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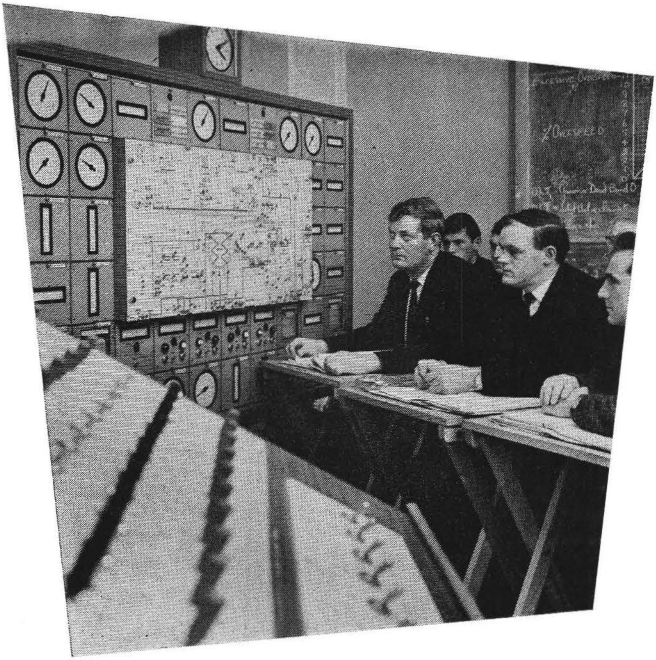

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IRISH FORESTRY

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IRISH FORESTRY

Volume 26 SPRING 1969 Number 1

Editorial

This journal is probably the most valuable possession of the Society, and the most useful return which members receive for their subscriptions. It has changed very little during its history. It is not intended that it should change radically at once, but it is probable that some changes will be necessary over the next few years. It is hoped soon to give members an opportunity to put forward their opinions as to the form and content of *Irish Forestry*.

One new feature, *Trees Woods and Literature* appears in this issue. This will consist of passages concerning trees or woods extracted from general literature. This criterion has, of course, very little validity from either a strictly technical or a strictly aesthetic standpoint, but the series may help to bridge the gap between the two cultures, the sciences and the arts, which unfortunately are rarely permitted to overlap.

Multiple use of forest land is a concept which has become widely canvassed in recent years. No doubt it will be used from time to time as a cloak to cover other deficiences, but it is clear that great progress is being made towards a genuine multiple use situation in Northern Ireland. See *Notes and News.*

The Thinning of Sitka spruce — Two Experiments

By G. J. GALLAGHER[1]

INTRODUCTION

Studies on the effects of thinning in even aged plantations have been carried out for almost a hundred years (Braathe 1957). Earliest work in this field was undertaken in Central Europe but to-day, investigations are under way in almost every country where forestry features as a commercial enterprise.

The complexity of analysing data of the many crop characteristics which must be measured has meant that from an early stage thinning research had to be conducted through planned experiments. The earliest and best known are those set up in Bavaria and in Sweden in the last century and have been described by Wiedemann, Ascman, and Carbonnier (Holmsgaard 1958). The experiment of most interest and relevance to conditions in Western Europe was that undertaken by the British Forestry Commission in Norway spruce on a private estate in Bowmont, Scotland. (Hummel 1947). Here for the first time a thinning experiment was established which fulfilled the requirements for statistical analysis. The "Latin Square" design was used and the value of this formal statistical approach has been illustrated in papers interpreting the results since establishment. (McKenzie 1962). In recent years, attention has been focussed by other workers on the difficulty of analysing thinning experiments. The size and uniformity requirements in a stand chosen for experimental purposes often cause difficulties. Various designs, including uni- and multi-factorial type experiments have been formulated to best cope with the considerable volume of data which can be produced. A review of work in the field of thinning experimental design has recently been compiled by the International Union of Forestry Research Orgnaisations (I.U.F.R.O., Unpublished). Here the value of replication was recognised and, though details for an optimum sized experiment were rather inconclusive, it seems that experiments comprising many large sized plots were favoured. Though the advantages of such complex thinning experiments have been recorded by some workers (Schober 1967) greater emphasis is now being given to the statistical properties of experiments to make them more manageable and to facilitate proper interpretation of results (Franz 1967).

Bradley 1967b) describes recent replicated experiments — mainly of the randomised block type — in the United Kingdom. The experiments involve four species and from one to three thinning regime

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components (intensity, cycle, type). These experiments are as yet too recent to yield results, but should provide valuable information on thinning intensities and cycles. Bradley stresses the necessity for objective specifications in experiments to allow quantitative analysis. He emphasises also the value of exercising control through thinning yield rather than on main crop factors.

Two apparently conflicting theories emerge from thinning research to date. The first, most strongly proposed by Möller (1954), is that, over a wide range of stocking conditions from full downwards, there is no reduction in volume increment. On the other hand when referring to conditions in Finland, Voukila (1962) maintained that all thinnings will reduce increment to some extent.

It is against this background of experimental work and theory that the initial effects of thinning on Sitka spruce, a species as yet little investigated, will be discussed.

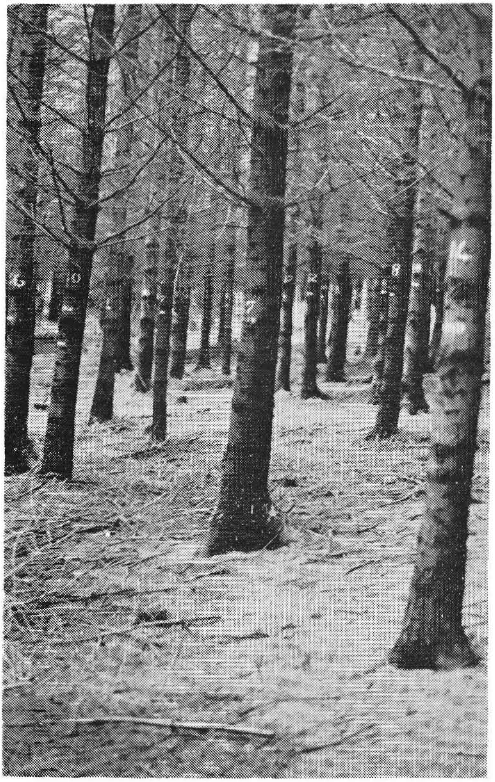
THE EXPERIMENTS

On the establishment of a research branch within the Forestry Division in the Republic of Ireland the value of experimental research into the influence of thinning on even-aged plantations was recognised. The implementation of the afforestation programme in Ireland has meant that most of the crops capable of exploitation are those which are reaching or which have reached thinning stage. This means that the supply of timber in this country will depend largely on thinnings for some time to come. A programme of experimental thinning research was therefore started in 1962. Contorta pine was chosen to be the first species for study. Sitka spruce was included in the following year (Gallagher 1966). A small experiment was established late in 1963 at Coolgreany Forest, Co. Wicklow, to assess the effects of different thinning types on volume production and increment of Sitka spruce, while employing the same intensity of thinning. Early in 1964 another experiment in the same species was set up in Avoca Forest, Co. Wicklow, to assess different thinning intensities. Thinning intensity can be described as the quantity of timber removed per annum, while type of thinning defines the way in which this material is removed in terms of tree categories.

Coolgreany

This experiment was originally intended as a field demonstration of different thinning methods, but it was decided that more valuable information could be obtained by replicating the treatments twice in randomised blocks. Each measurement plot was 0.2 acre.

