IRISH FORESTRY

Journal of the Society of Irish Foresters

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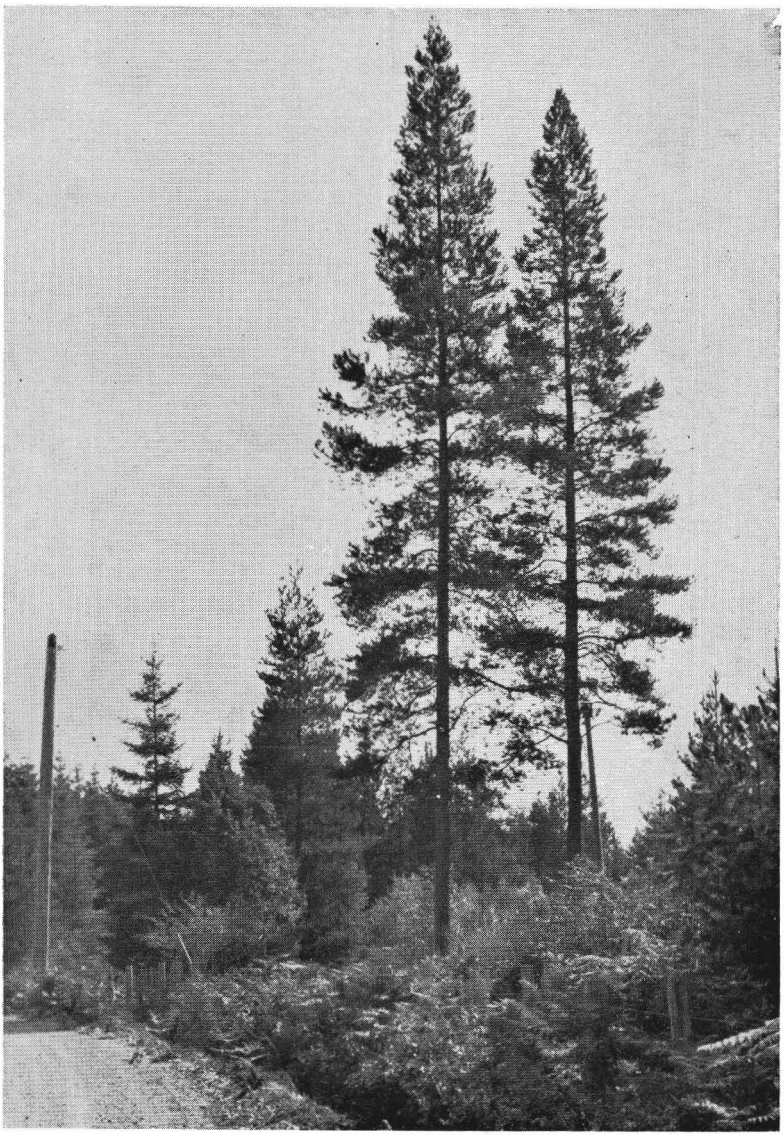

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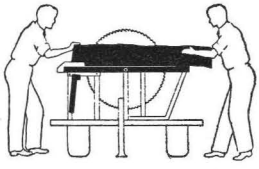

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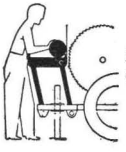

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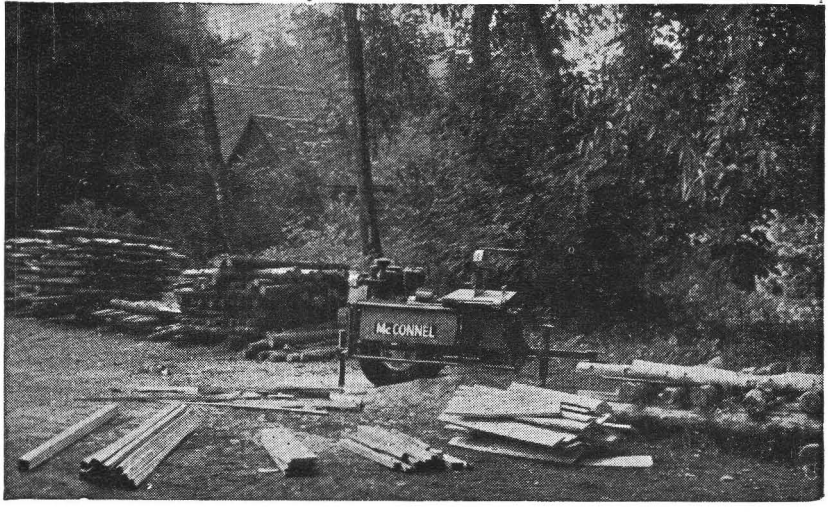

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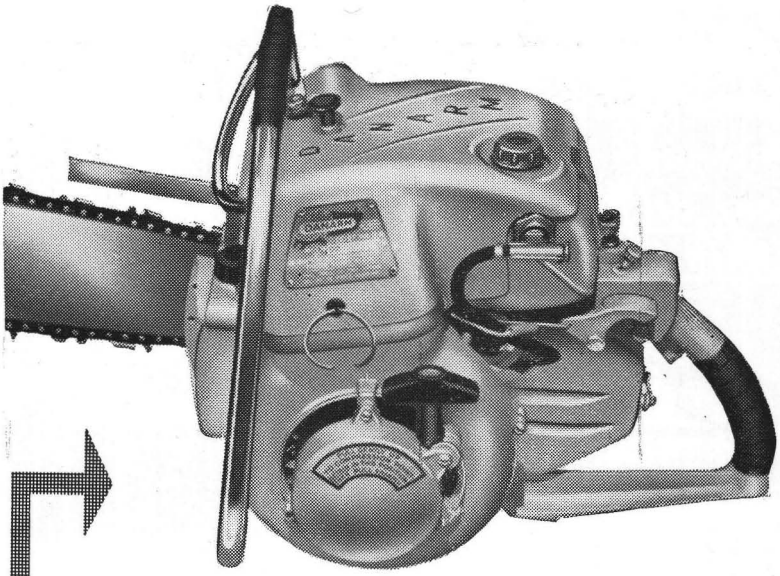

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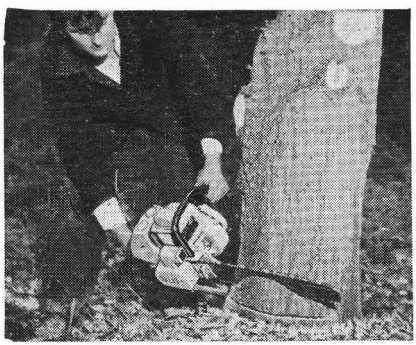

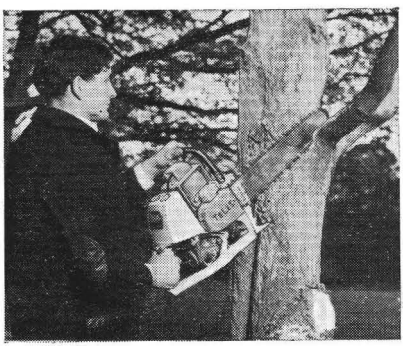

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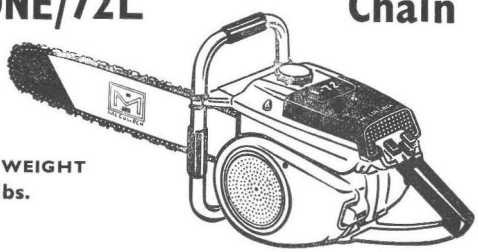

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IRISH FORESTRY

Volume XVIII. AUTUMN, 1961. Number 2

The Planning of Forest Engineering Activities *

E. R. HUGGARD,
Lecturer in Surveying and Forest Engineering,
University College of North Wales, Bangor.

FOREST engineers are usually associated with forest roads. Can you think of anything less likely to fire one's soul with inspiration? A newly-constructed road, which is little more than a track hacked from the hillside, serves a purely functional purpose—that of timber extraction and general administration. Perhaps in thirty or forty years time the poet may see it mellowed into the forest scene, set in a silhouette of leafy shade. To-day—it is just a forest road. Therefore, at first sight, the activities of the engineer in the forest would appear to be not only unexciting, but, also, more or less detached from the other main branches of forestry. In fact, such is not the case.

Forest engineering (including timber extraction) is an important part of the whole managerial plan. It is not a 'thing apart', but influences, and is influenced by, the policies of silviculture, management and utilisation. In the numerous situations where one man is in charge of all branches within his area, e.g. the average District Officer or Estate Agent, he should be conscious of the inter-relationship of policies to achieve efficient overall management. He must let his left hand know what his right hand is doing. If there are engineers, as distinct from foresters, working within and for the organisation then it is doubly important that liason should be complete and harmonious. An awareness of this inter-dependency must be developed among all the staff, and this may best be achieved by an understanding of each other's needs and difficulties.

Ever since its inception in 1919 the Forestry Commission in the United Kingdom has employed an increasing number of District Officers and foresters to form an efficient organisation. The quality and extent of its plantations (in spite of war and a scarcity of available land) testify to the efficiency of the Commissioners and their employees. However, soon after the war, there was introduced into the Commission a band of civil engineers who were employed primarily for the con-

* Paper read at the Annual General Meeting of the Society of Irish Foresters, Dublin, 11th March, 1961.

struction of forest roads. It was not clear whether they formed a separate Engineering Branch or whether they were an integral part of the whole organisation. Whatever the relationship, there was little doubt that the Commission suffered from quite severe teething trouble. All sorts of medicines were used to ease the agony. Such was the pain that the patient was not at all sure whether he wanted to have teeth, especially if getting them was so distressing. Neither the sharp tongue of the Commission nor the back-biting of the teeth helped matters. Even 'extraction' was resorted to, in cases where the teeth were assumed to be bad. My qualification for indulging in this metaphoric tale is that I was one of the teeth. Not, I might add, the wisdom tooth. Nor was I extracted—I fell out naturally.

This somewhat unpleasant chapter is now ancient history, but important enough to deserve recording. It is my opinion that the unquestioned harmony which exists between the Commission and its 'Engineering Branch' to-day could have been achieved much sooner and much less painfully. I venture to suggest that when the planning of engineering activities was mooted the first item should have been concerned with the psychological and educational aspects of integration. It is an unfortunate facet of human nature that we feel like 'taking it out' of the 'new boy'—just in case he might become bumptious—with the result that the innocent are punished with the guilty. If too much wind is taken out of one's sails one can very easily drift into the doldrums.

It is my intention, to-night, to survey briefy the influence which the engineer has on the other branches of forestry. It will possibly form a basis on which advice and guidance might be given to an engineer on entering the forestry profession. It is quite likely that the Irish Forest Service may wish to extend the use of engineers before very long. It could be equally useful to a District Officer responsible for all the branches of forestry.

The chart (Fig. I) briefly outlines the various aspects of forestry which are influenced by engineering and extraction. They are set out in no particular order and are by no means complete; they may be referred to under the following headings :—

Silvicultural Systems.

There is no scarcity of silvicultural systems. India and Europe abound in them. Professors propose them; students invent them; nature even tolerates them! They flow like flood water from the mouths of every member at a Society Outing. The choice of system affects the cost and method of extraction quite appreciably. If we are to plan future economic extraction effectively it is almost essential to know the probable thinning plan. Most woodland owners and, I dare say, the majority of State Forest Organisations to-day are in forestry for the money, although it is fully realised that there are supplementary reasons for growing trees, such as the relief of unemployment in some districts,

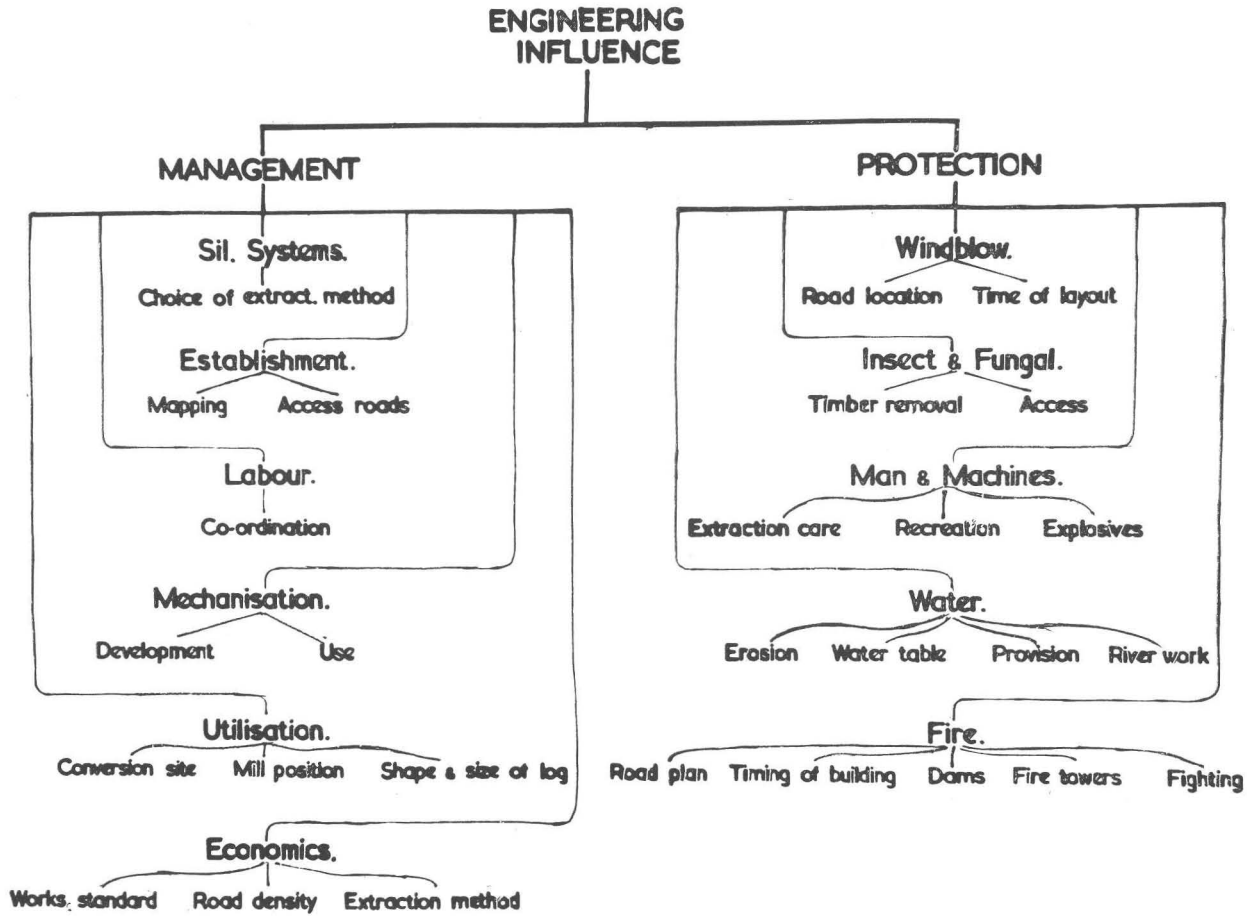

ENGINEERING INFLUENCE
MANAGEMENT
PROTECTION
Sil. Systems.
Choice of extract. method
Establishment.
Mapping
Access roads
Labour.
Co-ordination
Mechanisation.
Development
Use
Utilisation.
Conversion site
Mill position
Shape & size of log
Economics.
Works standard
Road density
Extraction method
Windblow.
Road location
Time of layout
Insect & Fungal.
Timber removal
Access
Man & Machines.
Extraction care
Recreation
Explosives
Water.
Erosion
Water table
Provision
River work
Fire.
Road plan
Timing of building
Dams
Fire towers
Fighting

Figure 1.

amenity, the preservation of game, as shelter or to form a national reserve. In commercial forestry the uneconomical silvicultural system, however ideal in theory, will be sacrificed for the sake of sound economy. It is very common now, especially amongst private owners, to thin heavily in order to cheapen extraction and obtain a quicker return.

