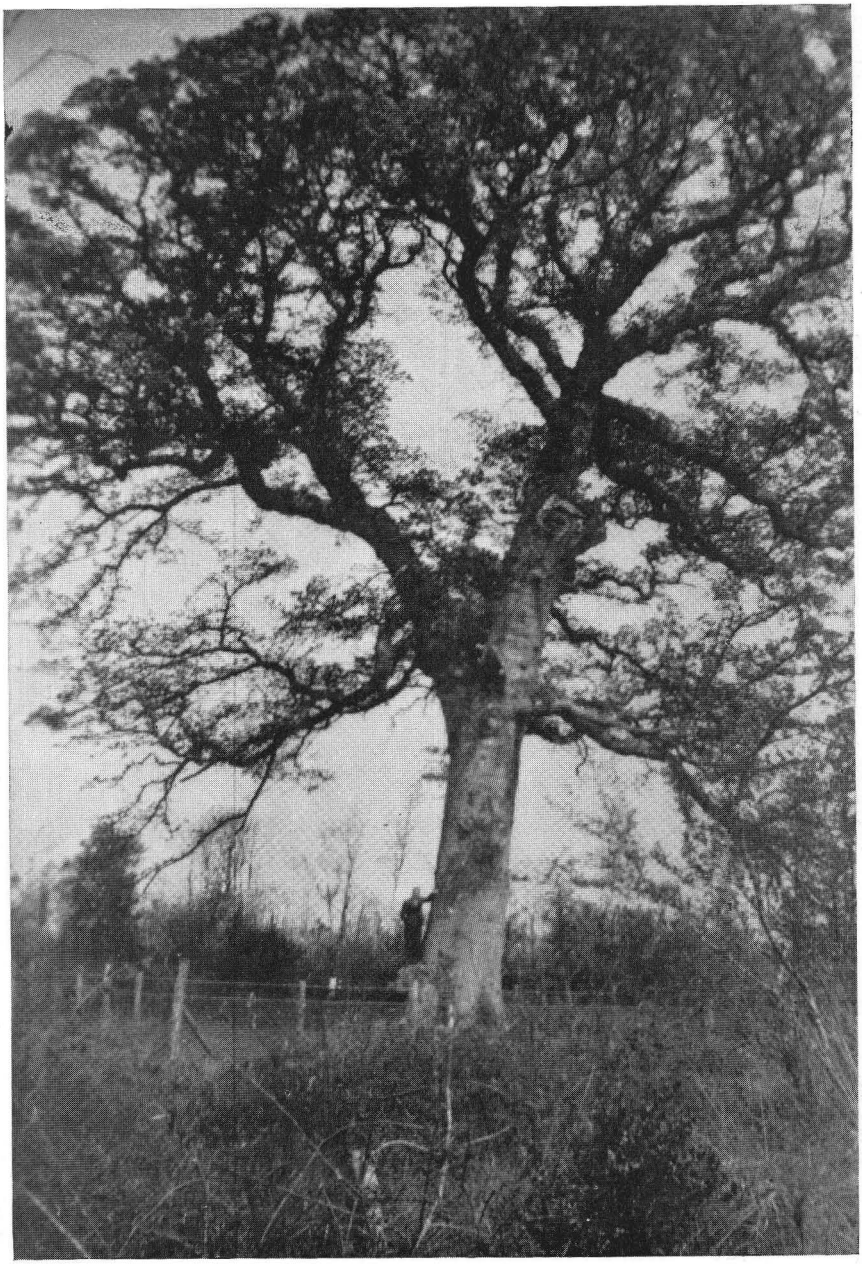
IRISH FORESTRY



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CONTENTS

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IRISH FORESTRY

VOLUME XI SUMMER NUMBER 1

MODERN TRENDS IN THE UTILIZATION OF FOREST PRODUCTS

By E. G. RICHARDS (British Forestry Commission).

INTRODUCTION

TIMBER was one of the earliest raw materials to be exploited by man; and the history of the utilization of wood is as old as the history of man himself. Our primitive ancestors in their struggle for existence required wood to perform for them a few but essential tasks; to-day, in our more complex world, we make use of wood in vastly greater numbers of ways, either in its natural state or by processing it to such an extent that the finished article bears little or no resemblance to the original material. This paper does no more than touch upon a few of the modern uses of wood in which we, as foresters, are interested. In particular the emphasis is on the demand for timber in Great Britain which can be met from young conifer plantations. The Census of Woodlands showed that, in 1947, the total area of Forestry Commission Woodlands amounted to over half a million acres, mainly conifers. Private woodlands amounted to $1\frac{1}{4}$ million acres, thirty per cent of the area being conifers. (The figures refer only to high forest, and exclude areas classified as e.g., scrub, coppice, felled or derelict.) It has been estimated that for purely silvicultural reasons, about nineteen million hoppus feet of soft-wood thinnings and seventeen million hoppus feet of hard-wood thinnings could be removed annually from the above areas of high forest. In State forests there has not been a great discrepancy between the theoretically desirable and actual thinning programmes; in private woodlands, however, much remains to be done, particularly in the case of hard woods.

In the case of conifers the principal species in plantations between ten and forty years of age are:

Scots and Corsican Pine	..	39 %
European and Japanese Larch	..	22 %
Norway and Sitka Spruce	..	31 %
Remainder (Douglas Fir the most important)	..	8 %

As far as the soft woods are concerned, with one major exception, the question of species has not so far played a very important part in determining the price of small conifer poles. On account of its greater strength and durability European Larch has always commanded a better price than other soft woods. During the war, when prices were controlled, higher rates were fixed for larch. Since decontrol of prices this differentiation has continued and, for example, when larch is ordered specially, 10 % is added to mixed conifer prices for pit props.

In the hardwoods category the English oak, ash, and beech occupy about 70 % of the 227,000 acres of hard-woods between ten and sixty years of age. The most important species in the remaining 30 % of the area are birch and sycamore.

Generally speaking, hard-wood poles are more difficult to market and command a lower price than the soft woods. ,Much depends on whether there is a wood turnery in the neighbourhood.

Demand for Timber in Great Britain

The consumption of timber in Great Britain in 1950 was 706 million hoppus feet over bark (" roundwood equivalent ") of which about 45 % comprised soft woods, about 15 % hard woods and 40 % derivative products—largely pulp for paper making, but including a substantial quantity of plywood and veneers. Home grown timber consumed amounted to 92 million hoppus feet over bark (" roundwood equivalent ") of which soft woods formed about one quarter. This was a year when soft wood consumer licences were required, but hard woods were freely available.

It may be of interest to examine several of the markets in greater detail.

Mines. In very round figures the mines absorb 80 million hoppus feet of timber annually. The bulk of the timber is consumed in lengths of three to six feet with a range of top diameters from three to six inches. Soft woods account for all but between six and eight million cubic feet of the total annual consumption. Hardwood mining timber is not imported and the use of hard-wood pit props has recently ceased in some pits. About 30 % of the total consumption is in the form of sawn mining timber, e.g., crown-trees, splits, pit sleepers, cover boards and chocks.

In considering soft wood round mining timber from the forester's point of view two distinct types of produce are involved. Firstly, there is the sale of partially prepared timber which may be dispatched to a specification allowing a range of lengths and top diameters. In this case the final preparation or cutting to size may be done, for example, at the colliery. Secondly, there is the sale of the prepared pit prop manufactured to a fairly rigid specification. Although the overall requirements of the mines are such that a wide variety of sizes of prop may be prepared, practical considerations have to be taken into account. The size of prop required varies from pit to pit, and

from time to time at any one pit: this one factor alone precludes the forester from merely choosing the range of prop sizes most suited to any particular parcel of thinnings and cutting accordingly. Normally, only one size of prop is loaded on to a railway wagon and, except in large-scale thinning operations, there is a danger, when cutting too many sizes, that the forester is left with part-wagon loads. By obtaining firm orders in advance and by limiting sizes to a few for each forest, the chances of preparing pitwood profitably are enhanced. Whilst these may seem to be very elementary points they are sometimes overlooked.

Cutting pit-props to exact sizes rather than to general specifications may necessitate peeling and seasoning, and in fact the use of peeled seasoned pitwood is tending to increase. If peeling and seasoning are undertaken, the forester's supervisory duties are increased and the money spent on preparing the peeled props must be idle until seasoning is completed and the props sold. On the other hand, peeling enhances the appearance of pit-props; seasoning, which is accelerated by peeling, reduces their weight and increases their strength. These two factors may be very important in helping timber to maintain its place *vis-a-vis* other materials in the propping and shoring of mines.

Pulpwood and Boardmill Material

In relation to the utilization of thinnings it may be convenient to consider what is generally termed pulpwood under three main heads, viz., wood used for the manufacture of (i) textiles, (ii) paper, and (iii) fibre boards. There are, at present, no pulp mills in Britain producing pulp for the manufacture of textiles; none of the paper pulp mills using wood are dependent to any extent on home-grown timber for their supplies, but the fibre-board mills rely to an increasing extent on home-grown timber. However, the possibilities of setting up new plants based entirely on home-grown timber have often been discussed and this provides the excuse for mentioning the subject of " pulp " very briefly to-night.

(*i*) *Textiles.* The use of wood for the manufacture of textiles is comparatively new, even though rayon was the first textile fibre to be made by man. In 1920 the production of rayon in Europe was just over 10,000 tons per annum, compared with about 800,000 tons to-day, made mainly from dissolving wood pulp. The latter figure represents a considerable consumption of timber with spruces as the most important group of species—when it is realized that it takes very nearly 200 hoppus feet of roundwood to make one ton of rayon.

(*ii*) *Paper.* Pulp for paper making can be produced from a wide range of vegetable fibres, but for one reason or another the extent to which is it possible to produce paper-pulp on a commercial scale has so far been rather more limited in practice than the theoretical studies of the problems have indicated. Fortunately wood is par-

ticularly suitable for the manufacture of paper pulp on a commercial scale. A number of processes may be used dependent on the species available or the end use of the pulp or a combination of both. Briefly these processes are:

(*a*) *Mechanical* (*Groundwood*) *Pulp*

Roundwood is ground by means of large stones into fibres. Yields are high (69 hoppus feet pulpwood per ton of pulp). As can well be imagined, soft woods that can be used in this process are limited to those with a comparatively low resin content. Hitherto, spruce has been the only soft wood used on any scale in Europe and Scandinavia; of the hard woods aspen and poplar have been used on a limited scale on the continent.

(*b*) *Chemical Processes*

Mechanical pulps have a somewhat limited range of uses, mainly for newsprint and paperboard. Pulps produced by the action of chemicals on wood chips have a wider range of uses, although approximately twice as much timber may be required to produce one ton of pulp.

The *sulphite* process, like the mechanical process, has hitherto been capable of using only conifers with a small resin content and has therefore been in competition for the not unlimited supplies of spruce in Europe. Broad-leaved species free from tannins and other heartwood substances are suitable, e.g., birch, beech, poplar and willow.