Since the establishment of the experiment the site has been assessed as General Yield Class (Bradley, Christie and Johnston 1966) 240-260 in the early stages and 220-240 in the most recent



measurements. Blocks have been allocated according to site productivity. First thinning was carried out at 17 yrs. (Top height 34 feet). Two types of thinning were compared :— (a) the Scottish eclectic thinning method (Macdonald 1961) and (b) a moderately heavy low thinning — C/D grade. (Hummel et al. 1959). The former aims at a predetermined number of dominant trees selected for the final crop by removing competing dominants and favouring selected dominants and non-competing co-dominants. It is argued that the system provides a fairly heavy thinning regime resulting in large sized material early in the rotation and ensuring a final crop grown in conditions of little competition. The low thinning used in the experiment is that generally employed in current management practice in which smaller and poor quality competing stems are removed. There is no particular emphasis on final crop dominants.

In order to assume a similar weight of thinning all, plots were adjusted to the same standing basal area after thinning. This adjustment was carried out after thinning to avoid bias in the method of thinning. First thinning involved a reduction to 86 square feet

Plate 1. (Far left). Avoca. Light low thinning.

Plate 2. (Left). Avoca. Heavy low thinning.

Plate 3. (Below). Coolgreany. Scottish eclectic thinning.

basal area[1] main crop or 28% basal area and 27% volume removal for all plots. The plots were re-thinned in 1968 (top height 39 feet) at which stage 80% of the periodic basal area increment since first thinning was removed. The quantitative adjustment was again carried out after marking.

Avoca

This stand has been assessed as General Yield Class 220-240. First thinning was undertaken at a later stage than at Coolgreany, when the crop was 21 years old (top height 41.5 feet).

Here the basis of the experiment was the consideration that, of all thinning components, the intensity, or annual thinning yield has the greatest effect on production.

Level of stocking was defined by basal area after thinning. Three intensities of low thinning were imposed. These resulted in

HEAVY ... Thinning to 100 square feet basal area main crop

MODERATE Thinning to 125 square feet basal area main crop

LIGHT ... Thinning to 150 square feet basal area main crop

The treatments were replicated in two randomised blocks using measurement plots of 0.1 acre. Initial total standing basal area was 155-170 square feet so the thinnings represented a removal of approximately 48%, 34% and 16% basal area or 42%, 28% and 10% volume. A desire to keep the treatments evenly spaced for analysis purposes influenced their selection.

First thinning was carried out in Spring 1964. The stand was re-thinned in 1968 (top height 49.5 feet) at which stage predetermined percentages of basal area increments were removed.

Heavy: 75% B.A. increment removed.

Moderate: 50% B.A. increment removed.

Light: 25% B.A. increment removed.

This was based on the mean basal area increments of both plots of each treatment. This maintained thinning intensities relative to one another while allowing some compensation for possible increment loss in heavily thinned plots. Second thinnings were equivalent to the removal of from 40% to 13% of the volume increment between first and second thinnings.

1. All basal area and volume data are in Hoppus measure (=.785 true measure).

VARIABLES

Stems per acre: All stems 1.3 ins. diam. and over.

Top Height: Mean height of the 40 largest girthed trees per acre (feet).

Dominant Diameter: Mean diameter at 4 ft. 3 ins. of the 40 largest trees per acre (ins.).

Mean Diameter: Arithmetic mean diameter at 4 ft. 3 ins. of trees 1.3 ins. diameter and over, weighted by basal area (ins.).

Basal Area: Basal area per acre of trees 2.7 ins. diameter and over (square feet).

Volume to 3 ins.: Volume to 3 inches top diameter per acre of trees 2.7 ins. diam. and over (cubic feet).

Total Stemwood: Total stem volume per acre of trees 1.3 ins. diam. and over (cubic feet).

Periodic Annual Volume Increment to 3 ins.: Annual volume production from 1st to 2nd thinning (cubic feet).

Periodic Annual Basal Area Increment: From 1st to 2nd thinning (Square feet).

Mean Annual Volume Increment: Total volume production to 3 ins. top to date divided by age (cubic feet).

Crown %: (Length of live crown/h) x 100. Mean of 10 trees per plot.

In each plot every stem was measured with a diameter tape to determine diameter and basal area. Volume was obtained through the least squares calculation of the volume/basal area regression $Y=a+bX$ for 10 fully measured sample trees in each plot (X is plot mean basal area and Y is plot mean volume). Total stemwood volume includes tops which are assumed to be conical and therefore 0.386 L (L=length of top) is added to the volume of each sample tree.

ANALYSIS

Analysis of variance was employed to assess variation due to blocks, treatment and error. In the Avoca experiment variation due to treatments was subdivided into linear and quadratic components. Tables 1 and 6 show the significance of differences in basal area and diameter increments between treatments. In a number of cases the levels of significance are very low but in view of the limited size of the experiments they are worth recording to suggest, if not prove, growth trends.

RESULTS AND DISCUSSION

Avoca

Analysis of growth after first thinning showed some significant difference with regard to basal area and mean diameter development. Through differences for other factors were much lower, volumes and increments are shown, as the trends are related to basal area growth and might have shown up more clearly in a more sensitive experiment. Crop characteristics such as the reduction in stems per acre and thinning data are shown in tables 4 and 5.

Basal area

Table 1 shows basal area increment per acre for five years since first thinning. Though levels of significance are low, certain trends are visible. Increased intensity of thinning tended to depress basal area increment until the fourth year after thinning, at which stage there was a significant recovery in the heavily thinned plots. After second thinning there was no depression of increment and in fact the heavily thinned plots may be still recovering relative to lightly thinned plots. Overall it is possible that moderately heavily thinned plots did best.

Mean diameter

The effect on mean diameter is more definite. Increasingly severe depression of mean diameter growth occurs in lightly thinned plots each year after thinning. This effect is maintained after second thinning also, at which stage diameter growth in heavily thinned plots is twice that in lightly thinned plots. This effect is to be expected as different thinning intensities give rise to differently sized mean trees (Table 1).

Volume

Though levels of difference are not significant there is a suggestion that volume may follow a similar trend to that of basal area (Table 2). Increment on heavily thinned plots is least and on moderately thinned plots greatest. Increments on moderately and lightly thinned plots are closer than heavily and moderately thinned plots. Table 2 shows volume production and annual increment patterns.

Crowns

There was a greater reduction in crown % in lightly thinned plots, the average rate of decrease being twice that of trees in heavily thinned plots (Table 3). All crowns are now approximately 40% of total height.

Dominant Diameter

It is interesting to note that there was no increment differential on dominants for different treatments, individual plots varying only between 1.4 and 1.5 inches. This is relevant to the contention that thinning does not radically influence the final crop.

TABLE 1

Avoca. Effects of thinning intensity on basal area (square feet Hoppus/acre) and mean diameter (inches).