Generally speaking, the Extraction Engineer dislikes logging from mixed plantations or from systems which necessitate light and scattered fellings. The clear felling of a heavy-yielding single-species stand is the logger's delight. Of course, many different silvicultural systems and mixtures are correctly advocated for various reasons such as the conservation of soil, the obtaining of maximum or sustained yields, or the encouragement of natural regeneration, etc., but the implementation of any treatment in a good plan will have been costed and due account taken of the considerable differences in extraction cost which results from using a different silvicultural system. It just would not be good enough to make calculations of profit based on an "average" extraction cost. The true value of timber to the grower is when it is at the mill—not at the stump. To boost that he can sell 'standing' is a 'red herring' —the price offered will take into account the difficulty or otherwise of extraction.

Establishment.

Surveying and map making is a much jollier subject—it is precise and there is little room for argument. There is something oddly humorous about the other fellow ending up in the wrong county—like one's friend falling on a banana skin. Prior to, and during, establishment, the engineer may be asked to carry out surveys and prepare plans. He is well trained for it and such employment would help to broaden his views on forestry. The checking and setting out of boundaries, the location of rides and fire lines, etc., need not be the prerogative of the silviculturist, certainly not in an organisation in which the aim of all employees is to produce trees and timber.

Liaison will be necessary for the possible provision of access roads, the cost of which will be debited against general administration and fire protection. It is very doubtful if it would be sound economics to lay out much money on access roads as the interest in the capital involved is generally greater than the gain in lower establishment costs. If some roading is to be built in the early life of a plantation (perhaps for fire protection) then it should be constructed prior to planting. To plant and then realise the need for roads because of the danger of fire is bad planning. It happens!

Labour.

There are few factors of forest management more likely to lead to wastefulness than a lack of co-operation between forester and engineer regarding the employment of labour in sparsely populated areas. This

is particularly noticeable when the two separate camps are vying against each other not only for the labourer's particular skill, but also for the purpose of maintaining an adequate labour force on his books. There is, at the moment, in labour-scarce Britain, a distinct tendency for firms, during slack periods, to reduce the working days of all employees rather than to operate a redundancy scheme. The system has its advantages, as well as disadvantages, both for worker and employer but, on the whole, it is nationally wasteful. In the forest there is the opportunity of operating a scheme of full-time employment. Integration of forest and engineering activities supplies an answer, provided the year's work is planned co-operatively in advance.

Mechanisation.

Much of the machinery used in forestry, from establishment to delivery of the timber in the mill, has been developed or borrowed from other professions, chiefly agriculture and civil engineering. Now forest machinery development is going ahead, but we are still just beginning to travel the path of development leading to complete mechanisation. Scientific progress is so rapid in all other branches of industry that every effort in forestry will be required in order to keep pace. More help is required from higher authority for promoting forest machinery research. The problem is a general one and not particularly influenced by engineers and there is little chance of the engineer influencing higher authority, so we will leave the matter there.

Utilisation.

The various branches of forestry are so intermingled that it is difficult to single out all the aspects of engineering influence. Utilisation is the 'bread and butter' of forestry (there is little or no jam) and on it depends the whole work and success of forestry.

Of direct importance to the Extraction Engineer are the policies concerning conversion centres and the position of mills. Regarding the former, the trend now appears to be to haul the tree in full length to break-down depots prior to loading on a lorry. Several recent Russian publications advocate the hauling of the whole tree, including foliage, to strategic centres. It is maintained that the conversion is more easily mechanised, there is less waste, the hauling effort is, if anything, reduced and the floor of the forest is kept clean of brush. The last advantage is debatable.

The siting of saw mills, pulp mills and chipboard factories affects the engineer to a much lesser degree. In the most general terms the location of large utilisation mills will depend on many factors including the following:—

The quality, quantity and distribution of the raw material (wood);
the minimum requirements of the mill for economic working;
the mill size/cost of unit output ratio; and
the transport system.

Whether or not there should be intermediate break-down centres between forest and mill will partly depend on the saving to be made on the transport of semi-processed material compared with the cost of that breakdown. With reference to Fig. II the complete timber movement plan is economically correct when the sum of A,B,C,D,E,F, and G is at a minimum.

Other considerations influencing the engineer would be the size, shape and moisture content of the logs most acceptable to the mill. The plan is quite fluid. Suggestions are actually being made that chips, suspended in water, might be transported by pipeline.

The point to note is that the engineer, like everybody else concerned,, should be 'in the picture' regarding the link-up of forest roads, conversion centres and mills. Only then can local planning be made (and adapted, if necessary), to fit into the overall scheme.

Economics.

A good forester is not a man who grows trees and produces timber —but, rather, a man who does it economically. Thus, the method chosen to carry out any action towards one's aim must be the cheapest, provided the standard is satisfactory. The three most important aspects within the compass of the engineer are :—

(a) The cheapest form of road construction which will carry the loads safely. This he does by designing to minimum standards.

(b) The density of forest roads which will ensure the cheapest extraction. This he calculates for the area concerned.

(c) The cheapest form of off-the-road extraction without causing damage. This he practices and carries out investigations into new methods.

The Timber Movement diagram (Fig. II) clearly indicates how the economics of all these three aspects influence the economy of the forest in general. In the study of standard, location and method there is plenty of unexplored ground between engineer and forester which requires development.

Protection.

The Achilles' heel of the engineer to an antagonistic forester (if there is such a person) is Forest Protection. If all else fails the engineer can be accused of imperilling the forest to a succession of major catastrophies.

By laying out the road lines prior to planting, thereby avoiding having to cut through an existing plantation, he can help to lessen the chances of windblow. A knowledge of the causes of windblow would be most valuable in the actual planning of a road scheme.

During and after extraction the timely removal of timber and the

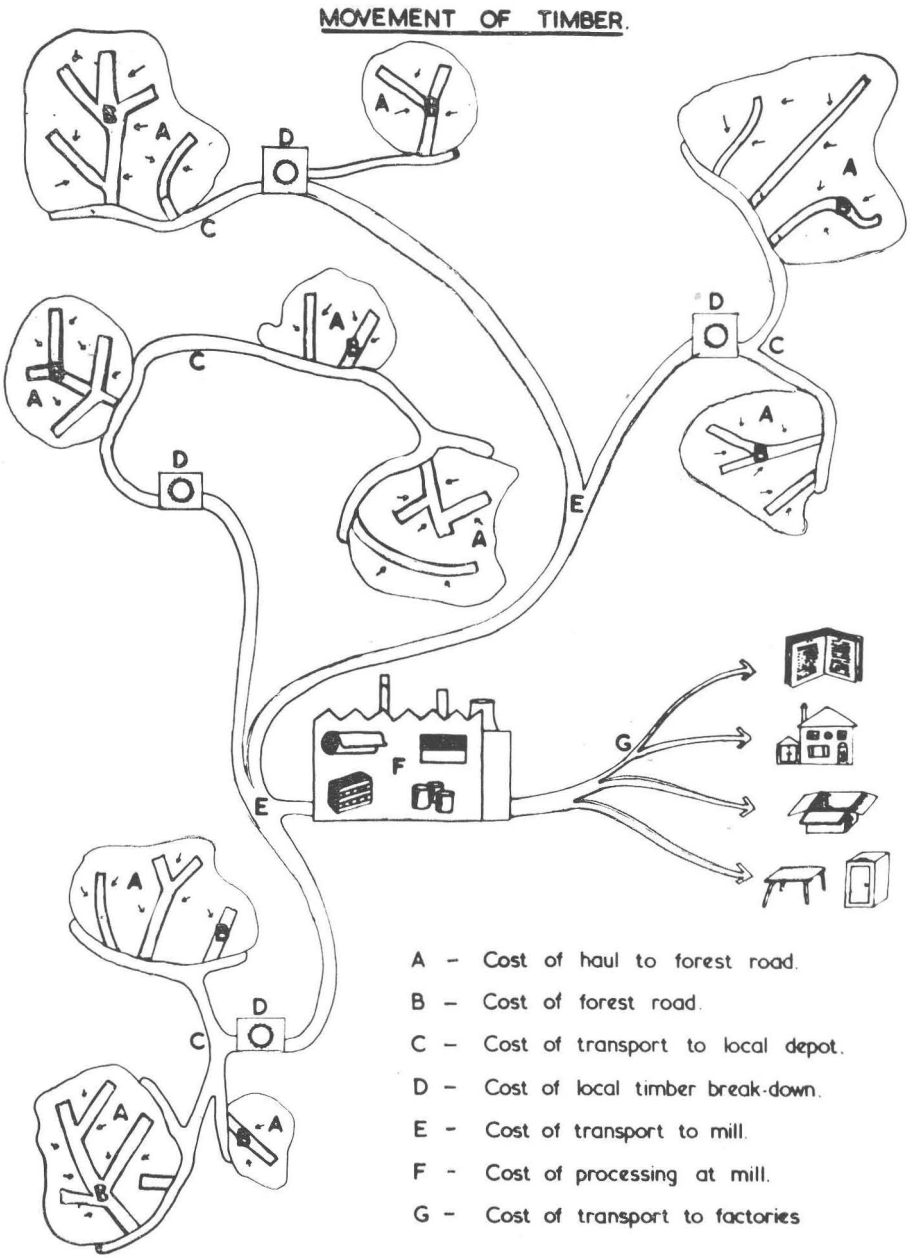


Figure II.
The means of transporting and processing timber is correct only when the sum of A, B, C, D, E, F and G is a minimum.

cleanliness of the floor are fairly obvious principles of forest hygiene. The physical care necessary during extraction and, indeed, for all engineering work is equally obvious and just as important. Examples of unwilful damage caused by engineers include the destruction of tree tops by careless blasting; damage to crops and soil by the movement of machines and plant; the erosion of soil because of faulty drainage works; and spoiling the amenity value of particularly pleasant areas by opening up quarries or constructing to an ugly design. There are many other damaging effects of an engineer's work but the vast majority of them could be avoided by encouraging the engineer to take an interest in the protection and amenity value of the forest.

It has always been a surprise to me to find that engineers are dis-associated completely from fire protection. The road plan, the timing of its construction, the design and location of dams and fire towers and the actual fire-fighting plan and its implementation are all of direct concern to the engineer.

Anyone who accuses me of trying to sell engineers to forestry might be forgiven but, in actual fact, that has not been my intention. Rather, it has been just the reverse. It is to ask you to sell or give away forestry to the engineers. Despite their shortcomings, if engineers are shown the whole picture they will understand and, in return, will love and care for the forest. It was also my intention to encourage the forester to allow his engineering instincts and interests to intermingle with his silvicultural knowledge. Failure, on his part, to do that may possibly limit his views to a narrow, flat and dull picture instead of opening up a wide, exciting and stereoscopic image.

What of the future? To foresee that there will be change is simple but to forecast the details of the change almost impossible. Man's scientific progress is 'snowballing' and it is probable that the important changes in forestry will come from outside the industry.

Although timber is replaceable it is not vital. There are many indications that the change which is taking place in wood utilisation will accelerate. As a fuel it has been almost superseded. As a building material it is losing its importance. In spite of the greater magnitude of the building programme in Britain, less timber is being used each year, chiefly because of the increased use of concrete and plastics and the trend in design to flat roofs. In the furniture industry new materials are being introduced and smaller quantities of solid timber are being used. It is in its broken down form that wood is finding an outlet of increasing importance. There is a school of thought claiming that a forest will soon be valued in terms of its cellulose content. Research into the breakdown of wood might possibly be more profitable than the growing of big trees. If that is true, and every indication points that way, it must have a marked effect on the managements of forests and consequently on the methods of extracting the crop. (Forgive the heresy), but might it not be true that the European management systems may have outlived their usefulness. Only an engineer, ignorant of

forestry, could afford or dare to suggest such a thing—please forgive me. I foresee our forests limited to two or three short-rotation softwood species, managed to give the maximum cellulose yield. There will be complete mechanisation in which the trees will be patch-felled and dropped into the hoppers of local factories to be broken down into chips, pulp and cellulose.

Much later still the importance of wood will give way to other more easily produced materials. The purpose of the forest will gradually change from timber production to amenity and soil conservation. The clamour for scattered hardwoods instead of dense echeloned conifers will assert itself at the time when man's material requirements are satisfied. But before that time there will be an era of intensive forest management for which the plans should now be made.

The Lulu Island Provenance of Pinus contorta

LAURENCE ROCHE

Introduction.

Lulu Island lies in Lat. 49° 20′ N., Long. 123° 15′ W. It is separated from Vancouver, B.C. by the North Arm, and bounded on the south by the main channel of the Fraser River. A large portion of the Island is bogland which is usually covered with dense stands of contorta pine. There are no stands of other species on the Island.

Soil.

The Island is composed chiefly of delta deposits laid down during the post-Pleistocene by the Fraser River debouching into the strait of Georgia (Johnson 1921). The westernmost edge of the bog lies within five miles of salt water. The depression in which the peat has accumulated apparently had its origin in abandoned river channels, formed as the river changed its course upon the upbuilding delta. During its earlier development, the bog was subjected to periodic inundation as is evidenced by the thick deposits of silt underlying the peat and its presence throughout much of the bog (Hansen 1940).