Very recently it has been announced that, in Sweden, Stora Kopperbergs Berlag have been able to produce sulphite pulp of good quality from Scots pine by using a two-stage sodium bisulphite cooking process, thus enabling them to utilize large quantities of small-sized pine for which there has been a somewhat limited market in the region of one of the main spruce-sulphite-pulp producing centres.

The *sulphate* process can make use of most conifers and a number of temperate hard woods. This advantage in the way of raw materials has to some extent been offset in the past by the limited range of papers that could be made from sulphate pulp. In the last twenty years modern methods of manufacture have overcome this disadvantage and it is now possible to produce a high quality pulp by the sulphate process.

Semi-chemical. Mention must also be made of the possibility that in the future more wood may be pulped, partly by chemical and partly by mechanical means. This so-called semi-chemical process gives the high yields of mechanical pulp from a much wider range of species than are acceptable in the conventional mechanical pulp-mill. As in the early days of the sulphate process the use to which the pulp can be put is—at the present time—somewhat limited. There is

hope, however, that in time improvements in the manufacturing techniques can be expected to remedy this situation.

All the above processes require bark-free timber of four inches diameter and up, and to be economic the weekly intake must be reckoned in hundreds of tons of timber.

Fibreboards

From the forester's point of view the manufacture of fibreboards from wood is a somewhat less exacting operation than the manufacture of paper pulps. Unbarked timber is acceptable, and in diameters below those normally acceptable in paper pulp mills. Virtually all the common conifers can be used, although the larches are not looked on with great favour. Poplar and willow, and to a lesser extent chestnut, birch, alder and beech, may be used in mixture with conifers.

Fibreboards, whether they be hard boards or insulating boards, have two outstanding advantages over natural timber—they can be made to given—and rather precise—specifications, and they can be made in large sizes. In addition they are frequently made from a proportion of small diameter timber which it would be difficult to dispose of in any other way.

Sawmill waste and roundwood waste from the cross-cutting of round timber to lengths can also be used in boardmills, although special machinery is generally required to chip slabwood effectively.

Chipboards

Although, strictly speaking, not within the " pulping " field, mention must be made of chipboard manufacture. Chipboards are made by bonding together of " chips "—produced from shavings and offcuts from woodworking factories—by synthetic resin glues. A strong board of rather large dimensions can thus be made from material which has hitherto been classed as " waste." Recently much thought has been given to the advantages that would accrue if the solid wood were cut into shavings specifically for chipboard manufacture. This may be an important development from the forester's point of view, in that forest thinnings, and perhaps sawmill slabwood of reasonable size, will probably play a greater part in the chipboard factory of the future than they have in the past.

Agricultural, Horticultural and Estate Timbers

In considering the enormous consumption of timber by the mines and the wood-hungry pulp and board mills, one must not lose sight of the humbler local markets for thinnings. In fact, at present, in Britain, the next most important group of industries after the mines, from the point of view of the utilization of small thinnings, are those using fencing stakes and stakes for agricultural and horticultural work. These markets absorb approximately 20 % of

the thinnings from State forests and use both conifers and hard woods. The quality required is inferior to that required by the mines and the range of sizes is greater. Poles are sold in the length for the manufacture of rails for fencing and pergola work for public parks and private gardens. The demand near big towns is heavy and there has been a good demand for round stakes for use on the new housing estates developed since the war.

Sawn Softwood Timber

So far we have mentioned two extremes in utilization, the use of timber mainly in the round, and the demand or potential demand, for round timber which undergoes a complete transformation before it reaches the final consumer. What of sawn timber—the " partially processed " wood ?

The main end uses to which sawn softwoods were put in 1949 are given below. The figures are no more than an estimate based on the issue of consumer licences for soft woods. Unfortunately there are no comparable figures for pre-war years and figures for 1950-52 have not been issued.

1949	*Thousand Standards*	*Million Cubic Feet*	%
General Industry ..	150	25	13
Export Packing ..	240	40	21
Food Packing ..	35	6	3
Shipbuilding and Repairing ..	45	7	4
Transport ..	115	19	10
Housing	340	56	29
Other Building ..	130	21	11
Miscellaneous ..	110	18	9
Total	1,165	192	100 %

It is at once obvious that housing and building are together the main consumers of sawn soft woods (40 %); what is even more interesting, and perhaps less often appreciated, is that packing (24 %) is the next largest market for sawn soft woods (and this too in a year when hard woods were free from consumer licence restrictions). The demand for the smaller sizes of boxboard is one that often can be met from thinnings, particularly from butt-cuts which are too stout or short for mining timber or pulpwood, yet too short for conversion to sawn lumber.

It is not always so easy to meet the demand for building timbers from thinnings, since building timber is frequently required to be either in long lengths or of high quality, or both. This is not to say that good structural timbers cannot be obtained from thinnings; they can, but the material will require to be selected.

SAWN HARDWOOD TIMBER

In the years 1946 to 1948 when hard woods were still subject to consumer licensing, out of a total annual consumption of about sixty million cubic feet, about one-sixth went into domestic furniture; this was the largest single user of hard woods except for the rather omnibus head " general industry," which accounted for about one-third of the total.

HARD WOOD (Million Cubic Feet)

Consumer	1946	1947	1948	1948 %
General Industry ..	30·0	27·0	30·0	33
(of which Domestic Furniture) ..	(14)	(10)	(10)	17
Export Packing	1·0	1·0	1·5	2
Food Packing	3·5	4·0	4·0	7
Shipbuilding and Repairing	2·5	2·5	2·5	4
Transport	7·5	9·0	9·0	15
Housing Other Buildings ..	3·0	2·5	5·0	8
Miscellaneous Home and Overseas Requirements	13·5	10·5	8·5	14
TOTAL	61·0	56·5	60·5	100 %

Apart from charcoal manufacture, fencing, sawn mining timber and certain types of turnery, the big demands for hard woods are for timbers which require considerable care in selection and grading.

If one can risk a few sweeping generalizations one might comment on the demand for thinnings by saying that hardwood thinnings have at present no " national " markets of the magnitude of those open to soft-wood thinnings. That there are four major outlets for softwood thinnings—to some extent complementary to each other, to some extent in competition with each other; viz., (i) the mines, (ii) pulp and board mills, (iii) farms, forests and market gardens, and (iv) the box and packing crate trades. That the mines require the bulk of their supplies of timber in lengths and top diameters similar to those most readily acceptable in pulp mills, fibreboard mills frequently accepting whole poles or parts of poles too small in diameter for either of these two markets. That fencing

posts—whether they be round, split, or square-sawn—may be obtained from thinnings which would also make mining timber or pulpwood; and that the lighter horticultural stakes may come from boardmill material. That logs capable of producing the larger sizes of pit-prop and pulpwood may often equally well be sawn into boxwood or packing crate material, and in this sense there is competition between three consumers for the same material. That on the other hand, the boxwood and packing crate markets can make use of those butt-cuts which, although of too large a diameter to make pit-props or pulpwood, are too short for conversion into the general run of sawn lumber.

DISCUSSION

From the foregoing even the most pessimistic of us could feel fairly confident that the demand for timber and timber products is there. Can one be confident that, as production increases, home-grown timber can be sold in a market dominated—except during the war years—by imported timber. So far as hardwoods are concerned home timber of *high* quality has not only held its own with imported, but has often been preferred. Home-grown Scots Pine and European Larch of good quality have always found a market where the timber has been properly prepared, selected and presented. In Scotland, particularly, the greater part of the long-established home timber trade grew and prospered on Scots Pine and European Larch.

It is common knowledge, however, that on much of the land which is available for forestry, Scots Pine and European Larch would not thrive, and other conifers have been, and must in the future, be planted. Sitka Spruce is the most important of these, followed by Norway Spruce, Japanese Larch, Douglas Fir, and Corsican Pine.

At the Forest Products Research Laboratory at Princes Risborough the properties of all these newer species have been investigated, catalogued and compared with the properties of imported timber of the same species and with, for example, home-grown Scots Pine and European Larch. The data have been made available in the *Handbook of Home-grown Timbers*, but it should be pointed out that as more and more of these species are becoming available in larger sizes, the work of testing goes on; and more reports of performance in practice are coming forward. There is no time to-night to enter into a detailed discussion of the results obtained. One can sum up the position fairly and concisely by saying that the evidence to date shows that home-grown timber can fulfil many of the demands for timber in Great Britain, provided that it is properly prepared and carefully selected for the end use in view. It is particularly important—and this is a personal view—to realize that home-grown thinnings are not by any means always suitable for the same end use as the mature imported timber of the same species. There is no doubt that in the past quite understandable prejudices against home-grown timber may have arisen in the minds of certain consumers

through the failure of themselves or their suppliers to appreciate this point.

The title of this talk was given as " Modern Trends in the Utilization of Forest Products." We have been discussing the present demand for timber and for its products such as paper and building boards. What of the future trends in utilization ? It may be significant that in the last twenty years or so the production of sawn timber in Sweden, one of the world's leading forest countries, has fallen by over 1,000,000 cubic metres (6·7 million in 1930, 5·5 million in 1950) whereas manufacture of soft and hard fibreboards has increased from under ten thousand metric tons in 1930 to over 270 thousand metric tons in 1950. Plywood and blockboard manufactures have more than doubled in the same period; and mechanical and chemical pulp production has increased from 2·4 million metric tons to 3·2 million metric tons. Thus, over the last twenty years in Sweden, there has been a tendency to use an increasing proportion of the annual cut of timber as a raw material to be broken down and reconstituted rather than to shape it and use it in its " natural " state. There are many reasons for this change, the most obvious being that the demand for products made from timber has grown rapidly, whilst the use of timber as timber has tended to remain static or to diminish. Less obvious perhaps, but equally important, is the fact that many products of timber such a fibre building boards can be made partially or wholly of timber of too small dimensions for use in the round or of too small dimensions to saw economically. The " waste " that arises in conversion—whether in cross-cutting round timber to lengths or in sawing into squared timber—is also being utilized to an ever-increasing extent in board manufacture. Whilst it is true that the use of timber as such has continued through the Stone Age, the Bronze Age, the Iron Age, and we have no reason to suppose that it will not continue through the Atomic Age, complacency would be a dangerous thing. Constant vigilance and research will be needed to ensure that if traditional markets do diminish and new unfamiliar demands are made upon timber the grower and processor alike are able to meet them. Should those new demands fail to materialize in " ready-made " fashion, there seems to be no good reason why they should not be created—in line with the modern trend in so many industries unconnected with forestry.

NOTES ON THE RAISING OF FOREST TREES IN THE NURSERY

By J. J. Deasy

Why a Nursery ?

In countries with large areas of established forest the replacement of felled, blown or dead trees is, in most cases, done by nature. In such countries artificial regeneration is employed only in patches where, for some reason, natural reproduction fails or in cases where, for financial, silvicultural or other reasons, the introduction of one or more new species or a different strain of the existing species is considered desirable.