	Heavy	Moderate	Light	Significance of linear component
Basal area :				
After 1st thinning	102.3	125.7	149.0	—
Increment Year 1	6.07	6.70	8.47	10%
,, 2	6.11	8.79	8.89	25%
,, 3	9.09	10.97	11.16	25%
,, 4	11.21	9.89	7.06	5%
Increment Years 1-4	32.48	36.35	35.58	25%
After 2nd thinning	122.53	152.74	184.69	—
Increment Year 5	12.20	12.36	11.23	25%
Diameter :				
After 1st thinning				
Increment Year 1	0.25	0.15	0.20	25%
,, 2	0.20	0.25	0.20	25%
,, 3	0.35	0.20	0.15	5%
,, 4	0.35	0.25	0.15	1%
Increment Years 1-4	1.15	0.85	0.70	1%
After 2nd thinning	8.30	7.45	6.30	—
Increment Year 5	0.45	0.30	0.20	5%

TABLE 2

Avoca. Effects of thinning intensity on volume to 3 inches top diameter, and total stemwood (cubic feet Hoppus/acre).

	Light	Moderate	Heavy
Periodic annual volume increment	329	341	306
Mean annual volume increment	162	179	171
Increase in mean annual volume increment since first thinning	31	31	25
Periodic annual stemwood increment	329	341	304
Mean annual stemwood increment	180	195	195
Increase in mean annual stemwood increment since first thinning	28	28	20

TABLE 3

Avoca. Effects of thinning intensity on crown development.

	Average Crown %		
	Light	Moderate	Heavy
After first thinning	64.0	51.0	49.0
After second thinning	48.0	39.5	41.0
Decrease	15.5	11.5	8.0

Stems per acre

The difference in stocking which now exists is clearly illustrated in Table 4 by the variation in number of stems per acre from over 1,000 in lightly thinned plots to 350 in heavily thinned plots. The volume and basal area differences are not so dramatic, indicating the unreliability of stems per acre as a criterion for stocking.

Thinnings

Table 5 shows a very heavy initial yield from heavy thinning, which includes relatively large-sized material. Yield from moderate thinnings at first treatment are still considerable but both size and quantity of material from light thinnings are negligible.

At a second thinning there was less variation in thinning produce as the treatments tended to move a little closer. The yield in size and quantity was still consistent however with the pattern shown at first thinning.

TABLE 4

Avoca. Stems per acre after thinning.

	Light	Moderate	Heavy
First thinning	1155	735	470
Second thinning	1020	615	360

TABLE 5.

Avoca. Details of thinnings removed.

Thinning	Intensity	Mean Diam. (inches)	Stems/ acre	Volume to 3 ins. top diameter acre
First	Light	3.2	645	264
	Moderate	4.0	930	897
	Heavy	5.0	875	1,313
Second	Light	4.2	135	153
	Moderate	5.8	130	369
	Heavy	7.0	110	487

The money equivalent yields per acre have been estimated as follows:

	1st	2nd	Total
Heavy	£100	£36	£136
Moderate	£68	£28	£96
Light	£19	£11	£30

Coolgreany

Here two types of thinnings were compared. Intensity of thinning was kept constant for both types. The results are much more tentative as the experiment was small, two treatments and two replications only. Levels of statistical significance were therefore very low.

However, taking experimental size into account, some of the recorded increments are of interest.

Basal area

Effects are given in Table 6. Though the "F" values were very low there was a slight suggestion that low thinning resulted in greater increment per acre for the four years after thinning. By second thinning, there was an apparent increase in basal area increment of about 10% in low thinned plots over eclectically thinned plots. The total effect of two thinnings may also suggest better growth on low thinned plots.

Mean diameter

Here it is suggested that, if any effect is apparent, it is that mean trees in low thinned plots increased more. After first thinning mean trees in low thinned plots were larger than in eclectically thinned plots (Table 6).

Volume

Again there is a suggestion of greater volume increment both for volume to 3 ins. top diameter and total stemwood for low thinnings (Table 7).

Crowns

Crown % was roughly the same for both treatments at first thinning. At second thinning crown % in low thinned plots decreased at twice the rate of that in eclectically thinned plots (Table 8).

Dominant diameter

Dominant diameters were initially greater in low thinned plots and increased .2 inches more than those in eclectically thinned plots.

Stems per acre

After first and second thinnings, remaining stems per acre were more numerous in eclectically thinned plots as a large number of

TABLE 6

Coolgreany. Effect of thinning type on basal area (square feet Hoppus/acre) and mean diamter (inches)

	Eclectic		Significance
Basal area :			
After 1st thinning	111.05	110.17	—
Increment Year 1	12.47	13.38	>25%
,, 2	11.78	11.74	>25%
,, 3	9.89	12.53	>25%
,, 4	13.48	14.39	>25%
Increment Qears 1-4	47.62	51.75	10%
After 2nd thinning	121.28	120.35	—
Increment Year 5	11.87	12.24	>25%
Increment Years 1-5	58.49	63.99	20%
Diameter :			
After 1st thinning	4.65	5.00	>25%
Increment Year 1	.25	.30	25%
,, 2	.25	.20	25%
,, 3	.20	.25	25%
,, 4	.25	.30	25%
Increment Qears 1-4	.95	1.05	25%
Increment Year 5	.25	.30	5%
Increment Years 1-5	1.20	1.35	10%

small stems were ignored at thinning. The distribution in low thinned plots is more normal (Table 9).

Thinnings

Table 10 shows thinning data from both types of thinning. In eclectically thinned plots a smaller number of larger trees resulted in about 100 cubic feet extra removed at first thinning. In the second thinning volumes were much the same, though the average size of trees removed in eclectically thinned plots was still larger. The size of these trees may be more attractive to timber merchants resulting possibly in a slight price difference.

Conclusions

The results to date indicate that thinning intensity does effect increment to some extent and also the size of trees within the stand. Type of thinning also seems, though less conclusively, to influence increment and stand structure somewhat.

It is obvious that Sitka spruce is a very flexible and tolerant crop as regards thinning intensity and that first thinnings can be quite heavy without adverse repercussions, though at greater than 40% volume removal, increment loss is likely to occur. Recovery appears to be quite rapid—within four years. The removal of 30% by volume or basal area is quite safe.

This is encouraging in the light of recent developments in systematic thinning trends and at present experiments are being set

TABLE 7

Coolgreany. Effect of thinning type on volume to 3 inches top diameter, and total stemwood (cubic feet Hoppus/acre).

	Eclectic	Low
Periodic annual volume increment	349	403
Mean annual volume increment	162	168
Increase in mean annual volume increment since first thinning	44	55
Periodic annual stemwood increment	348	404
Mean annual stemwood increment	176	187
Increase in mean annual stemwood increment since first thinning	44	55

up incorporating 33% reduction of stock at first thinning together with various systematic stem reductions at the same intensity. The maintenance of increment after a heavy second thinning is also encouraging and confirms the characteristic recovery power of spruces, suggested for Norway Spruce by Vuokila (1962) and McKenzie (1962).

Though the heavy thinnings in the Avoca intensity experiment varied somewhat from the "marginal intensity" defined by Bradley, Christie and Johnston (1966) and Bradley (1967a) — somewhat heavier at first thinning and a little lighter at second thinning in terms of volume removal they are close enough for comparison.

TABLE 8

Coolgreany. Effects of thinning type on crown development.

	Average Crown %	
	Eclectic	Low
After 1st Thinning	48.5	55.5
After 2nd Thinning	40.5	41.5
Decrease	8.0	14.5

The hypothesis that 50% removal of current annual volume increment will be near optimum for increment production seems to be supported in view of the continued high increment in heavily thinned plots after second thinning. A point of note is the changing relationship between volume and basal area with crop development. At first thinning basal area percentage removal was roughly equivalent to volume removal but at second thinning the removal of 75% basal area increment was equivalent to 40% volume increment removal—less than expected.