Ecology.

The bog surface has been modified by grazing, cultivation and fire, and since the last war, by drainage to facilitate house building. However some areas have retained their natural condition. These areas support the typical plant association of the British Columbia bog areas, that is, the *Pinus contorta—Ledum groenlandicum—Sphagnum capillaecium* association. *Ledum groenlandicum* (Labrador tea) is found everywhere in dense thickets. *Betula* is in abundance in some areas, and *Vaccinium oxycoccus* and *Myrica gale* are also usually present.

Pollen analysis of bogs of the Pacific Coast similar to that of Lulu Island have shown that contorta pine is usually the pioneer species and most abundant arboreal invader (Hansen 1944).

Climate.

The following table for a 15 year period is from the records of the weather station of Vancouver Airport. This data is valid for the Lulu Island area (Chapman 1952).

TABLE

Station: VANCOUVER AIRPORT Years: 15 Altitude: 22′ Latitude: 49° 11′ N.

	J.	F.	M.	A.	M.	J.	J.	A.	S.	O.	N.	D.	Total
Average Extreme Highest Temp.	51	54	60	68	74	78	82	80	76	66	57	53	
Mean Maximum	41	45	50	56	63	68	72	71	66	57	49	44	
Average Extreme Lowest Temp.	16	22	27	33	38	44	48	48	39	32	26	19	
Mean Minimum	30	33	36	41	46	51	55	54	50	44	37	34	
Mean Temp.	35	39	43	49	55	60	64	63	58	50	43	39	
Total Precipitation	4.94	5.06	3.74	2.53	2.01	1.43	1.11	1.15	1.96	4.80	5.12	6.47	40.32
% of Annual Total Per Month	12.3	12.5	9.3	6.3	5.0	3.6	2.8	2.9	4.8	12.0	12.6	16.0	
Number of Days With Precipitation	18	16	16	13	10	8	6	7	9	16	18	19	
Prob. of Precipitation	58%	50%	51%	44%	31%	24%	19%	22%	30%	51%	60%	61%	
Snow	6.2	4.8	1.2								1.0	4.3	17.5
% to Total Precip.	12.4	9.5	3.2								2.0	6.5	4.3%
Relative Humidity:													
A.M.	93	91	91	89	88	87	89	90	92	92	91	91	
P.M.	85	78	70	67	63	65	62	62	72	80	84	88	
Sunshine	68.9	92.4	127.8	192.8	246.1	268.7	292.7	244.3	204.7	113.5	68.8	42	

It will be seen that the climate of Lulu Island is very similar to that found over a large portion of Ireland, where the average temperature for winter months is 44° F. to 45° F. in the West, and 41° F. to 42° F. in the East, with July temperatures of 60° F. to 61° F. in the South and 57° F. in Donegal. Average precipitation on the Island is 40.32 inches which approximates very well with the precipitation over four-fifths of Ireland (G. P. Haughton 1957).

Present condition of the stands.

It is likely that within a short time few if any stands of contorta pine will be left growing on Lulu Island. Since the last war there has been a boom of speculative building. Large areas have been cleared of trees for this purpose, and also for the purpose of cranberry culture, which is an important industry along the coast of Washington and Oregon. The stripping of peat deposits has also hastened the destruction of the pine stands.

The writer has visited the Island on several occasions with Mr. Gordon Roche, the seed merchant. Practically all the contorta pine in this area is under twenty years and under five inches in diameter at breast height. Owing to repeated fires no mature stands now remain. The typical stand is dense and even aged (Fig. I) and generally every tree is infected by western gall rust (*Cronartium harknesii*). The most

Fig. I—Stand of *P. contorta* on Lulu Island bog. Note dense thicket of Labrador tea (*Ledum Groenlandicum*) in foreground.

Fig. II—Vigorous early growth of *P. contorta* on Lulu Island.

noticeable result of rust-infection is the stimulation of the host to abnormal tissue development resulting in malformed organs, or parts of the host, such as galls, swollen stems, stunting and leaf casting. There is little doubt that the disease retards growth, and deforms a very large number of trees. Trees free of the disease are taller and generally more vigorous than infected trees.

Contorta pine is an early seed producer, and it appears to be particularly so in this area. Trees as young as five years bear cones, and because of the accessibility of the cones, seed collecting has been principally from young trees, and older trees of stunted growth. This, of course is common practice regards lodgepole pine, and, whatever the provenance, practically all the seed supplied to Ireland throughout the years has been collected from similar stands. Seed collected from taller trees, such as those of the Ladner stands mentioned below, would be much more expensive than the lodgepole pine seed supplied to date.

Early growth appears to be rapid (Fig. II) but after about ten years there is an obvious lack of vigour in the stands, and in some instances they appear in check. Form is generally good, particularly so in Ladner, an area which though not on Lulu Island, can be considered of the same provenance because of its proximity and similar bog type and climate. The Ladner stands lie approximately 3 miles south-east of Lulu Island and are bounded to the north by the south arm of the Fraser river and to the south by highway ‡‡10. An interesting feature of the trees on the Ladner bog is that they appear to be completely free of western gall rust. They are also older and taller than the stands on Lulu Island. These trees lack the heavy branching and contorted form of the extreme coastal type of *P. contorta.* (Fig. III).

Fig. III—Stand of *P. contorta* on Ladner bog.

Genetic Improvement.

Seasonal variations in temperature and rainfall are considered the most important climatic factors limiting geographic distribution of a given species (Daubenmire 1956). Thus it is desirable, when considering the introduction of an exotic, to select that provenance which approximates as closely as possible the climatic conditions of the new habitat. The Lulu Island provenance of contorta pine is therefore of importance in Irish silviculture.

Genetic Improvement may be considered under two headings: Interspecific hybridisation, (Duffield 1954), and hybridisation between provenance, (Bannister 1959).

A fertile hybrid between the Rocky Mountain provenance of lodgepole pine (*P. contorta* var. *latifolia* Englem.) and Jack pine (*P. banksiana* Lamb.) has been produced at the Eddy Arboretum, Institute of Forest Genetics, Placerville, California. It has been shown that this hybrid is distinctly superior on the average to lodgepole pine in vegetative vigour. (F. I. Righter 1949). This hybrid is named *Pinus murraybanksiana.* A more desirable cross, from the point of view of obtaining a hybrid for propagation under Irish conditions, would be *P. contorta* var. *contorta* x *P. banksiana,* utilizing the Lulu Island provenance.

Pinus murraybanksiana occurs spontaneously in Alberta where it produces cones in the third or fourth year (Moss 1949). Duffield and Righter (1953) suggest that it may be a valuable tree for pulpwood production and should be tested in England and Ireland, and those parts of Australia and New Zealand where lodgepole pine has been successful.

A recent work has indicated that there are several regional forms of *P. contorta* exhibiting geographic unity and heritable differences, and meriting recognition as sub-species, (Critchfield 1957). The sub-species are as follows :

Coastal region :
Pinus contorta Douglas ex Louden ssp. *contorta.*
Mendocino White Plains :
Pinus contorta ssp. *bolanderi* (Parl.) Stat. Nov.
Rocky Mountains :
Pinus contorta ssp. *latifolia* (Engelm. ex Wats.) Stat. Nov.
Sierra Nevada :
Pinus contorta ssp. *Murrayana* (Balf.) Stat. Nov.

Critchfield points out that the coastal sub-species, which is of chief interest under Irish conditions, and includes the Lulu Island provenance, is effectively isolated from the two major inland sub-species by a distributional gap. This gap can be bridged by the forest geneticist and the good growing qualities of the coastal sub-species combined with the more desirable form of the inland type.

Interspecific hybridisation and hybridisation between provenances are but two of the many techniques available to the tree breeder for the improvement of a species. But they are extremely useful and Bannister has pointed out their value in relation to the improvement of *P. radiata* in New Zealand, a problem very similar to that of *P. contorta* in Ireland.

Of the two approaches hybridisation between provenances offers greater possibilities for improvement of lodgepole pine in Ireland, as development of methods to mass-produce large amounts of seed should be simpler than for the between-species crosses. However a careful study of the F_2 species hybrids now being produced at Placerville, California by open pollination of the artificial F_1 hybrids would certainly be worthwhile.

Literature References.

Johnson, W. A., 1921. *Sedimentation of the Fraser River Delta.* Geol. Surv. Can., Mem. 125.

Hansen, H. P., 1940. Paleoecology of two peat bogs in Southwestern B.C. *American Journal of Botany* Vol. 27, No. 3.

———— 1944. Further pollen studies of Peat Bogs on the Pacific coast of Oregon and Washington. *Bulletin of the Torrey Botanical Club.* Vol. 71, No. 6.

Chapman, J. D., 1952. *The Climate of B.C.* Fifth B.C. Natural Resources Conference.

Haughton, J. P., 1957. Physiography and Climate in *A View of Ireland.* Published for The British Association for the Advancement of Science by the Local Executive Committee, Dublin.

Daubenmire, R., Washington State College, 1956. *Climate as a determinant of vegetation distribution in Eastern Washington and Northern Idaho.* Ecol. Monogr. 26.

Duffield, J. W., 1954. The importance of species hybridisation and polyploidy in forest tree improvement. *Journal of Forestry,* Vol. 52, No. 9.

———— and Righter, F. I., 1953. *Annotated list of pine hybrids made at the Institute of Forest Genetics.* Placerville, California. Forest Research Note No. 86.

Bannister, M. H., 1959. Artificial selection and *Pinus radiata. New Zealand Journal of Forestry,* Vol. 8, No. 1.

Righter, F. I. and Stockwell, P., 1949. The fertile species hybrid *Pinus murraybanksiana. Madrono,* Vol. 10, No. 2.

Critchfield, W. B., 1957. *Geographic variation in* Pinus contorta Harvard University, Cambridge, Massachusetts.

Forestry in the Netherlands

PROF. T. CLEAR

IN the course of a recent study tour in the Netherlands, I collected some data on forestry and forestry fertilizer research in that country which may be of some interest to our members.

Out of a total land area of some 8,900,000 acres (roughly half the size of the 26 counties), there is a woodland area of 642,000 acres. Thus 7.2% of the Netherlands is under forest compared with about 2.2% here at home.

The area of State forest is 126,000 acres, which represents 19.5% of the total wooded area. Private forestry predominates in the Netherlands and accounts for 58% of the total area classed as forest. The private woods are mainly small plots of less than 10 acres in size, but there is a number of large private forest properties. The average size of forest unit held in private lands is a little over 20 acres, while the average state forest unit is around 1,000 acres. Municipality forests account for 15% of forest area and about 7% of 42,000 acres are held by societies for nature conservation.

The State Forestry Service, which is a branch of the Ministry for Agriculture and Fisheries, has its headquarters at Utrecht. Under the Director of State Forests, who is assisted by a Deputy Director, there are in addition to the Secretariat and Administration Section, four main sections, each under a Forestry Inspector, as follows :—

(1) Forest Management, which administers some 110,000 acres of State forest and 75,000 acres of waste land.

(2) Forestry Advisory Section, which deals with statistics, publicity and propaganda, nurseries, seed control and direct advisory work on 50,000 acres of private or other woods and 12,000 acres of waste land.

(3) Nature Conservancy Section. This section deals with recreation facilities in the forest and runs the Institute for Nature Conservation Research.

(4) Landscape Planning Section. Landscape gardening is an important feature in the Netherlands and the general planting of the countryside, for protection, amenity, together with the planting of public roads, is part of the responsibility of this section.

In all, about 35% of the nation's woodlands are managed or are directly advised by the State Forestry Service, which has 58 Forest Officers, nearly all graduates of the Agricultural University of Wageningen. There are 184 foresters in the Service. The foresters are recruited from the Netherlands Heath Company, School for Foresters, Arnhem.

There are many openings for forestry graduates and foresters outside the state service—in the municipal, company and crown forests, on private estates and as forestry consultants. The various research

institutes also employ forestry graduates, as at the Forestry Institute at the Faculty of Agriculture, Wageningen, The Forest Research Institute, Wageningen, Division for Forest Soil Survey, Bennekoin, The Polders' Development Authority, and so on. Graduates in forestry have gone into the nursery, landscaping or timber utilization fields and others find openings abroad, in the East Indies with bodies like F.A.O. There seems to be no shortage of employment opportunities for Netherlands trained professional foresters, which fact speaks well for the excellence of their training.

As is to be expected in a country so thickly populated and where agriculture of the most intensive kind is practised, forestry is concentrated on the poorer quality lands. While woodlands are scattered fairly widely over the whole country, the central region of the country—east of a line from Amsterdam to Utrecht and west of a line from Zwolle to Apeldoorn and Arnhem and north of the Rhine river—holds the greatest concentration of forest proper, as distinct from the small woodlot which is a universal feature. The east and south-east are generally heavily wooded, particularly the regions bordering Germany on the east and south-east and also along the Belgian frontier.

These forest concentrations coincide closely with the poorer heath land regions, with soils variously classed as humus podsols, humus iron podsols, inland dunes or blown sands. On this hungry light type of soil, as one would expect, there has been a concentration on afforestation with Scots pine in the past. The significance of Scots pine in Netherlands forestry can be seen from the following tables of statistics.

Classification of Woodland.

Type	*Area*	*% of Woodland Area*
Conifers	395,000 Acres	62%
Broadleaved	71,700 ,,	11%
Mixed	39,500 ,,	6%
Non-Productive	54,400 ,,	9%
Coppice	54,400 ,,	9%
Willow beds	9,900 ,,	1%
Felling Area	12,400 ,,	2%

In addition there are 31,000 miles of line plantation—mainly poplar and oak—which are rated as equivalent to nearly 100,000 acres of woodland in productivity.

Classification of Coniferous Plantations.

Type	*Area*	*% of Coniferous Area*
Pine	303,800 Acres	77%
Spruce	24,700 ,,	6%
Larch	34,600 ,,	9%
Douglas Fir	32,100 ,,	8%

ESTIMATED YEARLY PRODUCTION
(under bark) Hoppus Measure

	Woodlands		Line Plantations		Total	
	Conifer	Broad-leaved	Conifer	Broad-leaved	Conifer	Broad-leaved
Commercial Timber	11,000,000	3,000,000		4,000,000	11,000,000	7,000,000
Firewood ...		1,500,000				1,500,000
TOTAL	11,000,000	4,500,000		4,000,000	11,000,000	8,500,000
GROSS TOTAL ...	15,500,000 (H.ft.)		4,000,000 (H.ft.)		19,500,000 (H.ft.)	