Except for a few isolated examples of the application of such a system in this country the task confronting our foresters at the moment is the stocking of areas which do not carry even the remnants of a tree crop. The soil, vegetation and climatic conditions obtaining on these planting sites are very seldom suitable for the direct sowing of seed of the commercially valuable species, hence the necessity for the forest tree nursery where plants of suitable species, size and vigour are produced.

Nursery Site

The selecting of ground for a large permanent nursery is a highly important task and needs careful consideration. An unsuitable site may have disastrous results owing to the production of substandard stock and high operational costs. Expenditure on nursery work must be charged to the plantations from the start at compound interest so it is important to keep it as low as possible consistent with the production of high quality stock. More serious still is the question of the plantation which, owing to the use of low-grade plants in its formation, struggles on through a full rotation, producing a poor annual yield, ravaged by insects and fungi, and serving as a breeding ground for these pests which then attack nearby plantations.

In selecting a nursery site the following main points should be given careful consideration.

Soil. Broadly speaking, the soil demands of forest trees are similar to those of farm crops. Most conifers, however, prefer an acid medium (between pH5 and 6) and have a distinct dislike for limestone soils. These latter should be avoided for raising conifers

but they are quite suitable for the growing of most hard woods. Clayey soils are difficult to work, are generally very weedy, and seedlings on them nearly always suffer severely from frost lift. They are inclined to cake and crack in dry weather and young trees, on being lifted from them, suffer considerable loss of their fibrous roots. The nurseryman would be well advised to avoid such soils.

Fertile sandy loams are the best for general nursery purposes. Excess of stones in the upper twelve-inch layer is a disadvantage as such material makes cultivation difficult with a consequent increase in production costs.

The soil depth necessary for raising tree plants need not be great; the average depth of root penetration is about eight inches. Good drainage is an important factor. This is influenced by the depth of soil and the amount of organic matter present in it, the nature of the subsoil and the slope of the ground. A study of the drainage is desirable in winter and in summer as areas seen in the summer only may sometimes be misleading in this respect.

Old forest land is often suitable but the cost of clearing the ground may be a deterrent.

Topography and Aspect. Narrow valley bottoms are undesirable sites owing to danger from frost and excess moisture. Steep slopes are difficult to work and with constant cultivation suffer considerable downhill movement of the soil resulting in an exposed subsoil on the higher reaches. Gently sloping areas have the advantage of good surface drainage and are the most suitable. Generally speaking, the most suitable aspects in this country are northern and eastern. In hilly country many southern and south-western slopes tend to stimulate early growth and are dangerous owing to liability to possible damage from late spring frosts. They may also suffer from drought. Areas liable to floods should, of course, be avoided. A certain amount of shelter from harsh drying winds by belts and clumps of trees is often beneficial, but it is not desirable to have the ground so completely enclosed as to produce a near-green-house atmosphere—healthy, hardy plants is the aim. If the area is very exposed, however, hedges of a species such as Lawson's Cypress can be planted along the windward boundary and through the site at right-angles to the prevailing wind.

Shape and Size. As a fair degree of accuracy in the measurement of ground is necessary in most nursery operations and as short ground and lines of varying length are a nuisance from the working point of view, it is desirable that the nursery be approximately rectangular in shape. The question of shape, however, should not be brought to bear too heavily if the ground is suitable in other respects.

In determining the area required consideration must be given to the ground necessary to produce the number of fit transplants required each year for first planting and for replacing failures, the ground that must be devoted to seed-beds and manure crops, the

ground to be given over to paths and roads and the ground that, for some reason, may have to lie fallow. Experience has shown that, having regard to these points, the area of the nursery should be approximately 3 % of the annual planting acreage.

General. The best time to take over an area is immediately following an oat crop or a root crop such as turnips. Where the area is under grass and is urgently needed for nursery purposes a deep (nine inches) ploughing in October followed by cultivation with disc harrow and/or rotovator in spring will produce a tilth suitable for the lining out of seedlings.

Seed Supply. Seeds of most species can be bought from seed merchants or, in many cases, particularly hard woods, can be collected by the nurseryman himself. This collection by the grower is a commendable practice as the resulting stocks will be better suited to prevailing local conditions. It is very important, though, that the parent trees be really fine examples of their species. Heredity operates in trees as in other living things and consideration should be given to such factors as straightness of trunk, lightness of branches and rapidity of growth in the parents. Most of the common tree species ripen their seeds in October. Exceptions are Aspen, which comes early in May, Elm early in June, and Birch early in September. Seeds of broad-leaved species such as Oak, Beech, Chestnuts and Sycamore fall to the ground when ripe and can be picked or swept up. It may be necessary to pick seed of Ash from the tree as they are inclined to hang on, sometimes into the following spring.

Trees of *Cupressus macrocarpa*, Lawson's Cypress, and *Thuya plicata* growing on the margins of belts or as isolated specimens produce seed in abundance and at a height which makes collection possible without climbing. Gathering of conelets of the two last-mentioned species should not be delayed beyond ripening in October as they shed their seeds freely. The same applies to Silver Fir cones which, on ripening, disintegrate on the tree-top. Japanese Larch and Sitka Spruce, during bursts of hot sun, may also shed their seeds in October and therefore collection should not be delayed.

More difficult problems are presented by many species of Pines, common Spruce, Douglas Fir and European Larch. The cones of these, which may be gathered any time from October to March, are generally borne on the topmost branches and in the case of pines and larches may persist on the trees for several years. Collection from standing trees is expensive, as climbing is necessary but if fellings of these species are contemplated it may be possible to arrange that the work be carried out within the period suitable for collection.

Before any collection is made it is wise to ascertain whether the seed in the cones is sound by splitting a few with a sharp knife.

Drying of the cones by artificial heat in order to open them is necessary; the temperature in such operations should not exceed 130° F. Rather elaborate cone-drying kilns and other equipment are necessary for the extraction of seeds on a commercial scale but the

amateur or enthusiast should be quite successful with a simple home-made kiln and drum of fine mesh netting wire.

Aspen and Elm seeds should be sown immediately they are collected. Seeds of other broad-leaved species may be sown when collected or stored until spring. Conifer seeds should be stored in a dry cool place (optimum temperature is 32°-34° F.) perferably in air-tight containers; a petrol tin with an efficient screwcap is suitable.

It should not be forgotten that seeds of most tree species are very attractive to rats and mice.

Pre-sowing Treatment of Seeds

Seeds of Ash, Lime, Hornbeam, Rowan, Whitebeam, Holly and Hawthorn seldom germinate until the second year after ripening. During this period of dormancy it is the practice to store them mixed with equal parts of sand in a two-foot deep pit on a well-drained site. It is advisable to have a layer of stones or gravel at the bottom of the pit and to line and cover it with fine mesh wire netting against rats and mice. In March of the second year the seed and sand are sown together. Sowing rates in Table 1, however, are for clean seeds.

Conifer seeds may germinate more rapidly if soaked in water for certain periods. The usual soaking periods are five days for Sitka Spruce and one day for all the others. Attacks by mice and birds have to be guarded against and to this end the seed is dressed with red lead. This dressing has no adverse effects on germination. One pound of red lead should be sufficient for seven to eight pounds of seed.

The ground selected for seed beds should be fertile, friable and as clean as possible. In bringing the soil to a suitable tilth size of seed is the guiding factor. In the case of Oak and Chestnuts a tilth suitable for most farm crops is sufficient but it will have to be made increasingly fine as the size of the seed to be sown decreases until, in the case of small seeds such as those of Alder, Birch, Sitka Spruce, *Pinus contorta* and *Tsuga*, a top layer of at least two inches of soil as fine as meal is required. The achievement of this is a slow and laborious process if done by hand and entails considerable working of the soil. This has been the method employed for centuries but in recent times the rototiller and rotovator have considerably lightened the task.

In considering seed-sowing one may choose from three well-known methods, viz., (1) Broadcast in beds; (2) Band sowing; (3) Drill sowing.

1. The width of the bed may be three feet six inches to four feet but the 4 ft. bed is now generally accepted as standard.

Between each bed and the next is a path or alley usually fifteen inches wide to enable the worker to move freely in carrying out the necessary seed-bed operations. Beds may be used for all species and broadcast sowing in beds is the system most generally used in this country.

2. Bands are shallow trenches about seven inches wide separated by alleys of the same width but having a fifteen-inch alley at intervals of every four bands. They are used mostly for hard woods and are especially suited for Oak where it is the practice to undercut and wrench the roots in September with a view to producing a better rooted seedling.

3. Shallow drills may be drawn on seed beds by various methods but usually are made by pressing two-inch wide laths on the prepared seed bed. The depressions, in which the seeds are sown, are usually four to six inches apart and may run transversely or longitudinally on the bed. This method is used mainly for conifers and certain advantages are claimed for it, particularly in weedy nurseries where, by its use, weed growth may be more cheaply controlled.

Weed Control

Conifer Seed Beds. Normally many weeds appear before the conifer seeds germinate. These may be dealt with by spraying with vaporizing oil. Except where weeds have reached a height of 1½ to 2 inches it is as well to delay spraying until there are signs of germination of the tree seeds and then all the weeds that have come through can be killed in one spraying. After the seedlings appear weeding of seed beds has to be done by hand and by hoe.

Lining Out

The principal points to be watched in lining out in the nursery are:

(*a*) That the trench opened to receive the young trees should have a firm perpendicular back against which the trees are set, and be deep enough to allow of the roots being extended vertically downwards to their full length.

(*b*) That the young trees should be set at the same depth in the soil as they were in their previous situation, the soil mark on the stem being used as a guide.

(*c*) That fine soil should be placed against the roots and the trees well firmed by packing the soil with the foot.

(*d*) That the roots should not be allowed to dry out during the operation.

The spacings for the various species in the transplant lines shown on Table 2 have been found to be satisfactory. Wider spacings do not conduce to the production of any better plants and by adopting the spacings given the area to be weeded is kept at a minimum.

Season for Lining Out. Larch should be lined out not later than the end of February and it has been found that the best time for lining out Beech is October, and for Corsican Pine and *Pinus radiata*, February. Most species are generally too advanced in growth for handling after the end of April and all lining out should be completed by then.

Weeding Lines. Hoeing should be carried out as necessary during spells of dry weather. The " Planet Junior " wheel hoe has been found a most useful implement in this work. In addition to hoeing a few hand weedings between the plants in the lines is generally necessary during the growing season. Weeds should be killed when small as if allowed to grow they rob the trees of much moisture and nutrients as well as being more costly to control.

Soil Fertility

Owing to the intensive stocking of nursery ground and the fact that evergreen conifers return nothing to the soil in the way of leaf fall, the drain on fertility is severe.

Most agricultural soils, when first broken in, are capable of growing young trees for two or three years without the addition of manures. A close watch should be kept, however, for signs of decreasing fertility such as poor growth and discolouration of the foliage. If the fertility is allowed to run too low the cost of restoring it may be disproportionately high.

The application of artificial manures direct to young trees often has harmful and sometimes apparently negative results; their use in that manner therefore is not recommended. Other means of manuring are the growing of crops such as potatoes or turnips manured with farmyard manure, the application of compost or broad-leaved conifer leaf-mould and the use of green manuring. The last-mentioned is the most widely practised as the other materials are seldom available in the quantities required.