The lack of any real difference in diameter growth on the 40 largest trees per acre between thinning intensities is of interest indicating the possibility that any intensity of thinning which does not definitely select dominants will have little effect on the final rotation crop.

The overall suggestion from the thinning type experiment is that, if anything, low thinning is best for production and that it is doubtful if the work involved in selection for eclectic thinning is warranted by the increase in thinning size — though this is a point to be considered. In third and later thinnings differences in thinning production should weigh in favour of low thinnings as many of the larger trees will have been removed earlier in eclectic thinnings. That a thinning method with so definite a bias in favour of early selection shows relatively little difference from a less selective procedure is again encouraging in the light of probable future developments in more objective and systematic methods.

TABLE 9

Coolgreany. Stems per acre after thinning.

	Eclectic	Low
First thinning	1205	1038
Second thinning	929	676

Considerable differences in thinning yield are apparent for different intensities. The substantial first and second thinning yields from the heavier intensities translated into money terms do much to offset accumulating establishment costs at an early stage. The values per unit volume of these yields would also be increased by the numbers of larger trees included. Better monetary yields should also be obtained from early eclectic thinnings but the difference between those and low thinnings would be much less than between intensities. Tree sizes in eclectic thinnings also tend to drop in time as compared with low thinnings as the pool of large size trees decreases. On the basis that optimum first thinning for Sitka spruce lies between 50%-33%

TABLE 10

Coolgreany. Details of thinnings removed.

Thinning	Type	Mean diam (ins.)	Stems/acre	Vol. to 3 ins. top diameter/acre (cubic feet Hoppus)
1st	Low	4.0	632	485
	Eclectic	4.8	452	584
2nd	Low	5.2	362	696
	Eclectic	5.8	275	719

basal area removal (43%-30%) volume and second thinnings at 80%-60% basal area increment removal (50%-40% volume) these studies are being developed to include a more refined intensity experiment for Sitka spruce with a greater number of treatments and replicates, and an experiment into various means of systematic thinning with a standard first reduction of one third on stocking. Other species, notably contorta pine, Norway spruce and Scots pine are also at present under investigation.

ACKNOWLEDGEMENTS

Acknowledgement is due to Dr. P. M. Joyce, who was involved in the planning of one of the experiments, and to Mr. W. Luddy, Research Forester, who undertook most of the field work for these investigations.

SUMMARY

The paper reviews the initial effects on Sitka spruce crop growth of three intensities and two types of thinning. Main crop basal areas and probably volumes are depressed by very heavy intensities in the early years after first thinning but recovery is recorded in the fourth year. Main crop diameter increment is significantly greater with heavy thinnings which also yield higher thinning volumes. Little difference is recorded between low and eclectic thinning though there is a suggestion that main crop growth is greater with the former. First thinning produce from the eclectic method is greater in tree size and volume yield though indications are that this difference will disappear in time.

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The Wellingtonia in Ireland

By A. F. Mitchell[1]

The Wellingtonia or giant sequoia *(Sequoiadendron giganteum)* is a remarkable tree for its age and size, as is well known, but its adaptability is even more extraordinary. Within historical times it has been confined in its natural range to small groves in the valleys on the western side of the Sierra Nevada, on the eastern border of mid-California. In Eocene times, 30 million years ago, it was widespread in nothern temperate regions, including Britain. Being now so reduced and confined, it might be expected to be one of the less adaptable trees, whereas, in these islands at least, it thrives in as wide a range of conditions as any tree. In Britain, the tallest Wellingtonia is on the Devon-Cornwall border, but the biggest in volume, and itself 150 feet tall, is well north of Inverness, in Easter Ross. Others of 150 feet are in Wester Ross, Kirkcudbright, South-western Scotland, and the New Forest. Although it has little experience of high winds in its native valleys, in this windy quarter of the world, the Wellingtonia is the one truly wind-firm tree that has never been known to blow down. And this despite the fact that it towers above the shelter of its neighbours in so many exposed places. It is true that the recent hurricane in Argyll tipped one over at Benmore, but this had long been a leaning tree, so does not really count fully against it, and all the other trees in a long avenue of them there, withstood the full force of the gale.

On the first of our two tours around Ireland, sponsored jointly by the Irish Forestry Division, the British Forestry Commission, and John Murray, Publishers, and greatly facilitated by the Irish Forestry Division in all ways, the Wellingtonia was found to be markedly best developed in the east Midlands of Ireland and in Co. Wicklow. It seemed to be absent from Co. Kerry, and nearly so in Co. Cork. On the second tour, we found much the same, but we did find one in Co. Kerry, and added Co. Waterford to the area of the biggest trees.

The Wellingtonia was introduced to Britain, and thence to Europe, in 1853. There were two lots of seed, the first collected by J. Matthew in the Calaveros Grove, was sent in August to his estate, Gourdiehill, in Perthshire, and the second, collected by William Lobb for Veitch's of Exeter, from the same grove, arrived in December. They are said to be the first introduction by the fast steamship mail, and both lots were highly fertile. Immense numbers of trees were distributed all over Britain from them. It seems not to be on record, but there can be no doubt that some came to Ireland. One recorded as planted in 1855 at Coollattin, Co. Wicklow, must have been. Unfortunately the tree we found there must, from earlier figures, be a younger tree.

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1. Research Branch, British Forestry Commission.

The most westerly specimen we found, is a relatively young tree a hundred yards from the Lake at Muckross Abbey gardens, near Killarney. It is 80 ft. high x 12 ft. 8 in. in girth. In Co. Cork we found two, both at the incomparable Fota, the larger was 107 ft. x 16 ft. 5 in. In the midlands, a very large tree at Birr Castle has been damaged at the top by lightning, like so many in England, but will no doubt repair itself in time. The bole has a girth of 22 ft. 6 in. To the north, at Castle Forbes, Co. Longford, is one now 98 ft. x 15 ft. 8 in. This has added only 20 in. to its girth since 1931, which indicates a slow rate of growth in this region. In Co. Limerick, growth of the only tree measured was also slow. This tree, at Adare Manor, was 55 ft. x 6 ft. 7 in. in 1891; 82 ft. x 14 ft. in 1931, and is now 95 ft. x 16 ft. 10 in. In Co. Laois, growth is somewhat more rapid, and the trees are larger. A rather slender tree at Stradbally House is 110 ft. x 14 ft. 6 in., while an avenue about a mile long, at Emo Park, with a tree each side every 20 yards or so, protruding into severe exposure above the woods, has trees from 95 to 120 feet tall. The greatest girth noted is 18 ft. 4 in., and the exposure has had little apparent effect so far. At Abbeyleix, a Wellingtonia planted in 1866 was 45 ft. x 6 ft. when 25 years old. Now 102 years old, the tree 95 ft. x 19 ft. 5 in. In Co. Carlow, at Fenagh House, two trees are 83 ft. x 19 ft. 3 in. and 120 ft. x 14 ft. 6 in. Their increases in girth since 1931 have been 48 and 76 inches respectively.

In Co. Kilkenny, Inistioge is an exceptionally good site for the growth of many conifers, including the coastal redwood *(Sequoia* sempervirens), which here is larger than anywhere else in these islands. Its relative, the Wellingtonia is, however, far from outstanding, the two there being 108 ft. x 14 ft. 6 in. and 120 ft. x 16 ft. 1 in.