Growing Stock of the Woodlands (*Hoppus feet over Bark*).

Conifers	416,000,000
Broadleaved	55,500,000

Current Annual Increment of the Woodlands (*Hoppus feet over Bark*).

Conifers	23,580,000
Broadleaved	6,930,000

The Annual Increment appears to be practically double the yearly felling—which is probably due to the fact that a large proportion of the Coniferous area is still immature and growth under those circumstances normally greatly exceeds cut.

From these figures of coniferous acreage and annual growth, it is possible to deduce a figure for production per acre per annum.

On 395,000 acres, annual production is 23,580,000 Hoppus or 60 Hoppus feet per acre per annum.

This rather low yield may be attributed to the predominance of Scots pine in the plantations, to the poor quality of the soil and to the low rainfall.

The forest soils have been mapped and are broadly classed as follows :—

Dry podzolics	35%
Wet podzolics	25%
Brown podzolics	10%
Dunes and blown sands	25%
Clay, loess and peat	5%

The average rainfall is from 24″ to 32″ per annum.

These low yields from their coniferous plantations have presented the Netherlands' foresters with a challenge which they are meeting in a typical fashion. It is recognised that the low yields are associated with poor physical conditions of the soil—low rainfall, unsuitable tree species or strains and to a very great extent the low nutrient status of the afforested sites. They are attacking the problem of increased output mainly along the lines of improved selection of species (including greater concentration on Douglas fir and less on Scots pine), tree breeding, better thinning and silviculture (based on tree physiology studies) and most of all by studying the use of fertilizers in forestry.

Experiments in the use of fertilizers in forestry in the Netherlands go back to the beginning of the century. In this first period trials were mainly in Scots pine stands but the statistical analysis of these earlier trials failed to reveal any significant or reliable results. Research was taken up again in 1954 but on a more fundamental basis, with the main emphasis on tree physiology and its bearing on the relationship between growth and mineral nutrition of conifers. The new research tools, pot cultures, soil mapping, soil and foliage analysis, promise rapid and reliable information on this vital field of forest production. This type of research has been fruitful in the Netherlands in other fields and in forestry valuable studies have been made.

In approaching this question of fertilizers in forestry, it has been found that the following problems have to be tackled separately:

(a) The relationship between soil chemical factors within certain soil type units and the growth of different tree species.

(b) The nutrient economy of the plant and the effects of nutrients on growth.

(c) The influence of fertilizer applications on the nutrition and growth of plants.

(d) The interaction of the site and the fertilizer on the growth and nutrition of the trees.

These four main problems must be solved before any exact basis for quantitative fertilizer recommendations can be established.

Summary of Results of Fertilizer Trials and Research.

From the hundreds of trials with fertilizers in forestry—in the Netherlands—the following can be deduced: soil phosphate is of major significance, particularly with spruce, larch and Douglas fir. Due to the mycorrhizal equipment of forest tree roots and the long growing season enjoyed by conifers, the insoluble and poorly soluble phosphates are largely available to forest trees. Therefore, extraction with strong acids have given the best indicator values for phosphate availabilities. The Netherlands' workers measure the ratio of total phosphate in mg./100 grams of soil in the main rooting zone. There is a very good correlation between total P_2O_5 content and Quality Class of site for larch and Douglas fir. The minimum level for these species is around 20 mg./100 grams of soil in the case of humus podsols; P_2O_5 in excess of 60 mg. brings no further improvement. On humus iron podsols, figures in excess of 40 mg. of P_2O_5 show no further improvement in site quality. It has been found impossible to get correlations with Scots pine as the whole problem is so confounded with questions of provenance.

When taken within the framework of soil type and P_2O_5 status units, pH values have some influence, however weak, and indicate, if anything, that conifers are acid lovers.

It has also been established by workers in the Netherlands and elsewhere that there is a definite correlation between the N content of needles and growth; at least where there is no phosphorus deficiency present. The limiting values are given lying between 0.9% and 1.7%. If phosphorus is deficient there is a correlation between growth and N/P, with a definite optimum for Douglas fir of 10 and for larch 6. A deficiency of K in the needles, has so far not been found to influence the correlation established between the N content and growth. The K content of needles depends largely on the K content of the soil, unless a disturbing factor like too high pH is present. An improved K supply results in a more effective photosynthesis.

It seems that P influences the absorption capacity of the root system of the tree and, therefore, the uptake of both K and N. With improved P availabilities up to a given limit, there will be an increasing uptake of other plant nutrients, such as K and N.

On the other hand, the P content of the needles does not rise with increasing levels of P in the soil or only when there is a P deficiency. There is, in fact, a tendency for the P content of needles to fall due perhaps to what is called volume antagonism. The P content of needles is, therefore, no criterion of P requirements.

While the nitrogen and potash requirements of the trees are determined by their presence in the soil, phosphate has a decisive influence on the optimal uptake of these plant foods.

To sum up—

(a) Of all the plant foods in the soil, P plays the key role in the nutrition and growth of trees.

(b) There is a close correlation between growth and N content of tree needles, *if there is no P deficiency.*

(c) There is a positive correlation between the K content and the N content of tree needles, if N has not been applied as a fertilizer.

The results of the fertilizer researches in the Netherlands have shown to date that *Pinus* species have lower P requirements than Douglas, larch or spruce. Pines and larches require less nitrogen than Douglas and spruce. Douglas and pine seem to require more potash than spruce and larch.

The influence of fertilizer application on the nutrition of forest crops is particularly interesting.

On the one side, the phosphate content of the soil, which can be permanently improved by manuring, is vital for the adequate uptake of other nutrients; on the other, improved potash availability makes for an improved nitrogen economy in the plant in the long run. Nitrogenous fertilizers, on their own are only useful as boosters as in the nursery but, in combination with potash, they can have more lasting

effects. It appears then that phosphatic and potash manures have important roles in forest fertilization.

Finally, what about the prospects for soil asalysis as a simple key to forest tree nutrition. They do not appear to be promising. With close attention to soil classification or site mapping, some results of manurial trials can be forecasted when combined with chemical analysis of soils. A very great deal of work still remains to be done on the many and variable sites that come up for tree planting. The Netherlands research workers are now tackling this problem by laying down factorial N,P,K trials on the various site types. It will require hundreds of plots and many years must elapse before the results are to hand.

Acknowledgements.

The statistics used in this article were supplied (in continental units) by the Statistics Branch of the State Forestry Service in the Netherlands.

The material on forestry manuring in the Netherlands is my own translation of a paper entitled "Forstliche Düngung in den Nederlanden" by I.R.C.P. van Goor, Wageningen.

Footnote.

The Netherlands is indeed well worth a visit from a forestry point of view. There is scarcely any forest area anywhere in the world so well surveyed, mapped and recorded, as are the forests of this very progressive country. The research in thinning, tree breeding, manuring, is of direct interest and application here, the mechanisation of nursery work, draining, planting and grass cleaning, particularly in the Polder areas, is in advance of anything I have seen this side of the Atlantic. It is a most stimulating country for a forester to visit; here "A living nation builds for its future" in agriculture, in forestry, in education, in industry, in good neighbourliness. It is a country small in size but great in achievements. It is also a country where, if my experience is typical, there is a brand of hospitality, kindness and welcome that one would like to commend as the equal of our own, but in these fields, as in many others, we have to give first place to the Dutch.

Society's Activities

Nineteenth Annual General Meeting

The Annual General Meeting of the Society was held on Saturday, 11th March, 1961 in the Shelbourne Hotel, Dublin at 7 p.m. The outgoing President, Mr. M. Swan, was in the chair. He opened the private meeting.

Minutes.

The Minutes of the Eighteenth Annual General Meeting which had been published in the Journal were taken as read and were approved and signed.

Council's Report.

The Council's Report was read by the Secretary.

Meetings.

The first meeting of the New Council was held on the 11th January, 1960, at Jury's Hotel. Eight members attended.

The meeting made arrangements for speakers for the Annual General Meeting and also selected the venue for the Annual Study Tour. Sub-committees were appointed to deal with Editorial, Financial and Excursion affairs.

The second meeting of the Council was held at 23, St. Stephen's Green on Monday, 8th February. Twelve members attended. A full discussion on matters affecting the production of the Journal took place. The meeting made final arrangements for the Annual General Meeting and discussed the programme for the Annual Study Tour. A programme of day excursions was arranged.

The Council met again on the 25th April. Nine members attended. Matters discussed included the Treasurer's report, the Editor's report, the Society's badge and the Powerscourt estate. A sub-committee to deal with the matter of a Forestry Diploma was appointed.

Eleven members attended the next meeting of the Council held on 26th September. The question of a Continental Study Tour in 1961 was discussed and it was decided to recommend a home venue for 1961. Other business dealt with included arrangements for the election of the new Council for 1961, the Annual General Meeting 1961 and a programme of meetings for the winter period.

The last meeting of the Council was held on Monday, 21st November. Ten members were present. Reports from the various sub-committees were considered and the meeting made further arrangements for a programme of lectures for the following months. Arrangements

for the Ballot for new Council were completed. The proposals for the Annual Study Tour were discussed and also the subject and speakers for the Annual General Meeting were approved. Other matters dealt with were election of honorary members, changes in the Constitution and the diploma.

Record of Attendances at Council Meetings.

Swan, M.	5	Furlong, Miss E.	5
McNamara, M.	5	Hanan, A. M. S.	4
Fitzpatrick, H. M.	4	Gallagher, L.	4
Cosgrave, M.	5	Sharkey, M.	1
Mangan, D.	4	O'Carroll, R. N.	4
Harding, F.	5	O'Sullivan, D. M.	0
Clear, T.	5		

The Council is able to report a very successful year. A very full programme of activities was carried through. The excursions were well attended in spite of the rather uncertain weather and the Study Tour was one of the most outstanding tours to date. A full report of these activities has appeared in the Journal of the Society.

In spite of a very good recruitment of new members throughout the year, the position revealed by the Auditor's Report and Statement of Accounts is not at all a happy one. The total receipts from subscriptions shows a substantial drop on 1959, so that the paid up membership has fallen appreciably during the year. This decline is a matter of some concern.

The subscription rate is the same as when the Society started in 1942 while costs of all other services and commodities and the subscription rates to most other societies have risen twice or three times over. The fact that the finances of the Society are in such good shape is due in no small measure to the good work of members of the Council and in particular to the Business Editor.

The Society has done a tremendous amount for the advancement of Forestry in Ireland and every forester worthy of the name should deem it a pleasant duty to support the efforts of the Council to make our Society grow and prosper with the years.

Abstract of Accounts for 1961.

The abstract of Accounts had been circulated with the notice of the Meeting to all Members.

The adoption of both the Council's report and the abstract of Accounts was proposed, seconded and passed.

Valedictory Address.

The outgoing President delivered his valedictory address as follows : Ladies and Gentlemen,

It is believed that in prehistoric times, or perhaps it would be better

to say, before the influence of man, about half the land area of the world or some 25 million square miles, was covered with forest or woods of one type or another. But whereas in those times the forest boundaries fluctuated only with the glacial periods, contracting as the ice advanced and expanding again to follow the melting ice, under man's influence the forest area has almost continuously diminished. As would be expected the areas deforested correspond closely to the areas of greatest population concentration, for paradoxically, while dense virgin forest is essential to primitive human life it is hostile to civilization. As civilization developed agriculture became more settled and more productive, supporting a larger population with increasing demands on the neighbouring forest. The invention of iron smelting and steel, and the development of tools which made the extinction of the forest still easier, all played their parts. The main use of the forest was to provide fuel and indeed until the 18th Century, wood and charcoal were, for all practical purposes, the only energy giving combustibles with which to supplement wind, water and muscle-power.

The result of this development has been that Europe to-day can claim only 3% of the world's total forest area. This is in contrast to the U.S.S.R. which can claim 26%, South America 22%, while the U.S.A. and Canada between them can claim 16%. Since increase in population has been mainly responsible for the decrease in forest area we must combine these figures with those for population to appreciate them fully. For Europe it means that there is only .74 (or three-quarters) of an acre of forest per head of the population as against 13.6 acres for the U.S.S.R. while South America can claim 18 acres per head. The average for the world is almost 4 acres per head.

The most recent estimate is that just on $\frac{1}{3}$ of the world's land area, or 17 million square miles is now under forest. Of this area some $10\frac{1}{2}$ million square miles, or 62%, are judged as accessible, which is defined as being within reach of exploitation by existing transportation systems: but for one reason or another only some $5\frac{1}{2}$ million square miles are in use.

Of the world's forests in use there is an approximately equal division as to area between conifers and non-conifers. On the question of volume however, the growing stock for conifers is estimated at 1,600 cubic feet (Hoppus) per acre as against 900 cu.ft./acre for the hardwoods. The gross increment for conifers is estimated at 22.7 cu.ft./acre per annum with the hardwoods only slightly behind at 22 cu.ft./acre. If we look a little further into this question of growing stock and increment we find some interesting figures. While the methods used and the limits imposed in the assessments peculiar to individual countries make direct comparisons invalid nevertheless we do get some useful pointers. The growing stock for Europe is around 1,010 cu.ft./acre as compared with 1,890 cu.ft./acre for Russia and 1,520 cu.ft./acre for North America. These figures are for conifers only and for forests in use. The fact that the growing stock for Europe is so low will, I am

sure, come as a surprise to many of you, but a still greater surprise is that the world average is given as 1,630 cu.ft./acre, 61% higher than the figure for Europe. However we can take heart from the fact that the gross increment for Europe is calculated at 30 cu. ft. per acre to the U.S.S.R's 21 cu. ft. per acre and North America's 27 cu. ft. per acre and a world average of 24 cu. ft. per acre. Again these figures are for conifers in forests-in-use only. In Ireland we can claim a gross increment of around 36 cu.ft. per acre at present, but with a potential about double this figure.

What do all these figures show. In brief and in round figures, of the world's 17 million square miles of forest a third only is in use, a further third is deemed to be within physical reach of exploitation but for one reason or another is not in use and the remaining third is deemed inaccessible. Of the last third much will remain unexploited for the foreseeable future, either because of location, or because of species or quality. However we still have a third of the world's forest area within reach but as yet unexploited, on which to draw as a reserve, so that there is no cause for worry that the world's timber is running short. But this is talking in global terms and there is little consolation in the fact that there is plenty of timber in the world if we have not the wherewithal to buy it or to transport it over large distances, and we are at considerable distances from these reserves. Consequently it behoves us to supply, so far as is practicable, our essential needs at home. How do we stand in this respect. I would estimate that we now have around 408,000 acres under trees, but as there is no reliable figure available for private woodland this is somewhat of a guess. Our forest area represents 0.14 acres or one-eighth acre per head of the population : the average for Europe you may remember was just three-quarters of an acre. By references to the European average, the Irish figure appears low but it must be emphasised that in the statistics supplied for many European countries, lands classed as forest lands include appreciable areas of derelict woodland completely unproductive. All this means is that at present our forest estate could only allow us 5 cubic feet per person per annum without cutting into our forest capital. I would emphasise "at present" because almost half our forest estate has not yet come into the production of useable material.