Artificial manuring may be used in green cropping and a normal dressing per acre would be:

4 cwt. Superphosphate	35 %
2 cwt. Muriate of Potash	50 %
1 cwt. Sulphate of Ammonia	20 %

A good supply of humus in nursery soils is very necessary and even regular green manuring is not always capable of maintaining the supply at a suitable level. If signs of lack of humus such as caking of the soil or the appearance of grasses in abnormal quantities are noticeable a dressing of farmyard manure at the rate of fifteen to twenty tons to the acre is desirable, applied, of course, to a green crop, not direct to the young trees.

Fungal Diseases

Damping Off. On heavy soils containing excess moisture or in densely-stocked seed beds conifer seedlings under one year old are sometimes attacked by " damping off " fungi. These fungi can be controlled by:

(1) Burning the infected seedlings and opening shallow isolation trenches around the infected patches.

(2) Treating with fungicides such as (*a*) Cheshunt compound at a strength of one ounce to two gallons of water applied with a water-

ing can at the rate of one gallon per square yard, or (*b*) *potassium permanganate* at a strength of one ounce to one gallon of water, also applied at the rate of one gallon per square yard at ten-day intervals. These measures need not be adopted unless " damping off " appears but prompt action is necessary immediately it is noticed.

Leaf Cast in Larch. This is a widespread and serious disease of European Larch from which, however, Japanese Larch is normally immune. It can first be detected by the appearance of brown patches on the leaves of the lower part of the plant. In due course the affected leaves become completely brown and fall. It differs from frost damage, with which it may be confused, in that the browning of the leaves is gradual and that the tips of the shoots are seldom affected. Larch on ground of low fertility suffers much more than that on good ground. Sulphur sprays are used to prevent and control the disease, winter and summer strengths of these sprays being used. The most suitable sprays are of Lime Sulphur and Liver of Sulphur. The winter strength spray is applied once in January or February before the buds burst. Lining out of the young trees is usually done at this time and instead of spraying the shoots can be dipped in the liquid. Summer sprays are applied at fortnightly intervals from early April to the end of September. Spraying should not be carried out in strong sunshine, dull calm weather being the most suitable.

The following are the sprays:

Lime Sulphur : Winter Strength: 1 part in 30 parts water.
Summer Strength: 1 part in 40 parts water.
50 gallons of spray to 1,000 square yards.

Liver of Sulphur : Winter Strength: 14 lbs. to 100 gallons water
Summer Strength: 7 lbs. to 100 gallons water.
50 gallons of spray to 1,000 square yards.

Leaf Shedding Diseases in Pines. If disease appears spraying with a 1 % Bordeaux mixture should be carried out in the month of April. The mixture is as follows:

4 lbs. Copper Sulphate.
4 lbs. Lime.
40 gallons Water.

Oak Mildew. This is caused by the fungus *Microsphaera quercina* which can be controlled by spraying with a solution of 2 lbs. of Flowers of Sulphur to 50 gallons of water, giving special attention to the undersides of the leaves.

INSECT PESTS

Cockchafer Larvae. These are whitish grubs with brown heads and three pairs of legs. They cause considerable damage in the nursery by eating the fine roots of young trees and girdling the stronger roots. The most widely applied control measure consists of the fallowing of the affected ground and the hand-picking of the grubs, combined with cultivation during the month of July.

Green Spruce Aphis. These may be controlled by spraying with either nicotine or paraffin emulsions. The latter is the more widely used and the ingredients and methods of preparation are as follows:

Paraffin, 2 pints.
Soft Soap, 1 lb.
Water, 10 gallons.

The soft soap is dissolved in one gallon of boiling water and while the solution is still hot the paraffin is added. The mixture is churned well and nine gallons of cold soft water are then added. After being thoroughly mixed the emulsion is ready for use. In spraying special attention should be given the undersides of the leaves.

Frost Damage

Two common types of frost damage are recognized. They are (1) Damage to the leaves and shoots, and (2) Frost lift.

Damage to Leaves and Shoots. This type of damage usually takes place in May and early June when newly-flushed growth may be killed resulting in crooked plants, double leaders and otherwise undesirable shoots.

Protective Measures. Protection of transplants in lines is seldom economical owing to thin stocking of the ground and protective measures are usually confined to seedlings in beds. Screens made from laths 4 ft. x $2\frac{1}{2}$ inches x $\frac{1}{4}$ inch, which are nailed $\frac{3}{4}$ inch apart to " runners " 6 to 9 ft. in length are standard for seed bed protection. These screens are supported on wires which run one foot above the ground on each side of the bed.

Branches of Laurel, Broom, Birch, etc., stuck in the ground so as to form a canopy may be used instead of laths.

Generally there is little danger after the end of May or first week of June and the protection might then be removed.

Frost Lift. Losses from frost lift, which is a mechanical damage, are generally confined to one-year conifer seedlings; hard woods are usually sufficiently deeply rooted not to be seriously affected. Sitka Spruce is the most susceptible but small one-year seedlings of other conifers such as *Tsuga*, *Thuja* and Lawson's Cypress may also suffer.

Protective measures: As the amount of water in the soil is one of the most important factors relative to frost lift, efficient drainage in the beds is important. This may be facilitated by deepening of alleys and by leaving the soil in the alleys loose just before winter sets in.

One-year seed beds of susceptible species should be protected from October onwards in the same manner as described for protection against frost damage to leaves and shoots.

TABLE I

SEED SOWING

Species	*Yds. of 4′ bed to 1 lb.*	*Sq. yds. to 1 lb. (incl. alleys)*	*Yds. run of band to 1 lb.*	*Depth of cover (inches)*	*Season to sow*
(1)	(2)	(3)	(4)	(5)	(6)
Scots Pine	45	80	—	¼	April, May
Corsican Pine	17	30	—	⅜	do.
Pinus Contorta	45	80	—	⅛	do.
Mountain Pine	40	70	—	¼	do.
Pinus insignis	12	21	—	⅜	do.
European Larch	20	35	—	⅛	do.
Japanese Larch	25	44	—	⅛	do.
Douglas Fir	16	28	—	¼	do.
Sitka Spruce	45	80	—	⅛	do.
Norway Spruce	24	42	—	¼	do.
Abies Pectinata	8	14	—	⅜	do.
Abies Nobilis	8	14	—	⅜	do.
Abies grandis	8	14	—	⅜	do.
Cup. macrocarpa	16	28	—	¼	do.
Tsuga het.	45	80	—	⅛	do.
Cup Lawsoniana	16	28	—	⅛	do.
Thuya plicata	16	28	—	⅛	do.
Oak	½	¾	4	2	Nov. or Mar.
Beech	2¼	4	18	½	April
Sycamore	9	16	72	½	Feb. or Mar.
Ash	9	16	72	½	Aug. or Apr.
Spanish Chestnut	½	¾	4	2	Nov. or Mar.
Horse Chestnut	⅓	½	2½	2	do.
Alder	19	33¼	—	lightest possible	April
Birch	19	33¼	—	do.	April, May
Elm	11¼	20	90	do.	May, June
Pine	1½	2⅔	12	½	April
Hornbeam	5¼	9	42	½	do.
Whitebeam	3¼	1¼	6	½	do.

TABLE II

LINING OUT

Species	*Age*	*Spacing*	*No. per sq. yard*
Scots Pine	1 year	8″ x 1″	220
Scots Pine	2 year	9″ x 1½″	96
Corsican Pine	1 year	6″ x 1″	220
Corsican Pine	2 year	9″ x 1½″	96
Pinus contorta	1 year	6″ x 1″	220
Pinus contorta	2 year	9″ x 1½″	96
Mountain Pine	1 year	6″ x 1″	220
Mountain Pine	2 year	9″ x 1½″	96
European Larch	1 year	6″ x 1″	220
European Larch	2 year	9″ x 1½″	96
Japanese Larch	1 year	do.	96
Japanese Larch	2 year	9″ x 2″	72
Sitka Spruce	2 year	10″ x 3″	43
Norway Spruce	2 year	10″ x 2″	65
Abies pectinata	2 year	do.	65
Abies grandis	2 year	do.	65
Abies nobilis	2 year	do.	65
Cupressus macrocarpa	1 year	9″ x 1½″	96
Cupressus Lawsoniana	2 year	10″ x 2″	65
Tsuga heterophylla	2 year	do.	65
Thuya plicata	1 year	do.	65
Douglas Fir	2 year	do.	65
Pinus insignis	1 year	9″ x 2″	72
Oak	1 year	do.	72
Beech	1 year	do.	72
Sycamore	1 year	do.	72
Ash	1 year	do.	72
Spanish Chestnut	1 year	do.	72
Horse Chestnut	1 year	do.	72
Alder	1 year	do.	72
Birch	2 year	do.	72
Elm	2 year	do.	72
Lime	2 year	do.	72
Hornbeam	2 year	do.	72
Whitebeam	2 year	do.	72
Rowan	2 year	do.	72
Holly	2 year	9″ x 3″	48
Hawthorn	2 year	do.	48
Aspen	1 year	12″ x 4″	27
Poplar	cuttings	12″ x 6″	18

A REVIEW OF IRISH FORESTRY

By T. McEvoy

Pre-History

THE history of our present flora and fauna date, naturally, from the Ice Age. During that period when our climate resembled that of Greenland to-day, the country was covered by an immense ice-sheet, thousands of feet thick in places, which obliterated from view the native topography with its mountains and valleys and plains. The plant and animal population which had previously existed was more or less completely destroyed so that, when the ice sheet finally receded to the north and our climate became warmer, an arid waste had to be re-populated. We may picture the earliest post-glacial vegetation as rather like the Arctic Tundra, completely treeless. The earliest post-glacial plant remains, found in clay and gravel deposits, show no trace of forest trees. The next oldest plant remains are those found in the bottom layers of bogs—those bogs which began to form on the bottoms of glacial lakes. In these we find pollen grains of birch and willow and we may take it that these were the first tree colonists following the retreat of the ice.

At this point we may digress for a moment to discuss the methods of the historian of pre-historic time. In the bogs was hidden the key to the closed pages of history and only in the last forty years have these pages been opened. The microscopic remains of plants embedded in peat—visible to the unaided eye—had previously been examined but the picture remained incomplete. It was then discovered that under a high-powered microscope the tiny pollen grains of plants had distinctive, characteristic and constant shape and markings for each species so that the expert, given the pollen grain, could tell accurately the species. Now peat preserves pollen grains almost indefinitely and when peat was examined under the microscope, samples from different depths showed greater or less frequency of the pollen of various species and hence it was concluded that these species flourished and waned in the vicinity of the bog. By comparison of peat from different bogs a rough tabulation of the age of different layers was obtained so that a sketchy time-table for the arrival of the various trees was made out. Archæological investigations of crannogs (lake dwellings), etc., helped to define more accurately the later stages.