In Co. Waterford, the big Wellingtonias start east of Clonmel, at Gurteen le Poer, where there is a square planting of four among a splendid collection of large conifers. The two southern corner trees are 128 ft. x 19 ft. 11 in. and 126 ft. x 16 ft. 6 in., both with good spire tops that look capable of a much greater height. The other two trees are a little smaller. Further east, at Curraghmore there are even bigger trees. A widely spaced group of mixed Sitka spruce, Nordmann's fir and Wellingtonias, includes three of the last species all at least 130 feet tall. The largest of them is 135 ft. x 19 ft. 2 in. although the Sitkas make it look small! Across the road from this distinguished group are two more, 120 feet tall, one 21 in girth, the other 22 feet. This last is the only one big enough to be tree which was 106 ft. x 19 ft. 8 in. in 1931, and which was planted in 1871. Therefore those in the group are probably a little more recent than that. Another, near the House, is 115 ft. x 19 ft. 8 in.

In Co. Wicklow, west of the mountains, there are two slender trees at Humewood Castle, the larger now 123 ft. x 16 ft. 3 in. In the foothills of the south, Kilmacurragh has two trees, the larger

110 ft. x 19 ft. 3 in., and Coollattin has one 125 ft. x 15 ft. 8 in., which was 96 ft. x 9 ft. 9 in. in 1931. By the coast to the south-east, at Clonmannon, it is noteworthy that a Wellingtonia planted in 1926 is now 78 ft. x 9 ft. 5 in., which seems a praiseworthy effort, but a coastal redwood beside it and planted at the same time, has the remarkable size of 79 ft. x 12 ft. 11 ins. In the eastern foothills, at Shelton Abbey is a shapely tree of 130 ft. x 14 ft. 7 in., now struggling in acrid fumes from a fertiliser factory. Further north, at Fassaro House are two fine trees from the original seed of 1853 at least, although Mr. John Barrington, whose family planted them, has some evidence that they have been from an earlier, unknown source. Unforunately the date indicated by this evidence is before the tree was known to be discovered. The larger of these two has lost its top but is 95 feet tall, and has a splendid bole 22 ft. 2 in. in girth. Not far away, at Glencormac are two more, both 110 feet tall, and the larger 21 ft. 1 in. in girth.

It is at Powerscourt, nearby, that the finest Wellingtonias are found. A long line of them was planted by the river in 1861. One, near the House end of the line is 140 ft. x 16 ft. 11 in., and two at the far end are 130 ft. x 23 ft. 5 in. and 124 ft. x 25 ft. 10 in. In a strip of wood by the river, a little further along, is another of 140 ft. x 16 ft. 11 in. Of the several others in the gardens, the finest is that in the Tower Garden, which is 122 ft. x 21 ft. 3 in.

Trees, Woods and Literature

Now, Marban, will you be telling me what tree you're most disposed to, she said, for they must be all well known to you and you walking along through the forests from Waterford? What tree am I most disposed to? Marban said. Well, taking all in all, it's the holly, for it sheltered me in the cold March nights. And he called to her to admire one near by under whose branches they would find it hard to squeeze themselves. And Marban never said a truer word than this, Alec interjected, as I know well myself; the holly is as good as a broken house to a man on a winter's night. Luachet throught the leaves looked dark, and she didn't like the thorns, and later in the evening she stopped before a birch and said: That tree is more beautiful than the holly. And Marban answered her that the birch rose up as sweetly as Luachet's own body, and he said that the wind in the tree was as soft as her voice. It's the most musical of trees; his very words as reported by my grandfather, who got them from a book. Now what tree is that naked one? Luachet asked. That one, Marban answered, is the ash, the last one in the forest that the summer clothes. The most useful of the many that God has given us, he added, and to help the time away he told her it was the ash that furnished the warrior with fine spears. And when they came upon a hazel copse, he told her of the nuts that would be ripe for gathering in the autumn. And when they came to some poplars, he said the poplar and the aspen were useless trees, one as the other, the poplar giving but poor shade to the wayfarer, and the aspen not doing much better, a ragged, silly tree, shivering always as with ague. I like the willow better today than I did yesterday. How is that? she said. And he answered her that as soon as they came to a willow he would tell her. See, he said, how faithfully he follows the brook, as faithfully as I shall follow you, Luachet, listening to the talk of your mouth, bending my ear to it, the way the willows listen to the rippling water. And she asked if there was no tree he did not love at all. He said there was one, the pine, for it sheds only a fibrous litter in which nothing grows. A pine wood is without birds or animals, the marten is the only animal one meets in a pine wood.

From *A Story-teller's Holiday,* by George Moore. (Reprinted by kind permission of J. C. and R. G. Medley).

George Moore was born in Moore Hall, Co. Mayo in 1852. He was educated in England, tried painting in Paris, then moved to London and took to writing. He influenced the development of the novel in English. He came to Dublin in 1901 to help restore the Irish language (of which he knew not a word) and left, disillusioned, in 1911. His ten years in Dublin form the basis of his three-volume masterpiece *Hail and Farewell.* (1911-1914). He died in London in 1933. Moore Hall was burned down in 1923 and the desmesne with the crumbling walls of the great house now form part of Lough Carra state forest.

Notes and News

FOREST LAND VALUATION

The following is extracted from the speech of the Minister for Lands in the Dail on 5th March, 1969.

". . . As I have already said, we have a new system of land valuation in use in the Forestry Department and this is a big break-through in our campaign to develop our forestry potential. For the first time we have succeeded in establishing a cost-benefit type analysis of each new area of land being included in the forest estate as the basis for optimum management policies. Each area being considered is now studied in relation to both its potential timber yield and the level of capital development cost likely to be involved, and a price is determined which recognises its fair value for forestry purposes. Under the new system the range of prices which we are prepared to offer is much wider than under the old £10 ceiling price system. Land of relatively low productive capacity will still command only a low price if it qualifies at all for purchase but, for good forest land, valuations now range ferquently up to twice the old ceiling price and, in favourable circumstances where capital development costs are minimal it can go substantially higher.

Any man selling land now to the Forestry Division can expect a fair market price for any land which in the national interest, would be better used for forestry purposes than for agricultural purposes. To put it simply, price should no longer be an obstacle to land acquisition for forestry purposes."

CASTLEWELLAN FOREST PARK

The third forest park in Northern Ireland was opened by His Excellency the Governor on 31st March 1969. It is hoped that this park of over 1,000 acres in Castlewellan Forest, Co. Derry, will relieve some of the pressure on Tollymore Forest Park which had about 180,000 visitors last year.

Among the attractions of the new park are Castlewellan Lake of over 100 acres well stocked with trout (fishing permits will be available) a number of woodland walks and paths with a special trail for pony trekking, and picnic sites, viewpoints, etc. There is also the Annesley Garden Arboretum.

There is a car park for about 700 cars (car, 2/6d. per car) and close to it is a cafe which will provide light refreshments.

FISHING IN FOREST LAKES

The Northern Ireland Ministry of Agriculture has embarked on a programme of fishery development, and as a start has opened three mountain lakes of 10, 35 and 47 acres at Lough Navar Forest, Co. Fermanagh. The lakes are well stocked with brown and rainbow trout, with perch also available. Fishing is permitted only from the shores. Permits cost £1 per season, 10/- per week and 2/6d. per day. There is a bag limit of eight fish and a minimum takeable size of eight inches.