And what is our consumption per head : it is calculated at 9.5 cu. ft. of lumber and 80 lbs. of newsprint pulp, paper and such like per annum. This leaves a very considerable gap and to close it we show an import figure for timber and timber products of around £10 million, or £3 10s. 0d. per head per annum.

We are short of timber and because trees are slow to grow and take a lifetime to mature we will be short for many years to come. Consequently we must husband our supplies and do our best to avoid waste in any form. One common form of waste arises from the use of improperly or insufficiently seasoned timber, with consequent warping and distortion of the structure and the possibility of dry rot or other

fungal attack. Such defects can result in costly repairs and possible replacement of the timber in a relatively short time. We now have a Standard for moisture content for timber in buildings, which, if properly availed of, gives the assurance that our timber will be properly seasoned for the purpose for which it will be used.

Another way we can conserve our timber is to prolong its effective life by the use of preservatives and this applies in particular to timber used in damp situations, in contact with the ground, or in the open subject to the weather. This is an aspect also being tackled by the Institute for Research and Standards so that the layman can order his timber for a particular situation with complete confidence that it has been properly treated and preserved for his requirements.

A third way of conserving our timber is to grade it according to the stresses it will bear so that only the necessary amount of timber is used in any given structure. This is stress-grading, which is the grading in standard sizes by defects into categories capable of bearing the stress appropriate to the grade, and I emphasise this to distinguish it from the testing of small clear specimens which is probably better known.

So much for timber; we might now turn for a few moments to the plantations we are laying down. This year of 1961 has been designated "World Seed Year" by the F.A.O. of the U.N. in order to focus attention on the importance of the seed in the propagation of any crop. It is now generally accepted that the factors which we look for in our trees—rate of growth, straightness of stem, branchiness, quality of timber and so forth—are hereditary and therefore by careful selection and breeding we can improve the quality of our forests. Within a particular species and in its simplest form this selection can take place at various levels. First is the selection of provenance, then the selection of seed-stands within the provenance and finally the selection of individuals within the seed stand and the removal of the undesirables. This is a simple selection only; it does not involve the intricacies of controlled breeding and so is relatively simple in operation. I would consider it essential to any home collection of seed.

We do make considerable home seed collections and although they may vary from year to year depending on the quality of the seed harvest, I do not think it would be an exaggeration to say that around $\frac{1}{3}$ of our plantations spring from home seed collections, but collections which have had very little in the way of selection of the parent crops. A start has been made by the Forestry Division in conjunction with the British Forestry Commission to undertake a joint survey of *Pinus contorta* stands both here and in Britain with the expressed object of selecting high quality stands suitable for seed collection, to the mutual benefit of both services.

Looking to the future the selection of high quality strains coupled with our favourable climatic circumstances should yield excellent results.

I have now come to the end of my term as President, but before I

ask the incoming President to take the chair I would like to say a few well deserved words of thanks to my Committee: in particular to the Convenor, Tony Hanan and his committee Miss Furlong, on whom the brunt of the work and organising of the year's activities fell: also to Mr. McNamara, the Vice-President, for his help and advice. Our healthy financial position is due in no small measure to the energy and hard work of Malachy Sharkey and Niall O'Carroll who again managed to produce a Journal which was almost self supporting. How they did it I do not pretend to know—we can only thank them for doing it! To the other members of the Council I would say a sincere thank you for your help, advice and encouragement during the year.

My last duty is to announce your new President—Professor Clear. Professor Clear is very well known to all of you. He is a founder member of our Society and since its inception 19 years ago he has held the position of Secretary and except for a few years the position of Treasurer also. In these positions he has guided us over our early teething troubles to the sound and healthy position we are in to-day. We can, I know, look forward to a full and rewarding period under his guiding hand.

Confirmation of Election of Council for 1961.

The election of the incoming President—Professor Clear was confirmed and he took the chair. The names of the Council are given at the beginning of this issue.

Motions.

1. That the present use of the Society's funds is not in accordance with Article III of the Constitution.
2. That the Council should appoint a sub-committee to consider the possibility of the Society's surplus funds being used to publish, separate from the Journal, original works or translations concerned with forestry and should report the result to the next Annual General Meeting.

were formerly proposed by Mr. N. O'Carroll and seconded by Mr. L. O'Flanagan and opened for discussion.

Mr, O'Carroll said that he wished to emphasise that in putting the first motion to the meeting he did not intend any criticism of or reflection on the Council. He simply wished to draw attention to what appeared a rather large surplus of money lying idle and he thought it should be used to further the object of the Society as suggested by the second motion.

A full discussion ensued. Most speakers could see no point in, or necessity for, the first motion in view of the proposer's explanatory statement, while others pointed out that in its wording it clearly was an indictment and no explanation could make it otherwise. On the second motion the view was that something should be done. The

operative part, however, was that publications were to be separate from the Journal and many felt that this was undesirable and that at least some of the moneys might be spent in improving the Journal. All speakers favoured setting up a sub-committee as required by the motion but some felt that their terms of reference as expressed were too restricted. It was also pointed out that the surplus was accumulated over 19 years and so did not represent a large annual saving.

The Chairman ruled that as there were two motions they must be taken separately and not combined as suggested by the proposer. Mr. O'Carroll then withdrew the first motion.

Mr. McEvoy proposed as an amendment to the second resolution that the words "or to undertake other activities consistent with the objects of the Society" be added and also that the words "should report to the next Annual General Meeting" should read "and should report to the Council". This amendment was seconded by Mr. Johnston.

Mr. O'Carroll objected to this amendment on the grounds that it introduced an element of vagueness which he had wished to avoid by being specific as in the motion proposed by him.

The Amendment was then put to the Meeting and was declared carried.

The Chairman then put the amended resolution to the Meeting and it also was carried.

Public Business.

After a short interval the Meeting began its public business with a paper by Mr. E. R. Huggard, M.A., B.A.I., A.M.I.C.E., Lecturer in Surveying and Forest Engineering, University College of North Wales, Bangor. The text of the paper appears elsewhere in the issue.

Vote of Thanks.

In proposing the vote of thanks, Mr. O'Sullivan said: "It gives me great pleasure to propose this Vote of Thanks to the Speaker of this authoritative paper—I say authoritative because Mr. Huggard is well astride the subjects he dealt with, as he is a lecturer in Forest Engineering at Bangor University, and has contributed to the literature of the subject in his book 'Forest Engineering Handbook', and in collaboration with Mr. Owen, two books dealing with Forest Machinery and Forest Tools and Instruments.

These deal with the details, whereas his lecture here to-night shows in what way forest engineering and extraction integrate into the forest management plan to produce a unified whole.

In doing this, he has shown that the forester is no longer just a planter of trees, but rather a hard working, no nonsense scientist, bedevilled like all technologists to-day by that modern development of specialization.

However, Mr. Huggard has demonstrated, in my opinion, quite rightly, that undue specialization can be avoided provided the sylviculturalist gets a grounding in basic engineering. Of necessity, I think the future managers of plantations must have a basic knowledge of engineering and extraction systems, and this should be at least sufficient for the manager, to know when to ask for specialist advice.

Even more important is Mr. Huggard's insistence on extraction being part of the management plan—the old theory of let's plant them now and let someone else worry over extraction is gone, now we have an enlightened approach that calls for an extraction plan practically before the plantation is started. It is now, more than anywhere else that the intermingling of forester and specialist functions is obvious, and nowhere is it more important.

This is particularly true of Ireland—last year we sold produce of approximately half a million pounds—and who knows what is beyond.

These figures show the size of the problem which is made all the more diverse in that it is handled for the most part by private enterprise, each using his own devices. Surely Mr. Huggard's lecture here to-night shows that management and extraction cannot be so divorced. What benefits would accrue from an integration of management and extraction enterprise? The choice of the right machines, the right felling techniques and extraction methods is the obvious answer and this must be of benefit to all, not only in production costs, but also in less damage to the standing stock.

Here, then, seems to me to be a field wide open to collective research which if left to the individual's effort, with no common meeting ground, can only result in a loss to the community at large, of the value of individual activity.

Indeed, this is an aspect that this Society might consider. What of the future :—Extraction as we know it, varies from extracting a pole of say 1 cu.ft. in a stand of 1,000 stems/acre to pulling out a 30/40 cu.ft. 70 ft. long transmission pole in a stand of some 100 stems/acre.

I must confess that when I heard of this latter problem, I thought that perhaps the Indian Elephant might be the answer—so I went along to the expert in the Zoo to find out about elephants. Well! While I did this visit on official time, I really had not the courage to follow through and ask my Department to buy some elephants. However, maybe some of you enterprising gentlemen will land an elephant, plus 'mahout', on the doorstep of 22, Upper Merrion Street, and ask—'where's the timber?'

However, Mr. Huggard has come forward with more realistic suggestions—several of these are in fact under test in the U.S. and Canada. I have no knowledge of conditions in the U.S.S.R.

I can foresee the day when timber combine harvesting will be as common as cereal combining, and when this comes about, the training of the forester will be taxed to the limit because, lover of trees that he

is, he may well have to give way to the economic arguments that will be advanced for adopting such techniques—which may well call for a clear felling long before the sylviculturist thinks this is due.

On the question of transport, I was quite pleased to hear Mr. Huggard mention the hovercraft. This machine, which is most likely familiar to all of you, floats on an air cushion of a few inches depth. The machine has now gone beyond the prototype stage, and I have heard of it being applied in a banana plantation. Apart from this, I have no further information on it, but I think it has prospects of being the solution to economic transport within the forest—offering as it does, the possibility of avoiding metalling of roadways.

Once again, I wish to express my thanks to Mr. Huggard for his excellent lecture—which has been successful in making us think of the interaction of the various aspects of forest activity one on the other —he has done well."

Seconding the vote of thanks to Mr. Huggard, Mr. Durand alluded to his experience in British Columbia where roads were constructed by one holding the specific title of Forest Engineer. These men were specially trained in the art of compromise between the needs of engineering and biology. They were neither Foresters nor Engineers, but what may be described as hybrids and were far advanced from the days of the Logging Engineer whose one aim was exploitation of the present crop without thought of the future.

Mr. Durand also described a particular road survey on which he had worked as a student in Germany, where the surveyor had a Senior Forester as a special adviser and gave instances of how the two combined to produce a road layout to the best advantage regarding the sometimes conflicting demands of silviculture and road construction.

Mr. Sharkey also spoke and the Chairman concluded the public business.

Excursion to Monasterevan Forest

THE Society led by our President, Professor Clear, visited Monasterevan State Forest, by kind permission of the Minister for Lands, on 23rd April, 1961. We were met by the Forester-in-Charge, Mr. May, who welcomed the party on behalf of the Minister. He apologised that as he had only taken over the chargeship of this Centre a few weeks before, he was not very familiar with it. The area we were visiting had been acquired by the Forestry Division some eight years previously and consisted mainly of recently cut over woodland. It was a very fertile site suitable for a large variety of conifers and hardwoods and a feature of the replanting was the extent to which mixtures were used and the manner in which they were made.

The first stop was at a mixture of Norway spruce and oak. The Convenor, Mr. McNamara, explained the mixture, which was 3 lines

of Norway spruce and 3 lines of oak both at 5 feet espacement. The ash which appeared in the plot, was sucker ash from the previous crop and its presence was accidental. The Norway spruce was doing well but the oak was not good, with poor growth and many forked leaders. As the original intention had been a final crop of oak, the treatment of this crop was already posing quite a problem. In the discussion which followed it was suggested that this particular oak crop might have been genetically poor but it was significant that this particular property had no previous history of an oak crop, though in a district where the word "dara" appears in many place names, and it was suggested that ash might have been a better choice. In favour of this line type of mixture it was pointed out that the older type of group mixture had fallen into disfavour as being much more expensive. With this line mixture, only the normal number of plants were used, half being Norway spruce and half oak; nevertheless we could expect an almost complete hardwood final crop, while the conifer could be regarded as a cash crop.

Later we saw an *Abies alba* beech mixture, and on the opposite side of the ride a pure Douglas fir plantation. Mr. N. O'Carroll asked if anything could excuse planting the mixture in view of the development of the Douglas fir. Professor Clear took up the challenge and said it was a matter of policy whether to blanket the country with monotonous conifers or to follow the more traditional type of forestry. He believed there was a lot more to forestry than simply growing timber or a large bulk of cellulose. There were also the very important aspects of game and wild life preservation an amenity which was unlikely to be served if the aim was solely a bulk conifer yield.

The last stand visited was a 55/60 year old Norway spruce crop. The Estate records showed that Douglas fir had been planted with the Norway spruce but the proportion was unknown, the last few Douglas fir had been removed in a recent thinning. There was no record of any thinning or sylvicultural treatment but it was reasonable to assume that the area would repeatedly have been picked over for selected stems for estate use and what was now left would by no means represent the best. The Norway spruce was Quality Class III but a slabbed butt length showed that knots were remarkably small. A discussion on the qualities of spruce timber then ensued. It was pointed out that the tensile strength of spruce is considerably lower than that of the larches, Douglas fir or Scots pine. It is also a very difficult timber to impregnate with preservative and so it found no favour as a transmission pole.

To conclude the day we were shown a "togher", a submerged bog road. This old road of gravel and timber is now covered by almost 5 feet of peat, nevertheless its site is clearly reflected in the more vigorous and healthy vegetation of the bog surface directly above it. Mr. May had a section of the road carefully excavated so that its construction could be examined. Many interesting suggestions and theories were advanced to account for the existence of this road across the bog with high mineral ground only a short distance to the south and for its

presence being reflected in the surface vegetation, even though it is now covered by up to 5 feet of peat. No doubt these theories are still being discussed whenever our members meet.

M.S.

Excursion to Pettigo Forest

THE excursion to Pettigo Forest, on the 21st May, was to the portions of Lough Derg Properties, which lie between the eastern shore of the lake and the Border.

The excursion was well attended and Mr. G. McCool, our leader for the afternoon, welcomed a number of members and their friends from Northern Ireland, and introduced the subjects of the visit, which were to study the afforestation of difficult peat types, and road construction on deep peat.