To return to the thread of our story: Following on the heels of the birch and willow came the Scots Pine (now familiarly known as

Scotch Fir, Fir Dale, etc.) and the aspen. This would be about the Old Stone Age *circa* 8000 B.C. Next came the hazel which spread rapidly 7800-5000 B.C. The oak followed much more slowly and also the elm and ash. In fact, from the geological point of view, these species arrived in the nick of time—before the land-bridge with Britain was cut off by the formation of the Irish Sea. This water barrier did keep out beech, hornbeam and lime.

It may be mentioned here that species such as birch and sally which bear good seed within ten years of establishment, are indifferent of soil fertility, and the light seeds of which have wings or parachutes which bear them long distances in the wind, have a great advantage in advancing over and colonizing bare ground. Oak may take over fifty years to produce ripe acorns most of which drop within a few yards of its own crown.

Coming of Man

Now we come to deal with the first human settlers. We are told that the first settlers on our shores, Dr. Mahr's River Ford people, lived mainly by hunting and fishing—two sports still very popular in Ireland. They can have had little effect on the forest (in which some of the later arrivals may still have been spreading) as they neither tilled nor kept flocks. Before the Bronze Age, in which the stone implements previously in use were superseded by bronze tools, we may take it that all the lowlands and the lower hill slopes were covered with forest growth. The Bronze Age probably coincided with the Sub-Boreal Climate, which was drier and warmer than ours and in which forest possibly reached its highest elevations and maximum extensions in the mountains. The Bronze Age settlers (*c.* 2000 B.C.) differed from the Stone Age inhabitants in that they developed agriculture, herded flocks and tilled the land, living chiefly on the higher ground on the upper margins of the forest and on the dry esker ridges. We know from archæological investigations that these Bronze Age people engaged actively in commerce with Europe and were a settled population forming organized civil communities, skilled in various crafts. It is not surprising that they appear to have avoided the dense forest with gross timber difficult to fell with primitive tools, concentrating instead on the probably scrubby upper forest. It may be of interest to mention here that a mode of life essentially similar to that of the Bronze Age survived in Wicklow until very recent times. In Glenmalure and Glendalough the local people will still show you the " boleys " which were once the summer residences of the inhabitants, from which they tended their herds on the hills, in which they made their butter and cheese, and stored the wool clip. They retreated before the autumn winds to the winter home in the valley or glen, harvested the crops in the few enclosed fields and made the wool into frieze and flannel for marketing. The boley sites are still well known. In planting on Derrybawn over Glendalough an ancient copper pot was unearthed on the upper

slopes near one of these and is now in the National Museum—a relic of a life that has disappeared.

Towards the end of the Bronze Age there was a deterioration in climate which became colder and wetter, possibly accounting for the fact that the succeeding Iron Age people kept to the lowlands, leaving their traces in the "crannogs" on lake dwellings. This wetter climate caused an increase of peat growth with consequent destruction of forest in the mountains.

The period from the Bronze Age, when only the edges of the forest can have been touched, to 1600 A.D., when substantial areas had been cleared, must have been a time of constant diminution of forest which is almost entirely unrecorded. Casual references in MSS. and state papers the evidence of place-names and of the Brehon Laws, together with the remarks of occasional literary travellers, provide the only clues.

Brehon Laws

These laws, indicating the existence of a well-ordered society based on the clan system, were comprehensive and precise in regard to woodland. They show that all the forest was not parcelled out amongst individual clansmen (private owners). The bulk was held in common, together with waste land over which every member of the clan was free to graze his stock. This arrangement was general in European forests in early times when there was more than enough forest for all and timber had no appreciable commercial or exchange value. The emphasis *then* was on grazing and pannage (feeding of pigs) and the timber was of quite secondary importance. The appropriated woods were probably those having a value by reason of their nearness to a village settlement. They could be fenced off and swine could feed untended on the mast—principally acorns. Flocks would be safer in these appropriated woods, too, from raids by prowling wolves—which, by the way, survived up to the eighteenth century. The last wolf is said to have been killed near Powerscourt.

Even in the privately owned woods the people in general had certain rights to commodities considered essential. These were: wild garlic (presumably for culinary purposes in place of the modern onion), a night's supply of firewood, framework for a vehicle (or cart), timber for a bier for a corpse, for a spear-shaft, a bavell-hoop, a churn-staff, a spancel, a yoke for a plough. Also the wild animals of the wood were not preserved.

The law gives a list of trees divided into chieftain trees, common trees and shrubs. The chieftain trees are oak, hazel, holly, yew, ash, pine, apple. Again it is apparent that timber quality is of minor importance as compared with the feeding value of the trees; fruit, e.g., hazel and apple, are included, and elm passed over. The common trees were alder, willow, hawthorn, mountain ash, birch, elm. Aspen and arbutus were accounted shrubs. There were fines for unlawful interference with chieftain trees. Indeed this can be said

to be the earliest Irish record of restrictive forest legislation. And the punishment fitted the crime very neatly, e.g., for stripping as much bark as would tan leather for a woman's shoes the offender forfeited a cowhide and he must cover the stripped part with a mixture of smooth clay, cowdung and new milk.

PLACE-NAMES

Townland names in their Irish form are said by Professor McNeill to date chiefly from about 800 A.D.—a time of great agricultural activity. They therefore give us a clue to the state of woodland in those times. Out of 62,205 townland names in the whole country fully 1,310 have " derry " (a wood) as prefix or suffix. Joyce (who who wrote *Irish Names of Places*) states that " the belief that Ireland was well wooded is fully borne out by the vast number of names that are formed from words signifying woods and trees of various kinds. " If a wood were to spring up," (he continues), " in every place bearing a name of this kind the country would become an almost uninterrupted succession of forests."

Words signifying woods and trees in Irish and their occurrence in place-names provide interesting clues to the past.

Forest and Wood : Doire (derry—Derrybawn, etc.): (birch wood); Fidh: The Fews in County Louth, Feemore in Offaly; Ros: Rosmore, Roscommon, etc.—also a peninsula: Coill: (" kill "), but often means church—pronunciation is a clue; Quilty (plural).

Shrubby places : Scairt, Muine: Moneystown, Baile an Mhuine; Gaertha: Beal Atha an Ghaertha (Ballingeary).

Trees : Crann (Craanmore); Bile: Garran a' Bhile " Garranavilla."

Oak : Dair: Leach an Daire (Lackandarragh); Omna: Portumna.

Ash : Fuinnse, Fuinnseog: Ballinafinshoge (Glenmalure).

Birch : Beith: Gortaveha, Glenbeigh, Bahana.

Elm : Leamh(an): R. Leane (Killarney).

Yew : Eo, archaic: Eo-choill (Youghal), Oghill, near Redcross; Iubhar—more modern—Killinure; Ceim an Iubhair- over upper lake in Glendalough where yew still flourishes naturally, protected by its inaccessible position.

Mountain Ash : Caorthann: Famous old Irish story of Brughean Céise Corthainn: also Drumkeeran, etc.

Holly : Cuilleann: Cullentragh.

Hazel : Coll: Collon, Co. Louth, seat of Foster family prominent in the Irish Parliament of 1780, 1790's.

Arbutus : Cuinche: Quinn, once more widely distributed.

Aspen : Eacha, Crann Creathach.

Alder : Fearn(og): Ballyfarnon, Glenfarne.

Willow : Saileog: Ballynasilloge near Woodenbridge.

Firewood : Connaidh: Pollahoney near Arklow.

West Clare has practically no place-names referring to woodland and was probably always poor in timber.

Clearance Process: (1) Grazing

Probably clearance of woodland was seldom a deliberate act of uprooting or felling of a particular area. Rather was it a slow deterioration under grazing. It was not dramatic, therefore it went unchronicled, almost unnoticed. The first stage in the case of an oakwood is the destruction of the shrub layer of holly, hazel, etc. which grow under the canopy of the oaks. As these disappear grasses replace the fraughans, woodrush, etc., on the ground. Old trees gradually die off and the tree seedlings which spring up in the opening are cut back by grazing so the veterans are not replaced. The result in the course of time is an open type of wood resembling parkland. Much of our old woodland was probably of this open type.

(2) Fire

Another factor in the destruction of woodland which must have been particularly important in this country was moor-burning. Successive fires would spread from the heather of the mountain-top down into the oakwoods of the slopes, killing all but the bigger trees, especially young regeneration. Only three years ago I saw a case of this occurring at Glenwood, County Wicklow, and I have seen a similar process on the Slievenamuck Hills in Tipperary. Heather forms the ground-cover under the oak as the canopy opens and *it* is still more inflammable so that the deterioration is progressive.

Giraldus Cambrensis

Up to the Norman invasion Ireland, while having considerable areas of pasture as evidenced by the large cattle herds and frequent " tain " or cattle raids, still remained heavily wooded. Chief witness to this fact is Giraldus Cambrensis, who accompanied King John to Ireland in 1183. He found Ireland well-wooded with, however, " in some places very beautiful plains though of limited extent in comparison with the woodland." He mentioned that " yews abound "—and vast herds of boars and wild pigs."

To mention a few other points from early Norman times which help to give us a picture of that time: In 1209 the O'Byrnes and O'Tooles attacked Dublin from Cullenswood. Dublin was then a small town sheltering behind its walls and woods were still found near its gates. Cullenswood is just beyond Ranelagh on the 'bus route from the city. Again in this century oak to roof Westminster Hall was felled at Oxmantown—now also within the city. In 1290 timber was exported to Haverford in Wales for a castle for Queen Eleanor (wife of Edward II) from Newcastle and Glencree, County Wicklow. Other writers up to 1600 continue to give us a picture of a well-wooded country.

The first voice indicating a change is that of Fynes Moryson writing in 1603. " Ulster," he says, " and the western parts of Munster yield vast woods but I confess myself deceived in the

common fame that all Ireland is woody, having found in my long journey from Armagh to Kinsale few or no woods by the way excepting the great wood of Ua bhFailghe and some low scrubby places they call ' glens.' "

Around Elizabethan times the military and political aspect of woodland—as a hindrance to military traffic, a lair for ambushes, and as a refuge for the lightly armed Irish gallowglasses, is constantly emphasized. Elizabeth herself summed up this attitude in the saying: " The Irish will never be tamed till the leaves are off the trees." Thus O'Neill, after the failure at Kinsale, consented that " all and singular the thickets, groves and woods lying between his country and the bordering Englishry should be cut down and made plain land "(State Papers).

In 1579 Sir Warham St. Leger advised employing 4,000 English soldiers, besides the army already in the field under the Earl of Ormonde, to protect labourers in hewing down and burning certain large woods which served as safe retreats for the Irish, viz., Aherlow, Dromfynon, Glanmore, Glenflesk—chief strongholds of the Desmonds. Aherlow forest was 10 x 4 miles.

About the same time Baron Finglas recommended that the Lord Deputy should spend eight days every summer cutting passes on the borders of the Pale. He mentions as overgrown with wood two passes into Kalry—(Calary) (probably near Newtown and Glencree); also two passes into Ranelagh (the O'Byrne country—probably Deputy's Pass, etc.). In February, 1594 Lord Deputy Russel actually caused three passes to be cut into Glenmalure at Ballinacor (where Capt. Kemnis still owns several hundred acres of native oakwood) and at Kylaman (now Glenealy).