Other angling waters will be opened by the Ministry later in 1969.

I.U.F.R.O. WORLD CONGRESS 1971

The 15th Congress of the International Union of Forest Research Organisations will be held at the University of Florida, Gainesville, Florida, in March 1971. The meetings will be preceded by a special tour of Florida and there will be six technical post-Congress tours, each of about one week's duration. About 700-800 forest research workers from upwards of 50 nations are expected to attend.

The Forestry Divisions in Dublin and Belfast were both represented at the 14th Congress which was held in Munich in September, 1967.

PORTGLENONE RECREATIONAL AREA AND FOREST NATURE RESERVE

Porglenone Forest, of just over 100 acres, and situated in Co. Antrim just east of the River Bann, was opened to the public as a recreational area and forest nature reserve on 9th May, 1969. A car park, woodland walks and picnic sites have been provided for visitors. The area includes a forest nature reserve managed by the Ministry of Agriculture in co-operation with the Royal Society for the Protection of Birds, and a memorial grave in memory of Augustine Henry, Professor of Forestry in Dublin from 1913 to 1930 and joint author of *The Trees of Great Britain and Ireland,* who was born near Portglenone in 1857.

INSTITUTE OF WOOD SCIENCE

An Irish Branch of the Institute of Wood Science was inaugurated at a meeting in Dublin on 28th March, 1969. Chairman of the new branch is Mr. Leonard U. Gallagher, Timber Department, Institute for Industrial Research and Standards. Two papers were read: *Research and Education Related to Industry,* by Mr. W. E. Bruce, Chairman of the OECD Committee on Wood Preservation, and *Productivity in the Wood Using Industries,* by Mr. Desmond Cody, Institute for Industrial Research and Standards.

The aim if the Institute of Wood Science is to promote an awareness, through education, of the possibilities for the better use of timber. Membership is open, but there are several classes of members.

Abstract

Extraction Damage as a cause of Decay in Standing Trees

In a recent Swedish publication Nilsson and Hyppel[1] report on an investigation they carried out in Sweden on the incidence of rot in standing Norway spruce resulting from injury to the base of the stem or roots. They concluded that the location of scars and their depth are of great importance in determining the development of rot attacks. Root injuries near to the stem are more likely to result in serious rot attack than injuries further away from the stem. Deep injuries are more likely to result in serious rot attack than are superficial injuries. Based on a moisture analysis of the lower stem and roots they suggest that there is a zone between the dry heartwood and wet sapwood which is, from a moisture point of view, suitable for the growth of rot fungi. A deep scar near the stem will expose this zone, while a superficial scar must dry out for a while before the rot fungi reach the suitable zone. Scars far from the stem never make this zone available to fungi.

These findings, as the authors point out, may have significance in view of the increased mechanisation of thinning operations. They suggest that using tractors approximately 8 feet wide in extraction, it would be necessary to have extraction paths 13 feet wide to avoid damage which could cause injuries likely to lead to serious rot development in residual trees.

G. de Brit.

1. P. O. Nilsson and A. Hyppel. Studier över rötangrepp i sarskadar hos gran (Studies on decay in scars of Norway spruce). **Sveriges Skogsvardsförbunds Tidskrift,** 8, 1968, pp 675-713.

Obituary

The untimely death of Stephen Dennehy on April 21st is a sad loss to his family and friends. Born at Castletownbere in 1923 he joined the Forestry Division in 1945 and attained the position of Research Forester Grade I. To those of us who knew him and worked with him, he will be remembered with affection as a friendly, kind and conscientious colleague. He will have a special place also in the memory of many of the younger forestry officers who, during their practical years as students, worked under him and benefited from his guidance and forestry knowledge. His thoroughness in experimental field work will be evidenced for many years to come in the well established and maintained experiments and research plots which he managed in the southern and south eastern forests. We will miss him as a person and as aforester and we join in the expression of deep sympathy extended to his wife and family in their loss.

G. Gallagher.

Reviews

Forest Service

By George Ryle.

Pp. 340. David and Charles, 63s.

Sub-titled "The first forty-five years of the Forestry Commission of Great Britain", *Forest Service* tells the story of the growth and development of the Forestry Commission as seen through the eyes of the author, a professional forester, who joined the service as a forest officer in 1924 and retired from the post of Deputy Director-General in 1965.

The book is divided into two parts. Part I sketches the birth and development of state forestry and the forest service in Great Britain. Conceived by the Acland Sub-Committee of 1916, which laid the foundations of forest policy in Great Britain and Ireland for almost half a century, the Forestry Commission was born in 1919 and ably weaned by its first Chairman, Lord Lovat. To Lovat fell the difficult task of putting into effect the recommendations of the sub-committee and to him is given the credit of saving the Commission from the scrap-heap following the recommendations of the Geddes Committee in 1922.

During the 1920's and 30's the Forestry Commission came to be recognised as a fixed part of the nation's structure upon which it was safe to build in providing permanent employment. The author sketches the initiation and implementation of the Forest Smallholdings and Dwellings Scheme which he develops in depth in Part II. Although it was eventually outmoded and abandoned, this scheme enabled the Commission to build up the nucleus of a labour force in areas where labour was scarce. The period was one of progress for the Commission in contrast to the state of stagnation and depression that existed in industry and agricuture.

At the outbreak of war in 1939, the Forestry Commission was split into two sections, the Timber Production Department and the Forest Management Department. The author, then a Divisional Officer in South Wales, was allocated to the Timber Production Department and later seconded to the Ministry of Supply when the department was transferred and renamed the Home Timber Production Department. A thumb-nail sketch of the South Wales contribution to the war effort was given. Working with equipment often of Heath Robinson construction and with a motley labour force, the department purchased and converted 18 million cubic feet of timber to many different specifications. This was achieved by cutting red tape and allowing the Divisional Officer to purchase the timber.

The Forest Management Department comes in for some criticism for its attitude and behaviour during the war years. Apparently, it held on to its young woods so jealously that thinnings, much needed for pitprops, were allowed to fall into arrears to such an extent that line thinnings had to be introduced in an attempt to redeem the situation. There must have been a blind spot somewhere in administration. On the credit side this department planted and restocked 123,035 acres from 1939 to 1944; a very notable achievement in those times. Old practices, like old ambitions, die hard.

A digression to cover the author's experience with the North German Timber Control in the post-war years is noteworthy for his impressions of German Forestry. He makes the point that the German love for exactitude and complicated forms was seemingly much greater than their love for good silviculture or economic management practices. Whatever truth there may be in this it is hard to believe that the Germans knew nothing about cutting trees into diameter assortments for sawlog and pitwood until the British showed them how.

The period immediately following the end of the war was one of consolidation and all the energies of the Forest Service were concentrated on putting into practice the recommendations contained in the White Paper, "Post-war Forest Policy". This document was, in the author's opinion, the greatest and most constructive work the Forestry Commissioners had ever undertaken. It was also to be their last serious contribution to the formulation of Forestry Policy. Subsequent decisions on policy were brought about by outside influences or *ad hoc* committees to make investigations which should have been the prerogative of the Forestry Commissioners. The author attributes this failure on the part of the Commissioners to lack of awareness as to what was taking place around them, possibly because of lack of guidance by their top professional advisors or by a failure to maintain close personal contacts with the government. The White Paper recommended further devolution of powers away from the Headquarters of the Commission, but with the death of Robinson, a professional forester and Chairman of the Commissioners, the tendency to direct authority away from the conservators and directors into the growing headquarters staff became more pronounced. The author makes it quite plain that he has little time for this type of activity which he terms "empire building".