The first stop was at a gravel pit, where he described the methods of preparation of road sites; how the gravel was raised, conveyed, and applied, with a high degree of mechanisation.

Five miles of road had been completed last year, and eleven miles, in all, were under construction, to serve the plantations. Internal access had previously been very difficult, due to the irregular shapes of the main blocs, which, taken with the topography led to a greater mileage requirement than usual. The party motored between halts throughout the afternoon; and the new road system had obviously revolutionised the ease of working of the forest.

In a general summary of the history of the property, we were told that when 3,380 ac. were acquired from Sir Shane Leslie's Estate in 1936, only 320 ac. were regarded as of good quality, and in all 1,013 ac. plantable. These areas were distributed in over a dozen strips and plots within the property, and were confined to sheltered, flush slopes and troughs.

The main species used were Sitka spruce surrounded by *Pinus contorta,* and an outer fringe of mountain pine.

The older stands on view were 20 to 22 years old and mound planted.

Following the introduction of ploughing and measuring techniques about ten years ago, the poorer lands between the older blocs were treated and planted.

Control plots of P.56 indicated complete dependence for success on the use of fertilizers in the recent plantations.

A discussion of ploughing and drainage patterns took place, and several speakers were perturbed about future inconvenience in sylvicultural operations on intensively prepared lands. Mr. McDowell held that root systems would be vulnerable during extraction of thinnings. Mr. McCool pointed out the importance of correlating the working pattern and road system. Mr. Condon favoured deep ploughing. Mr.

McCarthy said that the drained layer of peat had shrunk about 50% in depth in six years. Mr. Condon discussed the relative response and suitability of flush troughs, ridge sites and intermediate inclines. He favoured Sitka spruce with intensive treatment in flush strips, merging gradually to *Pinus contorta* on the knolls.

New Sandrig bow saws were tried out. They were fitted with hard-toothed "throw away" blades, which could not be resharpened. It was explained that in full time working, it had been proved that the time spent on resharpening bow saw blades was uneconomical.

Mr. Lear expressed the opinion that the two-man model was satisfactory, but that the shorter one-man saw was too heavy.

A group of *Pinus contorta* of special interest attracted attention. The trees were notably straight, wind firm, bore a deep living canopy, with slender branches, narrow conical crowns, and four years healthy needles. They had coned from an early age.

It was stated that *Pinus contorta* in Pettigo Forest consisted mainly of inland forms, and it was felt that more robust coastal strains would have been advantageous in the poorer sites: but some members felt that in the long run, the good form of some of the strains used, would prove a better investment.

On displaying manurial treatments, Mr. McCool stated that ground mineral phosphate had proved superior to basic slag.

The members were invited to comment on an area where 22 year *Pinus contorta* appeared to be dying in groups, after several years of slow growth. The site appeared to be comparable with others which bore successful crops; and drainage and other items of treatment seemed satisfactory.

Various speakers suggested saw-fly or other insect damage; toxic effects from bog-iron; unsuitable strain of plants, etc., but no definite conclusion could be reached from the available evidence.

As the party had enjoyed brilliant sunshine and a keen, dry breeze, the final stop for tea was very welcome; and Mr. McCool concluded, by thanking Mr. McCarthy, Forester-in-Charge, and his staff, for a very interesting afternoon. Mr. Simpson and Mr. Dallas expressed the appreciation of the party from Northern Ireland.

J.E.J.

Excursion to Ballyboy Property — Glenmalure Forest

THERE was quite a sizeable turn out on Sunday the 28th May, though at the gathering point customers of the nearby hotel tended to confuse the numbers present. The promise of a sunny afternoon did not

materialise and the hill climb was welcomed to counteract the nip in the wind.

The leader for the day, Mr. J. O'Carroll, the District Inspector, was introduced to the gathering by Mr. McNamara as also were Mr. O'Keeffe and Mr. Joyce, the foresters for the area. Before setting out Mr. O'Carroll gave us some facts concerning the forest which is in a glen 8 miles long and 4 miles wide at its widest point near the hotel. The hills are very steep and contours are roughly 50 yards apart. Our starting point at the hotel was 444 ft. above sea level. The total area of the forest is 7,000 acres. First planting was carried out in 1922 with a Douglas fir/European larch mixture. Both failed and were later beaten up with Scots pine. Some Douglas fir along the road remains and is growing well, though this may be due to spoil from the road. An item of general interest was the series of foresters appointed to this forest, numbering 21 in all.

From the hotel the party proceeded in convoy towords Compt. 52. *En route* there was a brief halt to view some 1922 planting of European larch which had been beaten up with Scots pine. Some of the European larch remained. Figures from a sample plot showed that the volume was 1,830 cubic feet per acre consisting of 630 stems per acre with a volume of 2.78 cubic feet per tree.

The party then drove to the end of the forest road. From here on all had to rely on foot power, as modern modes of transport were of no avail. At 1,560 ft. the party entered Compartment 52, (P.24) and began to ascend the hill. This Compartment is reputed to contain Sitka spruce growing at the highest elevation in Ireland. On reaching 1,850 ft. a halt was called and Mr. J. O'Carroll gave figures from a one-tenth acre sample plot. The volume was 6,140 cubic feet per acre on 860 stems per acre; 7.14 cubic feet per tree. Over the whole 16 acres of the stand members who had worked on assessment gave a figure of 4,500 cubic feet. Mr. J. O'Carroll said that this compartment had not been thinned previously due to difficulty and cost of getting men to this point. A discussion arose, brought up by Mr. McGlynn of whether it was advantageous to thin such plantations, considering how this one had grown. He also pointed out that in similar situations the crowns had become thinner and the crop as a whole was not improved. A question from the gallery enquired about the advantages of high pruning to a stand of the sort. Mr. J. O'Carroll stated that as yet no decision had been reached, but he thought that it would be a waste of money. Mr. McEvoy pointed out that costs would be very high due to the nearness of the whorls. He also pointed out, in reply to a statement by Dr. Murray on the rapid taper, that this was probably due to loss of leaders as a result of storm damage. At this point a suggestion was made that this type of timber would be ideal for pulp wood. Mr. J. Stagg, however, was not long in dispelling this idea, as he pointed out that the stems were too large for the machinery in the mills. He also

pointed out that suppliers were tending at present to supply the larger sizes, and that certain factories had not been getting the optimum amount of suitable material for the last six months.

The ascent was continued when this discussion had concluded. On passing the highest point at which the trees were planted the altimeters were consulted and it was agreed that the height was 1,980 ft. At the summit the altimeters read 2,160 ft. Mr. McEvoy, on request, listed the mountains visible from the summit. They ranged from Kippure in the north to Slieve Buidhe in the south.

The descent from the top was hastened by the coolness in the breeze and refreshments were taken under the shade of some old beech. Mr. McNamara concluded the day's proceedings by proposing a vote of thanks to Mr. J. O'Carroll, Mr. O'Keeffe and Mr. E. Joyce.

J.O'D.

Annual Study Tour

First Day.

On Tuesday, 6th June, 1961, the 46 members attending the 1961 Study Tour assembled at the Eccles Hotel, Glengarriff, before moving to the Estate Property of Glengarriff Forest. At the first stop Mr. W. Shine, District Officer, welcomed the party on behalf of the Minister for Lands and introduced the Forester-in-Charge, Mr. Walsh, and the assistant Forester, Mr. McCarthy. This Property was originally part of the Bantry estate having been acquired by Lord Bantry at the end of the 18th century. In 1955 the Shelswell-White family, sold the lands, which comprised 424 acres of old woodland and 519 acres of bare land, to the Forestry Division.

Mr. Shine's opening remarks on the ever-present amenity question in Glengarriff Forest were to be re-echoed throughout this Study Tour, centred as it was, in one of our principal tourist areas. The tricky task of carrying out good commercial forestry while at the same time preserving the undoubted beauty of the area is being tackled by a gradual process, under four main headings :—

(*a*) Small fully stocked screens and knolls of old woodland, mainly oak, are being retained to preserve the "natural" appearance.

(*b*) By thinning out some of the oak which can be used for fencing stakes, bridging material and firewood, ground is made available for underplanting and group planting using *Eucalyptus* with some silver firs, beech and *Tsuga,* etc.

(*c*) In some areas away from the public eye, clear felling to the extent of about 20 acres per annum is carried out, followed by replanting using whatever species is best suited to the site.

(*d*) Bare areas, which are mainly low-lying boggy patches, are

also being planted up at the rate of 20-30 acres per annum, with Sitka spruce and *Pinus contorta.*

After looking at some of the underplanted eucalypts we were shown a 12 foot long oak bridging timber which had been squared to 12 inches in situ, by the novel method of using a two-man chain saw. This method greatly reduces the overall cost of production by overcoming the very difficult extraction problem. Following a working demonstration of this squaring operation, Mr. Shine showed us the small tractor-powered mill unit where oak is converted into fencing stakes and firewood. The mill was recently re-designed to operate with one tractor as the power unit, the side pulley driving the insert-tooth saw bench and the power-take-off driving a McConnell swing-bench. This, used in conjunction with a chain-saw for cross-cutting, has a remarkably high output but is only kept in operation for about a quarter of the year to prevent over-cutting in the forest. The party was struck by the ingenuity of this improvisation, operating, as it does, in the middle of the source of material and turning out fencing and bridging material for Glengarriff and other forests which would otherwise be far from any source of supply. Firewood in an area of comparative turf-scarcity finds a ready market locally.

A brief stop was made beside a delightfully harmless looking series of rapids in the Glengarriff River, which contain a "whirl-pool" with a most lethal reputation. As various members edged closer for a better look, speculation ran high regarding prospects of vacancies and promotions.

A plot of *Populus robusta* and *Populus gelrica* was the next point of interest but in spite of what appeared to be a favourable site this crop was considered disappointing by many of the party. The plants were 5 feet high, when planted in 1957, with a soil pH of 5, with no manurial treatment. Later the whole crop got 3 tons of lime per acre and two lines got a dose of nitro-chalk and potash which raised the pH to 6. The growth, however, is still slow and Mr. Morris favoured cultivating between the rows to suppress the lush growth of grass, rush and meadowsweet. However Professor Clear disagreed and cited the Dutch practice of growing alder at 5 foot spacing between the poplars.

Driving towards Macroom for lunch we were again forcibly reminded of the Forestry Division's responsibility with regard to the treatment of recognised and lesser known beauty spots. In the Pass of Keimaneigh we saw a variety of trees recently planted, including mimosa. However, the appearance of a fence and the inevitable exotic conifers in such a wild and hitherto tree-less place will inevitably cause some resentment until the public gradually comes around to recognising them as part of the scenery. One hopes that this same public will then become so attached to them that a similar outcry will be heard when an attempt is made to utilise these trees in the normal course of forest management. Time and hunger forced us to make one of the shortest

visits to Gougane Barra ever recorded, but we liked the look of the valley and also the very pleasing rural appearance of the twisty poles which held up the transmission wires.

The afternoon was spent in Glendav property of Macroom Forest, where we were first introduced to the Forester-in-Charge, Mr. Darcy, and to the assistant Forester, Mr. Murphy, by Mr. Shine, who then gave us a brief account of the size, progress to date and future programme for the whole Forest. Macroom Forest, employing from 60 to 80 men, has a planting programme of about 400 acres per year bringing the planted area to date up to 3,280 acres. As well as this, a large nursery has recently been opened and there is a 5½ miles per year roading programme.

A 25-year old stand of Sitka spruce was the first item for discussion. An estimated Top Height of 57 feet would put this in Quality Class II by British standards, but the volume given, of almost 4,000 Hoppus feet per acre, would appear, once again, to be the result of higher Stems Per Acre than that given in the Yield Tables. Mr. Shine sparked off a discussion by pointing out that the crown percentage of this stand was abnormally high, at 49%, taking the close espacement into consideration. Mr. Johnston thought that a deep soil gives a crop an increased volume combined with a capacity to stand a greater density with the crown persisting lower down the trees. Professor Clear produced again the useful rule of thumb which states that "20% of the top height=the spacing (in feet)". In the case of larch, 25% should be used. He was inclined to favour the view that the deep crown was due to the crop only receiving a light, and then an exceptionally heavy second thinning.

In his opening remarks Mr. Shine had mentioned the fact that in Glendav there was about 200 acres of *Pinus contorta* which was being badly blown and had to be cleared. We were shown the solution to this problem in the form of a creosoting plant in which the *Pinus contorta* poles were treated in the form of fencing stakes. The local farmers are very pleased with *Pinus contorta* as fence material claiming a life, untreated, of up to 10 years for a stake. Mr. Shine claims a 20 year life for the creosoted pole which they turn out at the rate of 15,000 a year at a cost of 1/4½d. each. Half of each stake is treated at a time, boiling for one hour and cooling for one hour. In reply to a query from Dr. Murray, Mr. Shine said that a second boiling might save creosote but the saving would be more than offset by the increased cost of the labour involved. The possibility of a mobile unit to bring the plant to the stakes is being investigated.

A further example of the increased efficiency in the Forest by using the right tool for the particular job was next demonstrated when we saw a "Cobra" portable rock-drill preparing road material for loading on to trailers. A saving of 10d. or 0.3 Standard Man Hours per cubic yard was effected by using this drill with spade-lug attachment in a very compact gravel quarry.

Following further discussions and demonstrations concerning road-making and bridging problems, the party returned to Glengarriff for dinner.

This year the Convenor had an innovation in the form of an evening excursion. Accordingly, after a somewhat shaky start, due to over-enthusiasm amongst the boatmen looking for custom, we were transported safely to Garinish Island. This island, now the care of the Board of Works, contains an outstanding collection of trees, shrubs and plants, many of them of sub-tropical origin. We were lucky to have the overseer, Mr. McKenzie, to guide us around the gardens and from him we learned something of their history. Garinish, formerly Ilnacullin, was originally little more that bare rock, clad only in patches of heather and holly, and it is recorded that it took about 100 men three years to lay out the gardens as they are now. These gardens, designed by Mr. F. A. Bryce, 50 years ago, comprise a formal Italian garden, rockeries, shrubberies, water gardens and arboreta of such variety that it is hard to record all one saw in so short a visit. Suffice to say that we were left with the impression that Mr. McKenzie and the Board of Works appear to be sparing no effort to keep up, and improve, this very beautiful and valuable collection. Of the many rare conifers perhaps the most interesting specimens seen were *Thuja koraiensis, Dacrydium cupressinum, Taiwania cryptomeriodes* and *Tsuga yunnanensis.*

The return journey to the mainland in the twilight was not without incident and one likes to remember the unusual sight of Mr. Galvin being rapidly trans-shipped from one small boat to another in the middle of the bay, the operation having something to do with the loading limits enforced by the law!