In 1608 Chichester reported that the woods of Shillelagh were sufficient for the King's ships for twenty years. (State Papers).

As in our general history, Kinsale marks a turning point, the end of an epoch. After Kinsale the commercial exploitation of our remaining forest assumed more and more importance in view of the growing shortage of timber in Britain. Ireland became the home of timber adventurers, and " planters," and state officials, Sir. W. Petty joined in the scramble to cash in on the standing timber. Sir Jonah Barrington puts the prevailing attitude of land-holders—not too secure in their tenure—in a pithy phrase: " Timber is an excrescence produced by nature for the payment of debts."

The production of wood charcoal for iron smelting boomed and iron furnaces and portable " bloomeries " were introduced and resulted in the rapid exhaustion of woods. In Wicklow the Earl of Stafford (to whom Elizabeth's magnificent, if not altogether altruistic grant of the whole of County Wicklow will be remembered) was the chief woodland owner. He owned the woods about Coolattin, Kilaveney, Aughrim (Roddenagh) and Rathdrum (Croneybyrne, Ballygannon, etc.). He introduced iron masters of the rather unwieldy name Cholmondley from England. The family name

became shortened to Chamney in which form it still survives in the county. They had fifty-two iron works in all, the larger works being at Shillelagh, Clash and Furnace in the Vale of Clara—hence the name. Iron was mined at Ballard, Ballycapple, in Avoca area, and ore was also imported. Large quantities of pipe or barrel staves and ships' timbers were also exported.

Unsettled conditions—rebellion, plantation, restoration, rebellion again—continued throughout the century and woodland continued to be devastated. Not until some twenty years after the end of the Williamite Wars (say 1710) were conditions favourable for the " peaceful art of tree-planting " and for interest in the preservation of what remained of our native woods. Although previously laws and royal ordinances requiring tree-planting had been frequent enough, it was not till this time that a real beginning was made. Many of the plantations seen by Arthur Young in 1777 on his Tours were laid down around this time. Unfortunately, side by side with planting, neglect continued and Young had frequently to deplore the felled and unfenced oak coppices. At that time too (1778) the last two of the iron works were reduced to part time by lack of timber at Killaughrim near Enniscorthy (where twenty years later the '98 rebels sheltered on the retreat from New Ross) and at Mountrath.

During this eighteenth century while oak remained the most important timber species, Scots Pine, European Larch and Scots Fir began to be used in plantations. Rarer species were also tried and we owe a debt of gratitude to these early planters for their enterprise in trying new species and also for the fact that they planted much of the over-mature hardwood beech and oak, etc., which provided much needed firewood during the emergency.

The '98 rebellion caused a temporary set-back to planting and we have accounts of cattle being stolen in Glenmalure and grazed without licence in Croneybyrne woods of the Earl of Fitzwilliam, now part of Rathdrum State Forest.

Napoleonic Wars

Commercially, Oak, which yielded first quality tanbark and ship's timber from the knees of its spreading branches, remained the most important species throughout the boom period of the Napoleonic Wars when European imports were cut off. The bottom fell out of the market after 1815 and prices for oak coppices never again reached a high level. Various new factors came into play which steadily curtailed the market for oak. Iron began to replace oak in ship-building soft woods began to replace the more durable (but also more expensive to work) oak in house construction; and new and more potent tanning agents were discovered in the bark of South American trees such as Quebracho. To-day only one firm in Britain and Ireland uses oak-bark for tanning. Still later, synthetic agents were introduced. The net result was that oak coppices became uneconomic and many which had previously been felled

every thirty years or so were allowed to grow more or less untended into high wood. It is these oakwoods from coppice which have yielded so much valuable firewood and sleeper timber during World War II. A few were felled in the first World War for trench timbers and pit-props.

Coinciding with the decrease in oak values, soft wood prices appreciated steadily as the market for them expanded. Most of the plantations laid down after 1840 were of soft woods and to-day about 90 % of plantations laid down are soft wood, pine, larch, fir and spruce.

Forest statistics show slight but steady increase in acreage over most of the nineteenth century; the increase being checked with the introduction of the first Land Acts, involving division of estates.

Figures : 1841, 345,000 1851-80 increase of 29,000
1891, 311,000
1905, 301,000
1930, 248,000

Planting had depended entirely on the landlords and, once their continued proprietorship was threatened, planting practically ceased outside the demesne proper. The situation was aggravated by a flaw in the early acts owing to which no compensation was payable for the timber growing on land acquired for division. This resulted in many landlords selling off the timber before acquisition. The new tenant proprietors too often disposed of their timber.

State Afforestation

Public anxiety regarding our timber resources eventually resulted in the State taking a hand. In 1885 an area of bog and moor was acquired at Knockboy in County Mayo and planted up with a remarkable variety of species. The result was a dismal failure. Whatever the cause—and exposure to salt-laden westerly gales, infertility of the peat and inexperience in the work, must have had their effects—this failure delayed the entry of the State into the timber-growing business for almost twenty years. In 1904 the Avondale estate of some 500 acres was acquired and a fresh start made under more favourable conditions. On this occasion there was no false start and the State forestry organization which at first consisted of one forest of 500 acres and a few individuals, has grown steadily.

OBITUARY

AN APPRECIATION OF THE LATE MR. KARL L. SCHORMAN

" . . . *The Ides of March are come*
Ay, Caesar, but not gone . . . ."

The historic and tragic significance of the Ides of March is known to most people, but had there been even the slightest foreknowledge of the dreadful tidings that the 16th March, 1954 was to bring his many friends and colleagues (the two terms meant much the same to Karl Schorman) would assuredly have besought Providence, like Josue of old, that the sun might stand still in the heavens rather than that it should bring the day to snatch away with such appalling suddenness the kindly-hearted gentleman that was Karl Louis Schorman.

Karl (" Charlie ") Schorman was born in Queensland, Australia, just sixty years ago. He came to Ireland at an early age and entered the Public Service late in 1910, serving in the Post Office and in the Department of Agriculture and Technical Instruction (as it was then known) before being appointed as a Second Division Clerk (from open competition) to the Board of Public Works in 1914. There he remained until 1920 when he returned to the Department of Agriculture and Technical Instruction where he was engaged on the work of forestry as an Executive Officer.

Following the passing of the Forestry Act, 1919 (which established a Forestry Commission for the (then) United Kingdom), the work of forestry was, in April, 1920, transferred from the Department of Agriculture and Technical Instruction to the Forestry Commission in Ireland. In April, 1922 (with the advent of the new Saorstat Eireann) the staff of the Forestry Commission in Ireland was transferred back to the Department of Agriculture and Technical Instruction which was then styled the Department of Agriculture. In 1933 the Forestry Division was transferred to the Department of Lands and Fisheries, which the following year became the Department of Lands, and since then the Forestry Division has for twenty years remained attached to the Department of Lands.

Thus, out of nearly forty-four years in the public service, Karl Schorman spent the last thirty-four years of his life continuously in the Forestry Service, attaining to the rank of Principal Officer of the Forestry Division for the $2\frac{1}{2}$ years immediately prior to his death.

He had seen during his official career three pieces of legislation affecting forestry entered upon the Statute Book—the Forestry Act, 1919 (mentioned previously); the Forestry Act, 1928 (brought into operation on 1st April, 1930); and the Forestry Act, 1946 (which came into effect on the 1st April, 1949). He was a representative several times of the Forestry Division at Geneva in connection with international conferences relating to forestry matters.

Karl Schorman had, throughout his long career on the administrative side of the Forestry Service, achieved a ripeness of experience, aided by an excellent memory, which was invaluable in solving the many problems which inevitably crop up in the course of work. He was always approachable and ever ready to help with suggestions or comment. Every colleague, senior or junior, whether on the administrative or on the technical side, had the same feeling towards him—that Karl Schorman was imbued always with a selfless and single-minded integrity of purpose—the good of the Forestry Division, which he loved with loyalty and sincerity.

Incapable of pettiness, with a certain endearing humility of self assessment, he had always a revulsion towards making unnecessary mountains out of relatively unimportant molehills. His straightforward dealings with every colleague earned him the respect and trust of all. The happy relationship between the public and the Forestry Division in its many facets is attributable in great measure to the courteous, fair and realistic approach which Karl Schorman brought to his duties over a long period of years.

He was an Associate Member of the Society of Irish Foresters since its inception and also served on its Council. He was always an interested and cheerful participant in various outings and visits sponsored by the Society. Readers of this journal will recall the interesting and thought-provoking article, " Scenic Amenities and the Forest," which he contributed to the last issue.

He was devoted to his family in an edifying degree. One felt that he was not only father but friend to his dear ones who must miss him sorely, in a manner which his friends and colleagues, deep as they feel his loss, cannot appreciate to the full.

May he rest in the eternal peace which he has justly merited.

LAURENCE F. BRANIGAN

Members will have learned with regret of the death on 21st March of Laurence F. Branigan, who was for many years a member of the Society.

Because he recognized the importance of re-afforestation in our Irish economy the late Mr. Branigan was enthusiastic for the progress

of the Society. He was a familiar figure on various excursions and at meetings, and made many friends among foresters.

Although claiming no technical knowledge of forestry, deceased took a keen interest in all the talks on various aspects of forestry organized by the Society. While he rarely contributed publicly to these discussions, his friends frequently enjoyed privately his constructive criticism of the views put forward and were greatly influenced by his sound opinion as to the best policy to adopt.

Those who knew Mr. Branigan in his profession as a lawyer were aware of his sound legal opinions and his other excellent qualities, valued them accordingly, and had a very high opinion of his straightforward character and undoubted abilities.

TWELFTH ANNUAL GENERAL MEETING

The twelfth Annual General Meeting of the Society was held in Jury's Hotel, Dublin, at 7 p.m. on Saturday, 20th March, 1954. The President, Mr. H. M. Fitzpatrick, was in the chair and there was a large attendance of members.

Opening the meeting the President paid a tribute to the late Mr. K. L. Schorman who was a long-standing member of the Society and also a member of its council. A vote of sympathy with his family was passed in silence, all members standing.

On the suggestion of the President the minutes of the previous Annual General Meeting, which had appeared in *Irish Forestry*, were taken as read and were signed.

The President then called on the Secretary to read the Council's report for 1953.

COUNCIL'S REPORT FOR 1953

The first meeting of the Council was held on the 9th February, 1953. Nine members were present. The Secretary reported that Mr. J. McDonald, Director of Research, British Forestry Commission, had agreed to give a lecture on forest research on the occasion of the Annual General Meeting. Arrangements were made to secure speakers and to send invitations to all likely to be interested. Arrangements were also made to hold a general excursion to Clonmel in May and day excursions to forests near Blessington, Castlepollard, Dundalk, Kilworth.

Further meetings of the Council were held in May, June and November.

