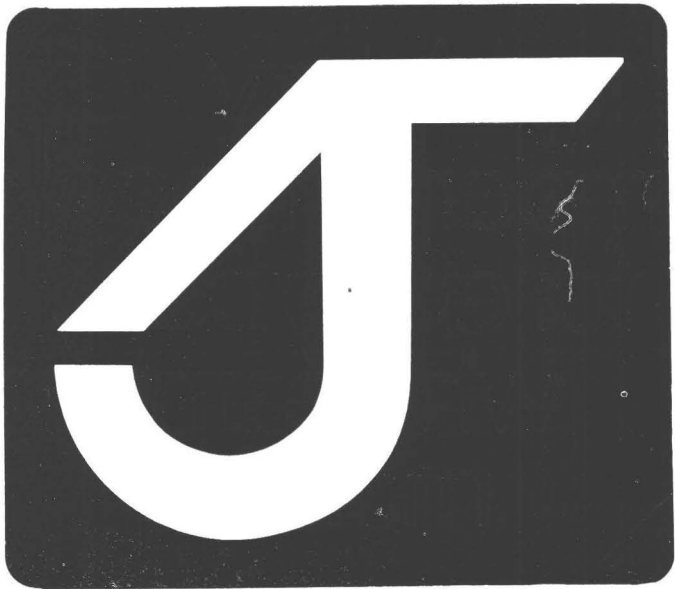
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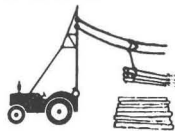
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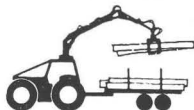
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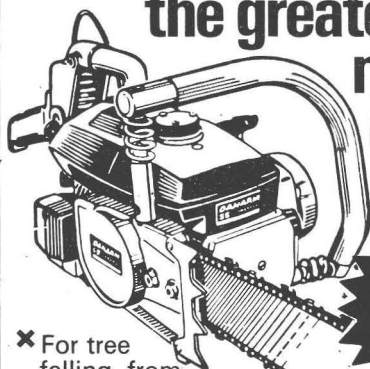
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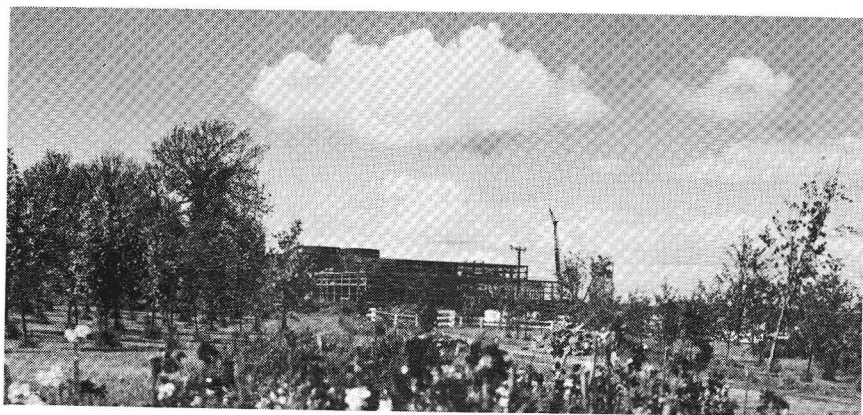
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