A.M.S.H.

Second Day.

The party set out at 9 o'clock on the second morning, in rather overcast weather. The buses stopped for a short period some miles outside Glengarriff to enable a bird's eye view to be seen of the forest. We were informed by Mr. Shine, at this point, (illustrating the tour of the previous day) how felling and replanting was being carried out so that amenity would be in no way lessened.

Our next stop was at the well known 'Ladies View' where we were introduced to the Forester, Mr. T. Moynihan and his assistant, Mr. B. O'Reilly. An extensive view of the forest area could be seen from the car park at which we had halted. It was easy for the party to comprehend the importance of amenity consideration.

Mr. Shine told us that 2,000 acres had been acquired from the Board of Works but due to objection from the local populace and other bodies, regarding the possible interference by forestry with scenic beauty and indigenous flora 1,247 acres had been left for amenity. Discussion followed as to the merits and demerits of tourism versus forestry.

At our next halt near Torc waterfall, Mr. Shine gave us the rele-

vant data for Killarney Forest. Established in 1933-34 it consists of areas, donated by Mr. Vincent, acquired from the Board of Works and from the Killarney Estate. Total area is 3,885 acres of which 820 acres is the plantable reserve. A large area of that classified as productive is in fact not so, as in Killarney the emphasis must be on amenity, so that much old, uneconomic and scrub timber must be held for scenic purposes. This was so, near our stopping place where 100 acres of scrub oak served the purpose of an amenity screen. The present labour force of the forest is 38 men.

We were told by Mr. Shine as we made our way to the foot of Torc, that the policy regarding the old hardwoods in the stand through which we passed, was that eucalypts should replace the oak without drastically altering the appearance of the Forest. The area inquestion had been planted with some 700 eucalypts of 3 different species using moss balled plants from Glengarriff nursery. Planting was carried out 15′ × 18′ apart in cleared strips along the contours. Cost of clearing was £5 per acre and of fencing individual plants, £6 per acre. Damage occurred from deer and man. Various methods of protection were discussed including deer fencing, other fencing modifications, closer planting and elimination of competing vegetation (primarily the rhododendrons). The rate at which the oak could be replaced was commented on with regard to the rapid growth of *Eucalyptus*—up to 6′ per annum, enabling the painless removal of the oak in 10 years under the screen of 60′ high *Eucalyptus*. Some of the problems arising from a *Eucalyptus* crop were commented on particularly the fact that the texture of the timber might not facilitate marketing, though indeed possibilities existed for the use of *Eucalyptus* for boards and furniture. Mr. Mooney mentioned that young *Eucalyptus* timber was considered unreliable and tended to split, but that good hardboard had been got from *E. muelleri*, *E. urnigera* and *E. globulus*. These species may possibly grow successfully in Killarney.

We walked on to the waterfall where we saw a stand of Scots pine, Norway spruce, European larch and Japanese larch planted on the site of what was said to be the best larch stand in the country (sold to the State in 1915). Planting was carried out in 1923 at 6′ × 6′ spacing. The waterfall slope was planted with Scots pine, Japanese larch, Douglas fir, Sitka spruce and European larch.

Mr. Shine informed us that here the roading target was 25 miles, of which 15 had already been completed. The road was to be a circular one, from the Kenmare-Killarney road around the waterfall. The planning was at present being carried out by engineers and surveyors. A number of difficulties were involved, including the proximity of the road site to the brow of the hill, and the bridging of streams.

Questions arose regarding the treatment of stands on both sides of the streams and waterfall. On one side could be seen how the problem of building up an uneven amenity stand under scattered old stems was being tackled. On the other, the difficulties of applying

treatment to the removal and replanting of a crop nearly ready for felling. Various aspects of the problem were commented on. Mr. McNamara said that he agreed with the treatment of the over mature stand by the underplanting of silver fir, Douglas fir, beech, accompanied by the gradual removal of old stems, where an annual cut could be contemplated; but on the other side a more difficult problem presented itself and the same treatment could not be applied. Professor Clear mentioned the difficulties of management and protection. A number of other suggestions were given as to how the P.23 stand should be treated, such as the introduction of an understorey, heavy thinning or clear felling, removal of plots at a time, and the allied dangers of windblow in applying these solutions.

Before moving on for lunch a few more general points were raised regarding good public relations with local and other bodies, and the necessity that in amenity areas such as Killarney and Wicklow, forestry must at times bow to its master, the public.

We then re-embussed and travelled on to Killarney where a satisfactory lunch was enjoyed by the party.

After lunch we set out for Killarney Forest stopping first at Rose Wood Property where, to commence the afternoon's proceedings, we viewed an impressive stand of European larch. Planting of the crop was carried out 3′ × 3′ in 1912-13. The area had previously been growing larch and due to a residue of lop and top, suffered in its early years from weevil damage. The crop was thinned in 1923-25-26 but no present records exist of these thinnings. We then examined a one-tenth acre sample plot the statistics of which are—

Average tree	...	10½ ins. B.H.Q.G.
Volume per acre	...	3,333 cubic feet.
Crown ...	...	32 ft.
Form Factor	...	.48.
Stems per acre	...	130.
Age ...	...	48 years.
Quality Class	...	I.
Total Volume	...	4,329 cubic feet.

A discussion arose as to the treatment of the crop, whether or not to cash in on the timber as it stood, or to wait further. Many questions arose as to use and treatment of the stand. Concerning the risks of holding on to the crop, Mr. Mooney asked whether value of the timber would increase sufficiently with growth. Reference was made to the boat-building market, its possibilities and limitations especially with a view to disposing of timber larger than transmission pole size. Mr. Maher mentioned that group clearing might be attempted to cater for the transmission pole market. This could be carried on over a number of years and the spaces replanted with Douglas fir. One conclusion reached, was that trees at present suitable for transmission poles should be felled now, and the rest could be held for a further period.

Reference was made to the large income to be obtained from transmission poles. Out of receipts from forestry amounting to £500,000, £100,000 or one-fifth came from this market. Mr. Mangan said that though the demand for transmission poles was of late somewhat reduced it was still there. 800,000 had now been put up and a replacement programme of 10,000-12,000 per annum was in operation. Mr. McNamara stressed the importance of maintaining supply to meet the demand.

We moved on to our next stop Compartment 12, Mossy Farm Wood, where a Scots pine, European larch stand planted at 4′ × 4′ spacing in 1917 to replace a stand of Sitka spruce, Norway spruce, Scots pine which was sold in 1916, was observed. The plantation had suffered from weevil attack and 4 acres were replanted in 1924 at 4′ × 4′ spacing. Beside this plot we were shown a stand of Sitka spruce p. 1917.

We were told that butt rot occurred in Sitka spruce and Japanese larch in 1954—a rather alarming fact. Mr. Morris posed the question as to why the Sitka should be poor on the site under observation and suggested the theory that the influx of grass might cause checking in the spruce. A question was raised by Mr. Shine as to why Sitka should develop butt rot on dry sites.

We then moved to C.13 and viewed a ¼ acre plot of Corsican pine p. 1917. Statistics of the crop compared with those of Yield Tables were as follows:

	Stand	*British Yield Table Quality Class II.*
Age	44	45
Stems per acre	372	305
B.H.Q.G.	8 ins.	8 ins.
Total height	60 ft.	61½ ft.
Timber height	55 ft.	
Vol. per acre	4,884 cu.ft.	4,060 cu.ft.
M.A.I.		156 cu.ft.
Form factor	.493	.49 cu.ft.
Length of crown	43 ft.	

Mr. Mangan spoke on the use of Corsican pine for transmission poles by the E.S.B. Stems had been taken from this stand. They had been at first creosoted. It was noted that they absorbed a large quantity. They were erected on an experimental line at Kilcock. On testing (boring etc.) good results showed. In strength Corsican pine appeared equal to Scots pine. One pole showed rot, but that was ascribed to the fact that the rot probably occurred before creosoting because it had not been placed on scids. Here, rot had occurred 10′ from the butt of the pole.

Our last stop was in the same compartment at a stand of Scots pine the statistics of which were as follows:

	Stand	*British Yield Table Quality Class III.*
Age	44	45
Stems per acre	430	550
B.H.Q.G.	6 ins.	$5\frac{1}{4}$ ft.
Total height	$43\frac{1}{2}$ ft.	$42\frac{1}{2}$ ft.
Timber height	34 ft.	
Vol. per tree	$23\frac{1}{2}$ cu.ft.	
Vol. per acre	2,055 cu.ft.	1,970 cu.ft.
Form factor	.439	.45

The stand had been planted with 1 + 1 + 1 plants, and after planting, suffered from pine shoot beetle attack. This was mentioned as a reason as to why 3-4 year old Corsican pine plants had been chosen in the previous stand.

Mr. Maher mentioned the influx of holly as an especial point of interest.

Other problems discussed regarding the crops, included the disposal of the crop in question. It was noted that the growth quality of the Scots pine was poor, as seemed to be the quality of Scots pine throughout Europe. Mention was made as to the importance of local provenance, a specific example given being the Sitka spruce from Ballygar. The discussion finished with comparison between contorta pine and Scots pine losses, the possibilities of *Pinus radiata* and the effect on crops of the wide variety of soil types in the district.

We adjourned once more to the buses and set off via a circuitous but picturesque route through Kilgarvan Forest and by Ballingeary where we saw recent land acquisitions, to Glengarriff.

Dinner.

Our last night commenced with an enjoyable dinner at which foresters and local dignitaries were present. Professor Clear, the President, thanked Mr. Shine, the local organisers and the Convenor, Mr. McNamara, for work well done in the organisation of this extensive and interesting Study Tour. He praised the co-operation existing between the local and visiting forestry personnel. He mentioned the beauty of the district and emphasised how lucky we in Ireland were to possess this heritage. He stressed the problems of management and acquisition in a county which had to cater for both the practical and aesthetic, and emphasised how we in forestry must be prepared at all times to understand the needs of the tourist and local populace, on whose goodwill the future forests depended. On this note the President called on Mr. Dallas to propose a vote of thanks.

Mr. Dallas mentioned how pleased he was to speak as a member of the Society and as a representative from Northern Ireland. He praised

the organisers and qualifying his words with a suitable anecdote gave tribute to the local personnel.

Mr. Shine answering brought the proceedings to a fitting close.

G.J.G.

Final Day.

On the morning of the third and final day we started off from Glengarriff to Kenmare Forest.

The main subject of the morning's inspection was Dromore Property. The estate was bought from a Colonel Hood in 1935-36. The lands, formerly the property of the O'Sullivan's, passed on in time to the O'Mahoney's into whose family the Hood's married. The property, planted in 1937, consisted of 500 acres, of which, formerly 151 acres were old woodland. Of this latter now only 50 acres remained. The clearance of the old woodland was slow, as it was difficult to dispose of the timber, much of which was firewood quality. The policy now, however, was to try and bring on a type of selection forest with the emphasis on hardwoods and *Abies alba,* and in this connection we were informed that the natural regeneration of *Abies alba* was an outstanding feature of the property. Of the conifers, Sitka spruce, *Abies alba,* and *Pinus radiata* were the best species, to such an extent in the case of the *Pinus radiata,* that it was a problem to keep them standing. Scots pine did not do so well here and larch fared even worse; the sticky clay nature of the soil was blamed for this, and larch was prone to attack by canker.

The first stop was in one of the old woodland areas in Dromore. Here, most of the former crop has been felled out, leaving odd standards of silver fir, beech and oak. Under these was a thriving mass of naturally regenerated *Abies alba* and beech in all stages of growth, up to 12 ft. or more. Here we could see, was the raw material for an active and vital mixed forest in years to come.

We moved on to Compartment 17 and into a stand of 23 years old Sitka spruce. From a 1/10th acre sample plot the figures which emerged were :—

	Stand	*British Yield Table Quality Class II.*
No. of trees per acre	560	555
Basal area per acre	149.8 sq. ft.	124 sq. ft.
Average tree B.H.Q.G.	6¼ ins.	5¾ ins.
Average tree M.Q.G.	5¼ ins.	
Total Height	52 ft. 10 ins.	48½ ft.
Timber Height	40 ft.	
Vol. of average tree	7.66 cu.ft.	
Vol. per acre	4,289 cu.ft.	2,750 cu.ft.
Crown %	50%	
Form Factor	.533	.46
Vol. of thinnings, 1955/59	478 Poles–536 cu.ft.	

A general discussion followed. Mr. Shine commented on the high form factor. Certain other members were sceptical as to whether this high form factor would be, in fact, general throughout the plantation. Mr. Morris pointed out that there was often a wide variation in form factor between individual trees, and that it was not strictly accurate to judge form factor, for all, from one sample felling. A soil pit on the site revealed a good deep, sandy soil of derived O.R.S.S. origin.

In contrast to the first plot, the second, in Compartment 16, was poor. Though only across the road from the first, it was on slightly higher ground, and the plot details showed quite a big drop in volume per acre.

	Stand	*British Yield Table Quality Class III.*
No. of trees per acre	820	750
Basal area per acre	136.3 sq. ft.	118 sq. ft.
Average tree B.H.Q.G.	5 ins.	4¾ ins.
Average tree M.Q.G.	4 ins.	
Total Height	44 ft.	40½ ft.
Timber Height	31 ft.	
Vol. of average tree	3.44 cu.ft.	
Vol. per acre	2,820 cu.ft.	2,130 cu.ft.
Crown %	61%	
Form Factor	.45	.44
Vol. of thinnings, 1960	70 Poles–140 cu.ft.	

A soil pit here revealed part of the reason for the dramatic fall in volume. This was a much shallower soil type with a tendency to gley in the sub-soil; in all, a less fertile site, as compared with the deeper soil of Plot I. It was suggested that this should be a good site for *Abies grandis,* and there followed a discussion on the pros and cons of this tree. Mr. Mooney referred to the immense volume production of *Abies grandis.* Professor Clear, to a curious fact that, in Wales, it had been found that the species was prone to attack from *Phomes annosus,* but, in Holland, it was thought to be resistant. Mr. Hanan said that in Avondale, after a wind blow, there was no evidence of the disease. The discussion continued as to the quality of the timber of Sitka spruce and *Abies grandis,* and it was agreed that in this respect, Sitka spruce had many advantages over *Abies grandis.* Mr. Mooney reminded us, that the size of the knot and the angle of the grain were more important than rings to the inch, where strength were concerned.