Towards the end of the period the Commission had the privilege, or the agony, to be selected for review by the Select Committee on Estimates of the House of Commons. The only real criticism to emerge was as to the method of accounting. The idea of running a business without regular knowledge of the capital value of the stock struck the Estimates Committee as unusual, even irregular. On the whole, however, its report was favourable, but before the Commissioners had been given time to examine it and comment, another outside departmental group was set up to take this function out of their hands and eventually report direct to the Minister. This, of course, sounded the death knell of the devolution policy proposed in the "Post-war Forest Policy" White Paper. As the author puts it "Henceforth a single heavy *praesidium* of confusedly overlapping functional Commissioners was to rule direct from Saville Row". Sweeping changes wer made in the administration including the abolition of the post of Deputy Director-General and the retiring age for forest officers lowered from 65 to 60 years. The organisation was to move from a primarily timber growing one to one where exploitation, selling timber and marketing would play a major part.

Part II consists of ten somewhat unconnected chapters dealing with major functions of the Forestry Commission. Some of these functions have been mentioned briefly in Part I and the author now takes the opportunity to deal with them in depth. In some of the chapters, such as "The Crown Woods" and "Private Forestry" he breaks new ground.

For a history of an organisation the text is relatively free of unnecessary tables and statistics. Anybody who wishes to find such data as the acreage of land acquired, the incidence of forest fires, the number of men employed or the planting progress by private landowners is referred to the appendices.

The author sets out to paint a picture rather than write a history and in this he has succeeded admirably. It is a story of the people who built up and made the Forestry Commission; a story of their dedication to an ideal, their successes and their shortcomings and the inevitable clashes of personalities at the top. While many of the names mentioned are almost legendary in forestry circles, the author does not forget the rank and file even if they are not named.

Throughout the text the author employs a directness of approach that is refreshingly candid. He does not beat about the bush. He is lavish in his praise where it is merited, but he is also highly critical of people and procedures on occasions. It is inevitable, however, that he should view the events and personalities of his early years through rose-tinted spectacles and be much more discerning and critical in later years. During his time as a forest officer, the field staff managed their forests and made their decisions with the absolute minimum of direction from above. The District Officer had almost unlimited freedom of action with the broad policy framework and generally the planning sequence was upwards rather than downwards. Just as the automatic pilot of the jet age has superseded the "fly by the seat of your pants" aviator of pre-war days so are the planning and decision functions of the field officer being eroded, first by drillbook solutions and ready reckoner techniques and now by operational research and the computer. It had begun to happen in the Forestry Commission when the author retired. Now it has progressed to the stage where district staff are being given short courses to familiarise them with the jargon and to get them on the right wavelength. The author hopes this is just a passing phase; this reviewer feels it is the price of progress.

The author faithfully portrays the changes which have taken place down the years. Acquisition is a case in point. In the 1930's the planting programme was 20,000 acres per year and acquisition was scaled down to ensure merely the retention of a workable reserve. One acquisition officer catered for England and Wales during the period. In contrast the planting target in post-war years was not achieved mainly because of inability to acquire land. Part of the difficulty arose because the Minister's Agricultural Officers and the County Agricultural Committees considered improved pasture land and high mountain land to be "too good for forestry", but a contributing factor was the complacency of the Commissioners. The adoption of a properly calculated land-use policy is urged so that acquisition can be boosted to achieve the post-war target of 5 million acres by the end of the century. The comment that a planting reserve of anything less than six years would seem to be precarious will not receive wide acceptance in the Irish Forestry Division.

The author is rightly critical of what he terms the "airy-fairy" policy which emerged in 1963. This recommended that purchases of land should be restricted to places where there "were good economic reasons" or where tree planting would "maintain or improve the beauty of the landscape". Yet one suspects that the criticism is directed not so much at the wooliness of the policy but at the Treasury which has taken the final decision on acquisition out of the Foresters' hands.

A strong advocate of recreation facilities, amenity and game preservation the author makes the point that they must be secondary to wood production. On the question of economics he is less lucid. He takes issue with economists who have suggested that forests not achieving an ultimate discounted revenue of some preconceived figure should be abandoned and queries the validity of their decision making under conditions of future uncertainty. His argument is valid and evaluation of a pay-off matrix by *maximin* or *minimax* criteria is not going to solve the question of future uncertainty of supply, demand and price to everybody's satisfaction. Yet until we can breed clairvoyant economists we must make do with what we have. The author's formula for successful forestry is quite simple—the production of as much wood as possible of the quality required for the best markets. Economic motivation must not be the sole criterion, but the raw material should be produced as cheaply as possible.

The present state of overstaffing is better understood in the light of data provided. From 1954 to 1964 the number of directly productive men declined by 3,768 but clerical and managerial staff increased by 628. Is the Commission reverting to the German practice which the author so abhorred or is it simply Parkinson's Law in operation? The author does not elaborate, but comments that the non-industrial staff is big enough for an increased rate of progress without the need to recruit a single extra man or woman.

The book is anything but the dry history which the title might suggest. The text is liberally interspersed with anecdotes and the illustrations are excellent. A criticism which the author acknowledges in the preface is the unduly strong Welsh bias, the result of the author being almost permanently stationed in the Principality. The development of forestry in Scotland, in particular, is somewhat neglected.

Another criticism is the author's poor knowledge of Irish history. He refers to the planting achievement in the early years which was carried out without Irish collaboration and "but for the partition in 1923 substantial land would have been acquired and dealt with in that country". Despite this error Irish foresters will enjoy the book.

P. M. Joyce.

Timber Pests and Diseases

by W. P. K. FINDLAY.

Pergamon Press. 280 pp., 57 illustrations. 30s.

The blurb suggests that this book will be valuable to students at colleges of technology and at universities, and also to all concerned with a wide range of occupations including furniture manufacture, forestry, architecture, building, estate and land management and boat building. This is indeed an impressively wide range of potential purchasers. I think the suggestion is probably justified; I would however consider it more appropriate reading for the occupations mentioned rather than for college of technology or university students. That it would be a useful and broadly based introduction to timber deterioration for the latter category is not doubted.

The real value of this book I feel is that, for people who use wood in its many and varied forms and uses, it provides a clearly and simply written account of the causes of deterioration in timber and the measures that need to be taken to minimise or eliminate the losses resulting from deterioration. Before discussing types of deterioration, Dr. Findlay has a very valuable section on the nature of wood. As well as describing basic structure and composition, durability of timber is dealt with at some length. The basis for differences in durability from one species to another is discussed and a useful heartwood durability classification is given on page 16. It struck me reading this section that if a little more thought was given to the type or species of timber used for specific purposes considerable deterioration could be prevented and savings in money terms accomplished. Dr. Findlay gives useful information in this section on the uses of timbers based on his durability classification.