MEMBERSHIP

During the year three Grade I, ten Grade II and seven Associate Members were elected. Income from membership subscriptions in 1953 amounted to £152, as against £156 in 1952, so there are indications that our effective membership declined. The number of members in arrears also increased and the sum due for 1953 was £65 15.

INCOME

The total income for the year was £353, of which over £201 came from the Journal, mainly from advertising. The best thanks of the Society is due to our subscribers and to the Business Editor. The Council urge members to support our advertisers.

JOURNAL

Two issues of the Journal appeared during the year. The Editor is to be complimented on the high standard of both issues. The Editor reports that difficulties in securing material for the Journal and also delays at the printers, are tending to hold up the publication of the issues beyond the scheduled time.

EXCURSIONS

Reports on the excursions held during 1953 appear in Vol. X, No. 2 of *Irish Forestry* recently issued.

The excursions were very successful in every way but for some reason the autumn day excursions were not so well attended as those held earlier in the year. The Council has the question of excursions under active consideration and is planning a much fuller programme of day excursions for 1954. The Council has also had the Annual General Excursions under review and is planning ahead for 1955.

The Council wishes to acknowledge its indebtedness to the Minister for Lands, the officials of the Forestry Division and the private woodlands owners for the facilities provided to members on the excursions of the Society. The Council is particularly grateful to Messrs. Irish Forest Products and Messrs. McAinsh for the very welcome fare provided for members on the occasion of the visits to Castlepollard and Clonmel.

PROPOSED DAY EXCURSIONS—PROGRAMME FOR 1954

April 25th. Ballinagee, Holywood State Forest, Co. Wicklow.
May 16th. Gloster Roscrea—Estate of Major E. T. T. Lloyd.
August 15th. Slievenemon State Forest.
August. Ballymanus, Glenealy State Forest.
September. Glaslough, by invitation from Sir Shane Leslie.

ANNUAL EXCURSION, 1954

Lake District, England, June 1st, 2nd and 3rd.

The adoption of the Council's Report and Abstract of Accounts, was proposed by Mr. M. Bogue and seconded by Mr. J. J. Maher, was passed unanimously. Speaking to the adoption of the Abstract of Accounts Mr. A. B. Ross said that as the Society's finances were in such a healthy condition he would suggest that some of the money should be transferred to an excursion fund.

The outgoing President then gave his valedictory address in which he reviewed the growth of State Forestry over the past half-century. He also gave an outline of the present position with regard to private forestry.

The meeting formally confirmed the election of office-bearers for the year 1954 and the incoming President, Mr. T. McEvoy, took the chair.

After a short recess the President called on Mr. E. G. Richards, Utilization Development Officer, British Forestry Commission, to read his paper on " Modern Trends in the Utilization of Forest Products," a copy of which appears elsewhere in this issue.

The vote of thanks to the speaker was proposed by Mr. T. Deirg, Minister for Lands, who spoke first in Irish and then in English. He pointed out that from the evidence offered by the speaker, from publications, etc., there would appear to be a similarity of problem facing the British Forestry Commission and ourselves. The Commission, however, were a much larger organization, with greater resources and research facilities, and there was no doubt that the necessary markets could in time be built up.

Last year our receipts were in the region of £150,000, excluding receipts from our sawmills. Cong Sawmill was at present undergoing reconstruction but receipts from Dundrum Mill were around £16,000 mainly for oak cross-arms for the E.S.B. and Rural Electrification.

Mr. Richards, he said, estimated that the minimum economic requirements of a pulp mill would be about 100 tons of timber per day. He would ask his audience to consider what this would mean in felled timber and what its effect on our forest programmes would be. He said he would like to see pulp factories here but we have at present a ready market for our timber and so there was no need for the State to go into the business of processing.

Before closing, the Minister paid tribute to the late Mr. K. L. Schorman, who had been associated with the Forestry Division since its infancy.

Mr. A. B. Ross, seconding the vote of thanks, said:

" Speaking as a member of the Native Timber Merchants' Federation I would like to try and show how utilization of Forest Products have changed in a space of ten to twelve years.

On the Question of Conifer Thinnings. Prior to 1950 practically no market existed for Sitka or Norway Thinnings other than a very limited demand for fencing. With two factories now accepting fairly large quantities of conifer thinnings a ready market is available, but as obviously ever increasing quantities of thinnings come available, it is fairly evident that a third outlet is or will be required, and perhaps in time the paper factory situated on the Suir will be equipped to utilize fairly large quantities of thinnings. I do not say this from the point of view of increasing competition but purely as an opinion of the availability of supplies.

Larch and Scots Pine Thinnings. For the past year practically no pit-wood or pit-props have been shipped to Wales or England, mainly because of the quantities available in Scotland resulting from the disastrous storm of early last year, and presumably increased supplies from English forests. Eventually it is hoped this market, or portion of it, will return. On the question of what can be extracted from conifer thinnings for manufacture into nylon, etc., I shall leave to someone with scientific knowledge. At this point I might mention that the Institute for Industrial Research and Standards, with their laboratory at Glasnevin, could undertake tests. In addition, perhaps a section equivalent to the Forest Research Station at Princes Risborough could be added at Glasnevin.

Hardwood Thinnings. This portion of Mr. Richards's address interested me very much, not because of the difficulty of obtaining a suitable market for hard-wood poles, but because there are hard-wood plantations of apparently fairly large area to be thinned. It is sad to say such is not the case in Ireland and it would appear if there are to be any reasonable-sized areas of young hard-wood plantations the Forestry Department will require to acquire these for preservation. There is no doubt that a few of these do exist in the country. There are possibly six private estates in the country where schemes of re-afforestation exist, and in at least two of these properties no hard-wood is grown or being planted.

Conifers. Large Thinnings. In a few years' time large quantities of Spruce (Sitka and Norway) will be available and provided there is co-operation between the various interests, no difficulty will be found in finding a ready market. It has already been proved that flooring of 5″ to 7″ widths can be produced from these thinnings, and when dry can compare with the very best quality.

Mature Conifers. Prior to the Emergency no difficulty was found in disposing of native soft-wood, railways, canals, etc., being ready buyers. When the Control of Timber Order came into operation all first quality soft-wood was reserved for house-building and special construction schemes. Railways were forced to use low-grade soft-woods and now that ordinary trading conditions have returned little native soft-wood is accepted by the builders and railways are now inclined to purchase their requirements abroad, though it is doubtful if a finer sleeper exists than a Scots Pine one. Other home-grown conifer sleepers are not acceptable. The Canadian Douglas Fir sleeper does not take creosote and it is therefore presumed the native Douglas Fir is the same but I would like to see this species and others tested. For many years one of the principal furniture manufacturers has been using native conifers instead of Columbian Pine, having discovered the home-grown article equal to or better than the imported article for his particular job.

Mature Hard-woods. A happier story to unfold here. Prior to 1941 practically all hard-wood was shipped cross-channel, either

in the round or rough sawn, for many varied purposes. As a result of the second World War little or no foreign hard-wood arrived in Ireland and for a few years furniture manufacturers and many others were forced, against their will, to use the native article. As time went by they discovered that if this was handled properly it was an excellent alternative and by now practically all are using it, having installed kilns, etc., for proper seasoning.

In the past four years, probably following the modernization and erection of kilns at the State-owned Dundrum Mills (perhaps some day some member of the native trade will admit that this was the incentive for the additional kilns later erected) manufacturers and, believe it or not, native timber merchants, erected drying kilns and modernized their plant, with the result that at present there are no less than twenty-eight modern drying kilns in this country and there may be one or two more. In addition, there are probably a further six drying chambers. Of the twenty-eight kilns, only four are in Dublin City and four are belonging to the Forestry Division.

Without fear of contradiction, the articles of furniture, etc., being manufactured from Irish hard-wood in these factories are equal, and in many cases better than can be seen abroad. It is not generally known that one of the factories using home-grown hard-woods has turned out such excellent articles of artistic design that these can be found in the Irish Embassy in London, in one of the principal stores in New York, and in the offices of heads of semi-Government concerns, Priories and Churches all over the country.

From the foregoing it can, therefore, be assumed the modern trend in the utilization of native timber has been forward, and the future is so full of possibilities that the next few years in the life of a native timber merchant is going to be very interesting.

Supporting the vote of thanks Mr. O. V. Mooney said:

" There seems to be little doubt that now, at last, the time is fast approaching, or has already arrived, when our forests are forcing upon us the realization of the basic reason for a forester's work, which is the growing of trees for timber and ultimate sale and profit.

For long years past, one may say indeed for forty years or more, foresters have worked hard and immersed themselves in the task of establishing plantations at the least cost and with best effect.

Foresters have always kept a vigilant eye on the unit costs, whether in the nursery or in the planting field, and so they still do and will do, but it seems to me that, wrapped up as we have been in the many ramifications of the early silviculture of forest crops, we have not often had time to raise our heads and look ahead and upwards at the rising timber tree. These trees are now forcing our attention.

Outside the ranks of professional foresters we have often heard the virtues of forestry enumerated but very often these eulogies, whilst stressing the value of forestry as a provider of employment, a protector of the soil, a beautifier of the countryside, an ameliorator

of the climate and so on, have failed to emphasize the ultimate objective.

The theme to-night is to emphasize the real meaning of forestry and Mr. Richards has done a fine job here by putting before us a realistic picture of everyday thinking amongst the uprising forests in Britain and by throwing into relief the now necessary utilization approach to forestry.

Those, and there should be many here, who know the older stands at Avondale, particularly those of Douglas Fir, Silver Fir, Norway Spruce, Sitka Spurce and Tsuga, which were planted between 1904-1910 and which are now solid timber crops up to an average of 80· high, will doubtless have a feeling of regret when they think that there was only about 2,000 acres of forest plantation laid down up to 1920. They might say: ' If only we had 15,000 acres—a recent one-year planting figure—of Avondale timber to-day how well off we would be.'

Between 1920-25 5,345 acres were planted and 15,912 acres in the five years between 1925-30, and 20,465 acres between 1930-35. Between 1935-40 36,047 acres were planted. It is the young forests from the twenties and the early thirties that we now are handling for sale and utilization mainly. While any forester realizes the absurdity of relating productivity to area of planted land, these figures may serve to impress that we have now entered our productivity and utilization era very definitely. We must, of course, expect big increases in productive area and dimension of timber as the years go on, but our main problem to-day is development of markets and utilization for trees ranging from say 3″ in diameter x 20′ high, to trees up to 16″ diameter x 60′ high, involving sizes from rustic poles and pulp-wood and pit-wood at one end to boxwood and small timber sizes less frequently at the other.

In dealing with thinnings Mr. Richards makes an early reference to Douglas Fir when quoting species percentages for plantations between ten and forty years of age and shortly afterwards he drew down on the price differential favourable to European Larch over other conifers which also exists in this country. Most of our Douglas was planted between 1920-30 when it may have reached a peak of 7 % or 8 % of all other species, but thereafter it fell to a low percentage of about $1\frac{1}{2}$ % average through the thirties and lost favour altogether after that.