In the section dealing with causes of deterioration in timber the more common destructive agencies are briefly discussed. These include mechanical wear, decomposition by fire or prolonged heating, chemical attack, fungal decay, insect attack and attack by other animals, marine borers, birds etc. The following three chapters consider in more detail fungal decay and damage caused by insects. There is an interesting and useful section covering the structure, reproduction and classification of fungi. For instance on page 35 Dr. Findlay says that "removal of the fructication no more checks the growth of the fungus than plucking fruit checks the growth of a tree". I am sure that this truth would surprise not a few people. This section is followed, logically, by an important section discussing the conditions that must exist for fungi to develop. Each factor is considered separately and adequately. As with timber durability mentioned earlier a knowledge of these factors and an appreciation of their importance could prevent a lot of unnecessary decay occurring in buildings and elsewhere. Insects are dealt with similarly, but are divided into sections (1) Coleoptera, Hymenoptera and Lepideptera and (2) Isoptera (termites). There is a very large section devoted to the death watch beetle (*Xestobium rufovillosum*) and the furniture beetle (*Anobium punctatum*) detailing their habitats their preferred oviposition locations and methods for their control and prevention. The section on termites is of interest; while most of these insects are unlikely to successfully establish themselves in Ireland, Dr. Findlay states (p.128) that "the climate in parts of Great Britain does not differ greatly from that around La Rochelle in France where *reticulitermes lucifugus* var *santonensis* is well established, and is quite a pest in orchards and gardens".

The chapter dealing with diseases of standing trees seems a little out of place in a book which is otherwise devoted to felled or converted timber. The title of the chapter—Diseases of Standing Trees— is itself somewhat misleading. In fact apart from a brief introductory section the bulk of the chapter is devoted to wood rotting fungi, their effects and prevention. This is however a small criticism as the chapter does impart useful information on the more common timber decay organisms affecting standing trees. I liked particularly the section dealing with prevention of top rot in park, roadside and garden trees. There is a lot of very sensible advice here for local authorities and private garden owners concerning selection of trees and shrubs for planting in relation to their future development and treatment, including examples of good and bad pruning practice and methods and materials for treatment of pruning wounds. I must repeat that while I liked this section a person looking for this sort of information would be unlikely to seek it initially in this book.

There follows a thorough section on the care of timber after felling and conversion, which discusses, among other things, the reasons for removing logs from the forest as soon after felling as possible, factors associated with storage and protection of logs and seasoning storage and protection of sawn timber.

Decay of timber in buildings is likewise treated in a comprehensive manner. Once again Dr. Findlay places emphasis on the causes for both dry rot and wet rot in buildings. Descriptions of the principal fungi and the types of damage caused by them are given as are methods for treating various types of damage to different structures or timber components. There is a useful table on page 192 which describes the principle observable features of the more common fungi responsible for rot in buildings.

The concluding chapters deal with protection of timber used on farms, in gardens, in ships and boats, for marine works, in vehicles, in aircraft etc. I do not intend to comment individually on all of these. The most practical suggestion in the section on protection of timber on farms and in gardens is that "surface application of preservative is of little value on timber that is permanently in contact with the earth" (p.22). This point is reinforced by Mr. Milne Home whom Dr. Findlay quotes "I think an important point in this —that if you use untreated wood for fencing stakes you will put in at least three and possibly four, to equal the life of one creosoted stake. If you take it as low as three and calculate the labour involved in doing three times over what you would otherwise only require to do once, you will see that the small additional expense of using creosote as preservative is very well spent money". There is a fascinating account of the importance of decay in the timbers of warships during the 16th, 17th and 18th centuries. Dr. Findlay comments "that it is not therefore surprising that the first serious attempts to understand the causes of decay and to discover means for its prevention were undertaken by those responsible for His Majesty's Ships of War".

Taken in total I think this a good book which should enjoy a wide readership, not as a definitive text, its scope is too wide for this, but as a reference book in technical libraries and as a useful and informative source for persons who, though not specifically interested in timber deterioration, have cause to handle or use timber for a variety of reasons. Finally, I must say that I found the book very readable. It is not often that one is entertained by a technical book. Dr. Findlay writes with simplicity and clarity and with a pleasant sense of humour and historical background which should generate sufficient interest in the reader to assimilate the wealth of information contained within the book. The lay out and type face are good and do not place any strain on the reader. Many of the illustrations while good photographs might have been more benefit to the non specialist reader had they been in colour. I am thinking particularly here of illustrations showing the effect of decay organisms on timber.

Gerard de Brit.

Other Publications Received

(F.A.O.) *Directory of debarking machines.* Compiled by the Forestry and Forest Industries Division, Food and Agriculture Organisation of the United Nations. Rome, 1968.

W. T. Curry and S. A. Covington. *Grade stresses for European redwood and whitewood.* Ministry of Technology, Forest Products Research Bulletin No. 52. HMSO, London, 1969. 7s. 6d.

Society Activities

Certificate Examinations

Those who wish to enter for the Woodman's Certificate or Forester's Certificate examinations this year should send their application forms to the Examination Convenor (Mr. J. F. Durand, Sequoia, 121 Arnold Park, Glenageary, Co. Dublin) before the end of June. Further details of these examinations and of the National Diploma in Forestry examinations can be had from the Examination Convenor.

Machinery Display and Field Day

The Society is sponsoring a forestry machinery display and field day to be held at Glenealy State Nursery, Co. Wicklow on 6th September 1969 (2 p.m. - 6 p.m.). Apart from the machinery display there will be a game exhibit, tree felling competitions, demonstrations of nursery practice, timber handling and road making, and an arboricultural exhibit. A picnic area, forest walks, and a car park will be provided, and refreshments will be available.

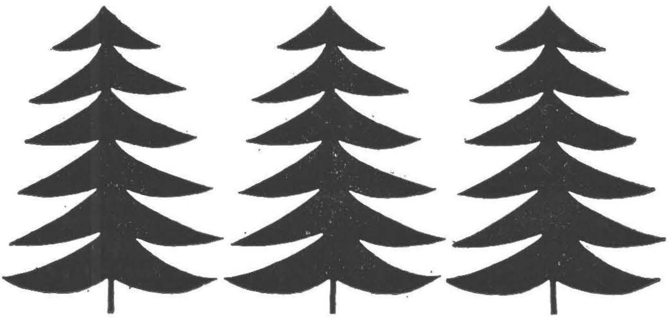
Demonstration space (rates £5 and up) may be booked through the Business Editor, or through Mr. Basil Wilson, School of Forestry, Pomeroy, Co. Tyrone. Early booking will allow inclusion in advance catalogues.

New Permanent Address

Through the courtesy of the Royal Dublin Society, the Society of Irish Foresters has been provided with meeting rooms, storage space and a permanent address.

Communications to the Hon. Secretary should in future be addressed :

Society of Irish Foresters,
c/o Royal Dublin Society,
Ballsbridge, Dublin 4.



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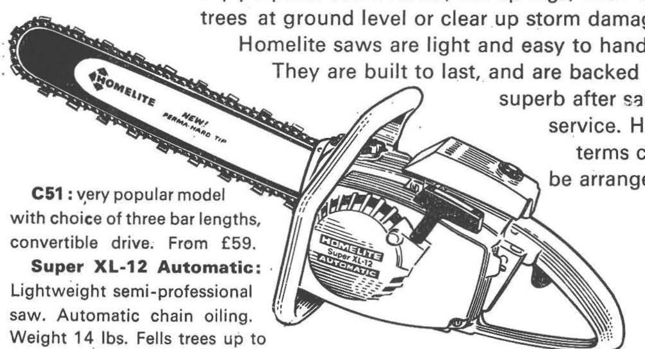

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