Douglas Fir is, in the opinion of many, one of the most promising timber trees we have now. In many of the demesnes and in the older State plantations, it has proved itself a fine volume producer of quality timber. In the young and pole stages it may also have a great future for it tends to replace European Larch for many uses where durability is the paramount requirement and, indeed, there seems to be a growing conviction amongst foresters that it is a better fencing post than European Larch. It looks, indeed, as if it has high qualifications for uses in all work exposed to weather and in this respect it

can be seriously considered for use in gates and weather-boarding for houses, whilst it makes a fine scaffolding pole, tripod, pea-stage and so on, and it is hoped in the future that it may find favour as a transmission pole for which, of course, there would be a very great market in this country. Douglas Fir is also readily acceptable for wall-board and cardboard manufacture.

Indeed Douglas Fir should commend itself highly to planters, especially in an era when the uprising generation of European Larch is not always measuring up to the high virtue of older generations.

We are not likely to be troubled for a long time with utilization problems from our hard-wood plantations but the pattern is much the same. An exception, however, is Poplar which, as we all know, is a faster grower than practically any of the conifers and produces a vast bulk of useful wood quickly. Here in Ireland where we have known Poplar so well and for so long, we have very few stands of utilizable size but it should profit us well to consider the Black Poplars more, not in the hectic rush of fashion but in the selective process of site suitability. Poplar is an all-round tree from the utilization standpoint, from pulpwood to plywood, matches to boards.

In his talk Mr. Richards has placed the emphasis on thinnings and rightly so for, as I have mentioned before, it is with the sale of light and heavy poles that foresters will mainly be concerned in the coming years. If we are to make a success of our sales here we must study with the greatest concentration the utilization of small produce.

Here in Ireland we have very much the same kinds of sale for poles as Mr. Richards tells us of in Britain. But in the better-off counties local sale to farmers is prodigious and so far in these places this market is, I am glad to say, insatiable. Experience seems to show that the more wood is used in rural life the more it is wanted.

We have also a wallboard factory which absorbs a considerable quantity of thinnings and it is hoped in the near future that another mill will open for the manufacture of brown wrapping paper and packing cardboards. The much fluctuating pit-prop market which seems always to live through the most violent crises is picking up somewhat of late and export of anything up to 8″ in Douglas Fir, Euoprean Larch, Japanese Larch and even Norway and Sitka Spruce, can be made in that direction.

Thus local sales, fencing posts and poles, pulpwood, scaffolding poles and pit-wood can cope fairly well with our produce in small pole sizes but we must start to think of other things for the 5″ or, more generously for 7″ upwards.

And here we know at once that boxwood is the answer to the greater part of the problem. In this respect we know too that there is no doubt as to the suitability of our wood. For boxes not requiring high quality specification, Japanese Larch, Douglas Fir, Silver Fir, Scots Pine and many other woods are suitable and the ideals of high-grade boxwood, strength, whiteness and lightness, are present

in both Norway and Sitka Spruce. It is probably only fair to say that until now the quantity and supply of home-grown boxwood has been too erratic to make boxwood sawing worth while to commercial saw-milling firms and it has only been a sideline for most. It looks as if there is every hope that things will change for the better in the near future and that supplies will then be greater and more even.

Our greatest concentration must be on the economic utilization of small-sized wood, even though it is hard to keep wastage in such work below 50 %. Mr. Richards has covered this field well and has made an interesting remark when he states that it takes 200 cubic feet or 6½ tons of round wood to make one ton of rayon and that about two tons of round timber will make one ton of mechanical pulp. There seems to be a wide field in the pulping field—particularly in the production of newsprint, of which there is large home consumption, but the possibility of production of other pulps would, no doubt, be influenced by factors of our own small home consumption. The use of plastic finished products has greatly increased and is bound to increase more and this is a line that deserves consideration.

Finally, there is home-grown constructional timber for the larger sizes and there is no utilization problem here where there is good quality timber of the well-tried species such as Scots Pine, European Larch and Norway Spruce. However, there is no particular significance in this trend as good standing timber in substantial sizes is very scarce indeed.

There is, however, still a prejudice against home-grown timber for constructional material and the qualification of foreign timber is frequently met with in building specifications.

Though we know, and are fully convinced, that the well-tried and better-known conifers such as Scots Pine, Norway Spruce, European Larch and perhaps Sitka Spruce and Douglas Fir are at least the equal of the imported wood, we have to admit at the same time that there has been ample justification from time to time for criticism of the quality of our timbers as presented for building purposes. War emergency conditions tended to encourage certain malpractices and timber of all sorts and species, very often not suitable at all, and in all sorts of unseasoned conditions, were used, thus bringing our home-grown timber into low repute.

Foresters and timber merchants can win back and establish the good reputation of our home-grown conifer timber in the first instance by concentration of all skill in the production of high quality timber in the forest, and the second by devoting study and available resources to proper seasoning and skilful sawing of the timber.

The importance of the seasoning of wood properly is not generally appreciated, perhaps, in Ireland and there certainly is no time now to mention more than the great benefits to be derived from judicious air-drying and kiln-drying of softwoods and hardwoods.

Perhaps we always think of the seasoning of timber as a process of reducing moisture content to a degree where wood will not warp or twist afterwards. We may less often remember that seasoning: 1. Imparts greater strength to timber; 2. Makes it lighter; 3. Makes it resistant to decay; 4. Makes it take preservatives; 5. Makes it take paints and polishes and other finishes."

SOCIETY OF IRISH FORESTERS

STATEMENT OF ACCOUNTS FOR YEAR ENDED 31st DECEMBER, 1953

INCOME	£ s. d.	£ s. d.
To Balance from last account		
In Bank on Current Account	316 7 5	
Less Amount due to Secretary	23 16 6	
		292 10 11
To Subscriptions received		
1 1st Grade Tech. 1951	1 0 0	
5 „ „ „ 1952	5 0 0	
34 „ „ „ 1953	34 0 0	
2 „ „ „ 1954	1 10 0	
1 2nd „ „ 1951	10 0	
10 „ „ „ 1952	5 0 0	
51 „ „ „ 1953	25 10 0	
3 „ „ „ 1954	1 10 0	
1 „ „ „ 1955	10 0	
4 Associate 1951	3 0 0	
13 „ 1952	9 6 0	
84 „ 1953	63 0 0	
2 „ 1954	1 10 0	
1 „ 1955	10 0	
1 „ 1956	15 0	
		152 11 0
„ Interest on Investment		1 14 4
„ Journals sold and advertisements		201 5 8
		£648 1 11

EXPENDITURE	£ s. d.	£ s. d.
By Stationery and Printing ..		28 7 10
„ Printing of Journal ..		147 19 5
„ Postages		19 15 6
„ Expenses *re* Meetings ..		18 3 3
„ Bank Charges and Cheque Books ..		1 5 2
„ Honoraria		30 0 0
„ Purchase of £200 Dublin Corporation 5 % Redeemable Stock 1968/73 ..		195 15 0
„ Balance		
In Bank on Current Account	211 15 7	
Less Amount due to Secretary	4 19 10	
		206 15 9
		£648 1 11

I have examined the above Account, have compared same with vouchers and certify it to be correct, the balance to credit being £206 15*s.* 9*d.* which is on current account at the Ulster Bank, Ltd. There is also a holding of £200 Dublin Corporation 5 % Redeemable Stock 1968/73. Credit has not been taken for Subscriptions for 1951, £4 10*s.* 0*d.*; for 1952, £22 10*s.* 0*d.* and for 1953, £65 15*s.* 0*d.* which were outstanding at 31st December, 1953.

D. M. CRAIG, *Hon. Auditor*,
85 Harcourt Street, Dublin.

23rd January, 1954.

COVER PHOTO

Our cover photo is of a large Sessile oak tree popularly known as the " Raven's Tree," which stood in Desart property of Callan State Forest. It was blown down in 1947 when it was found that heart was gone to a height of 9 ft. above ground-level. Its total height was 95 ft. and its diameter at 6 ft. was 10 ft. 3 ins. Its age was about 1,200 years and its total weight, including branches, was 65 tons.

There may be a connection between this tree and the famous Irish chieftain, The O Brennan Mor. Known as " The Raven," he was mentioned by Spencer in *The Fairey Queen*, and was worthy of the special attention of Mountjoy and Carew between 1570 and 1600. He is also mentioned in the story " Bog of Stars."

This tree grew near the centre of the scene of the Raven's activities and close by is the ruins of an old fort.

FORESTRY COMMISSION PUBLICATIONS

Leaflet No. 31.	**The Grey Squirrel, a woodland pest.**	**9d. (10½d.)**
Forest Records:—		
No. 22.	**Shelterbelts for Welsh Hill Farms.**	**2s. 0d. (2s. 1½d.)**
No. 23.	**Fires in State Forests in the Years 1929-1952.**	**1s. 6d. (1s. 7½d.)**
No. 24.	**Revised Yield Tables for Conifers in Great Britain** ...	**1s. 3d. (1s. 4½d.)**
No. 25.	**Japanese Larches at Dunkeld, Perthshire.**	**2s. 0d. (2s. 1½d.)**
No. 26.	**Drought Crack of Conifers.**	**2s. 6d. (2s. 7½d.)**
No. 27.	**Use of Home-Grown Timber in Wood-Turning and Related Trades in Scotland in 1953.**	**1s. 3d. (1s. 4½d.)**

Obtainable from H.M. Stationery Office, York House, Kingsway, London, W.C.2, and 80 Chichester Street, Belfast, or through any bookseller.

A publications list will be sent on request, free and post free, by the Secretary, Forestry Commission, 25 Savile Row, London, W. 1. (Prices in brackets include postage.)

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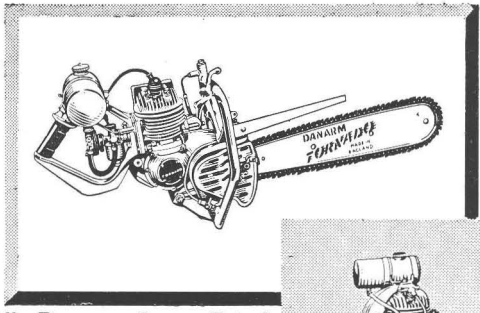
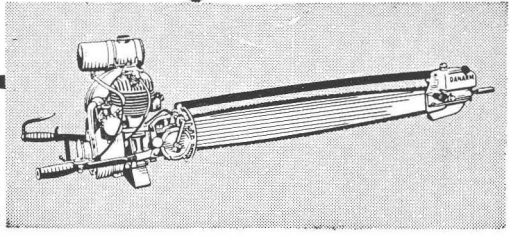


Left: Danarm 'Tornado' —the world's fastest one man' chain saw. Standard blade 22½ins.

Below: The Danarm 'Two Man' saw. Cutting capacities up to 7 feet.



All Danarm Saws—Petrol, Electric and Pneumatic (the latest Danarm model) are now equipped with Danarm-Oregon Chipper Chains or Butterfly 3-link Chains as standard. Full details of saws and chains on request.

J. CLUBLEY ARMSTRONG DANARM LTD.

ABFORD HOUSE, WILTON ROAD, LONDON S.W.I.