En route to the next plot we stopped to look over a "Sill bridge". Mr. Shine explained that its special feature was, the low cost of con-

struction; some £140. This was achieved by cutting out the work of building up the abutments. Further on, we saw some more excellent examples of the natural regeneration of silver fir, where the seed-trees had been removed.

The third plot, in Compartment 2 was another excellent stand of Sitka spruce.

Compartment 3 *P/37. 24 Yrs. Quality Class I.*	*Stand*	*British Yield Table 24 Years Quality Class I.*
No. of trees per acre	540 stems	390 stems
Basal area per acre	184.6 sq. ft.	130 sq. ft.
Average tree B.H.Q.G.	7¼ ins.	7 ins.
Average tree M.Q.G.	6 ins.	
Total Height	61 ft.	59 ft.
Timber Height	49 ft.	
Vol. of average tree	12.25 cu.ft.	
Vol. per acre	5,615 cu.ft.	3,590 cu.ft.
Crown %	54%	
Form Factor	.53	.47
Vol. of thinnings, 1953-55-58	633 Poles–920 cu.ft.	

After he had read out the impressive details, Mr. Shine asked us for our comments, as to whether we thought the stand, as it stood, was overstocked or not. There followed a vigorous discussion on this topic and also on the form factor, which was again high. While it was felt the stocking was high, it was thought by some, that this stand could hold its present rate of growth without thinning, for the present. Others would have preferred to see it less heavily stocked and maintained that the average quarter girth could be higher with less trees per acre. Müller's theory was quoted in support of this view. Mr. Morris, at this stage, informed us of the sobering facts as found in the Department's recent assessments of its growing timber. Of the 201 sample plots they took in Sitka spruce, one was Quality Class I, 25, Quality Class II; the average run was Quality Class IV. Norway spruce averaged in the vicinity of Quality Class I and II.

Those depressed by Mr. Morris's gloomy statistics were quickly cheered up again by the last stand of Sitka spruce. This was the best we had seen—surely super-quality Class I! The soil here was a deep brown earth.

Compartment 2 *P/37. 24 Yrs. Quality Class I.*	*Stand*	*British Yield Table 24 Years Quality Class I.*
No. of trees per acre	460 stems	390 stems
Basal area per acre	168.3 sq. ft.	130 sq. ft.
Average tree B.H.Q.G.	7¼ ins.	7 ins.
Average tree M.Q.G.	6¼ ins.	
Total Height	65½ ft.	59 ft.
Timber Height	54 ft.	
Vol. of average tree	14.65 c.ft.	
Vol. per acre	6,739 cu.ft.	3,590 c.ft.
Crown %	52%	
Form Factor	.617	.47
Vol. of thinnings, 1953-55-58	502 Poles–983 cu.ft.	
M.A.I. of total yield to date	317 cu.ft.	

After this nobody wished to argue and most of us were ready for lunch.

When lunch had been finished we moved off to Lansdowne Estate just outside Kenmare where we were met by Mr. Johnston, the estate agent. As time was short, we had a tour, at what might be described as, at break-neck speed, around the estate. We were shown through beautiful gardens with a wide variety of shrubs and trees; the *Araucaria* caused the chief interest. Then we moved along rhododendron strewn avenues by the sea, with overhanging gnarled *Pinus maritana* and Scots pine. Further on, we passed through what, to some members, must have seemed like "Colonel Fawcett's last stand"; the luxuriant growth of the royal fern, bamboo and numerous other species of exotic vegetation was very spectacular.

Outside the beautiful house the President closed the tour saying that we were all very grateful to the Minister of Lands, and in particular to Mr. Shine and all the other field officers who put such meticulous work into the preparation of a very enjoyable tour over the last three days. He also thanked Mr. Johnston for showing us around the estate. With that the Forestry Society's tour of Killarney 1961 was brought to a satisfactory close.

M.J.S.

Excursion to Borris Forest

ON Sunday, 9th July, a visit was arranged by the Society of Irish Foresters to Borris Forest. Mr. Crerand welcomed the Society's members and friends, on behalf of the Minister for Lands, to the forest, and after giving a short outline of its history, handed us over to Mr. Mooney who was leader for the day. We were standing at The Nine

Stones so there was quite a view of the forest beneath us as well as Mount Leinster and Slievebawn rising on either side. Mr. Mooney gave details of the geology of the area, it being the end of the Leinster chain of granite.

A few yards brought us to our first stop of the day—the divide between two *Pinus contorta* stands, one planted in 1950, the other in 1951. The 1950 crop was appreciably better. Mr. Mooney gave figures of a height growth assessment that he had made. A general discussion ensued regarding the relative vigour of the two crops, but it was more or less agreed that provenance was the real reason for the difference.

From there we went on to visit a Japanese larch stand in which a thinning was marked. L. O'Flanagan gave figures of volume per acre and increment. These were compared with the British Forestry Commission Yield Tables. Mr. Hanan spoke about the *Pinus contorta* Volume Tables which had recently been completed. He was questioned as to why Hoppus measurement has been used and replied that the tables had actually been made in true measure and converted into Hoppus, which was the type of measurement that timber-buyers were familiar with in this country.

Our next stop was a *Pinus contorta* crop, planted in 1938, which has been reserved for seed production. Mr. N. O Carroll outlined the criteria by which the seed trees had been selected, principally vigour and good form, and explained that future thinnings would be carried out, both to remove undesirable elements and to favour crown development and seed production of the selected trees. He said that the reason for this project, in which some of our best stands would be dedicated to seed production, was due to the difficulty in importing reliable *contorta* seed.

After a short visit to a poor Scots pine stand, we repaired for tea, after which Mr. Hanan thanked the Forester-in-Charge, Mr. M. J. Swords, and all concerned, for an interesting afternoon.

L.O'F.

Excursion to Cong Forest

A highly enjoyable and interesting day was had by the members of the Society and their friends who attended the excursion to Cong Forest on Sunday, 27th July. The capricious weather favoured us kindly and this factor coupled with the magnificent scenery of far famed Cong helped in no small measure to make this outing a memorable occasion.

The President, Professor Clear, welcomed the group and in a short address he expressed gratitude to the Minister for his kind permission to tour the Forest. Then the Professor placed the party into the capable hands of Mr. T. Grunnell who led us forthwith to see, examine and

criticise a pure stand of 31 year old Sitka spruce growing on limestone drift.

In the discussion that followed the ever present controversy of silviculture versus economics raised its hoary head and the problem of to clear fell or not to clear fell also instigated some interesting arguments. According to Mr. Grunnell the stand would in all probability be clear felled inside 10 years as the close proximity of a saw mill had the tendency of shortening the rotation. Economics ordained that an early crop should be utilised at an earlier date than a similar or even slightly older stand say 60 miles away.

The talk then drifted into the timber sphere and the forester in charge of Cong Sawmills, Mr. Fahy, gave us a picture of the type of produce held in preference by the local consumers. It appears that untreated Sitka spruce is considered a most suitable material for constructional work. A big factor in its favour is its lightness—a property much appreciated by builders.

The members were then brought on a sightseeing trip and a bewildering assortment of the lesser known exotic trees were pointed out. Included among these were such trees as *Sequoia sempervirens, Cryptomeria japonica, Abies nordmaniana, Podocarpus, Acacia,* and within sight of Ashford Castle itself was a *Ginko bilobia* or as one member of the group so aptly called it "The Living Fossil Tree".

In the midst of these rarities was a *Pinus contorta* but it was a *contorta* with a difference. Instead of the lowly insignificant pulpwood pole we have come to associate with this species we saw a towering awe inspiring tree vying in cubic content with any of our better known high volume producers. It was gratifying to see the capabilities of *Pinus contorta* and as Professor Clear remarked the qualities of the timber of this much maligned tree had in many respects proved superior to both Sitka spruce and Scots pine.

Entranced by the lively discussion and enthralled by the varied collection of trees, the party did not feel the hours flitting by and it came as a surprise when we began to experience the mild pangs of hunger. This state, however, was short lived as we finished the excursion in the traditional manner by enjoying an excellent cup of tea and sandwiches.

Before departing on our respective journeys homewards, the President expressed on our behalf our deepest appreciation to all those who had helped to make the excursion the resounding success it was.

E.McG.

Visit to Baronscourt and Lislap Forests West Tyrone District

ON sunday, 27th August the Society visited Baronscourt and Lislap Forests in the District of West Tyrone.

The party assembled at Baronscourt Sawmill where the members were welcomed by Mr. Parkin, Chief Forest Officer, on behalf of the Northern Ireland Ministry of Agriculture, who also introduced many well known foresters who at one time or another had connection with Baronscourt Forest; these included Mr. Phillips, District Officer, Mr. Kerr, Forester and Mr. Wright the former District Officer who was about to leave the district and was the main organizer of the tour.

Before starting Mr. Wright and Mr. Kerr gave a brief history and description of the forest, illustrated by maps of the area. Baronscourt Forest covers an area of 3,010 acres and consists mainly of well established woodland. It is naturally divided into 4 blocks of varying size and the entire unit is 'U' shaped, open to the north. The 'U' lies on the sides of a shallow valley in which is situated portion of the Baronscourt Estate of the Duke of Abercorn. Much of the present forest was established on fairly good argicultural land, the remainder being park land and old woodland. The soil consists of deposits of sand, gravel and boulder clay over-lying mica schist.

Rainfall is average (38-40 inches) for this part of Northern Ireland. Frosts are common and snow slight on the lower regions. Winds, however, are generally strong, despite apparent shelter. This is possibly due to a funnelling effect caused by the local topography.

The percentage of each species planted is approximately as follows :

80% Sitka spruce.
7% Douglas fir.
5% Japanese larch.
8% Other species (including Scots pine and *Tsuga*).

On the night of the 4th February, 1957 approximately 200 acres of the forest were devastated by heavy gales. In October 1959 a further 250 acres were windblown. The total area blown is, therefore, about one-sixth of the planted area.

A detailed working plan was prepared for this forest in 1960 and the area has been under controlled management since that date.

The first stop was at Compt. 213, a Sitka spruce crop planted in 1923, the edge of which had been blown in 1953. The gap has been gradually increasing since then. After the first clearance of the windblow the heather came in. The windblow has obviously made possible the present natural regeneraiton on the area.

Here also a large area of Sitka spruce which had been blown in 1959 and 1960 by a north-west wind, although the prevailing wind is south-west, was seen. It was here pointed out that no wind resistant

effect was apparent from a mixture of Sitka spruce and Douglas fir, a stand of which had been blown.

A most interesting feature of the tour was the "Eclectic method" of crown thinning seen when the party stopped at a stand of Sitka spruce P.42 and P.43, where this treatment had been recently carried out.

Mr. Parkin introduced Mr. Clarke, Production Officer, an enthusiast of this method of thinning, who outlined the aims and the procedure adopted in the practice of this treatment.

The first stage in this Eclectic method of crown thinning is to select 40 to 50 final crop trees per acre. These are then pruned to 16 feet or 18 feet and at a later stage to 25 feet. All these spot trees should be dominant in the upper canopy and the emphasis was on side light. The aim was to remove all co-dominants, eventually isolating the crowns of the selected trees and leaving the smaller sub-dominants as followers. These grow vigorously enough to adequately suppress all vegetation coming in as a result of the removal of the heavily crowned co-dominants.

En route to the next stop a forest village was pointed out. Baronscourt village comprises 24 houses and was this year winner of the Certificate of Excellence for the best developed site of more than two houses in Northern Ireland. It was apparent from the well-kept gardens and lawns and general neat appearance of the village that the award was well merited.

At the next stop two stands of *Pinus contorta* were seen:

I. *Compt. 236.* *P.30.* *Altitude 450'.*

No. of stems	420 per acre.
Top height	58 ft.
Mean B.H.Q.G.	5½ ins.
Basal area	84 sq. ft. per acre.
Volume	1,802 H.ft.
First thinned	April, 1961.
No. of stems removed	180.
Volume of thinnings	329 H.ft.
Total yield to date	2,131 H.ft.

II. *Compt. 237.* *P.36.* *Altitude 450'.*

No. of stems	660 per acre.
Top height	39 ft.
Mean B.H.Q.G.	4 ins.
Basal area	73 sq. ft. per acre.
Volume	1,038 H.ft.

The first stand was thought by Mr. Mooney to be a Washington coast provenance and he commented on its vigour of growth and level branch development. The latter stand he said was probably of British Colombia origin and had given a performance much better than any stand of this provenance grown on a site of similar fertility in the South.

During the course of this stop Mr. Parkin introduced Mr. Roy Faulkner, a geneticist from the British Forestry Commission, who for the previous three weeks had been examining stands throughout Ireland with a view to selecting plus trees of *Pinus contorta* from which scion material would be collected for the establishment of seed orchards.

Mr. Faulkner then demonstrated a *Pinus contorta* plus tree which had been previously selected and gave a brief summary of the main characteristics required in such trees.

The principal attributes of a plus tree he said were: that it should be vigorous; that the stem should be straight and free from forking; that the crown should be dense and the branches relatively short and horizontal.

Mr. Faulkner said that the main objects of his survey were: to select seed stands; to select individual plus trees and to carry out progeny tests for the selection of the best seed trees; also to cross good coastal types with outstanding inland types and to establish seed orchards having 20 to 30 different clones.

Lislap Forest.

After lunch the party proceeded to Lislap Forest where Mr. Parkin introduced Mr. Fotheringham, the forester.

Lislap Forest covers a total area of 3,525 acres comprising two main blocks, Lislap and Glengawna. The area still to be planted is 300 acres and the planting programme is scheduled for completion by 1964.

At its most northerly boundary the glen formed the spill area of one of the largest glacial lakes in the British Isles. The area is covered with glacial deposits of a schistose type and this is overlain with deep peat.

Rainfall is approximately 45 inches. Frosts are severe and prolonged in most hollows on the higher slopes. The higher slopes also suffer exposure from the prevailing south-west winds.

The species planted are approximately as follows:

Sitka spruce	80%.
Larches	8%.
Other conifers	12%.

The fire danger to this forest is very severe and it is one of the most dangerous areas in the province in this respect. Approximately seven miles of its border is a danger area consisting of heather covered lands, mainly used for sheep grazing. In 1947 over 200 acres of well established forest were burned.

At Compt. 56 an area of 18 acres was visited. This had been planted in 1940 mainly with a *Pinus contorta*/Sitka spruce mixture which had at the moment reached various stages of development. In some areas the Sitka spruce had been completely suppressed by the *Pinus contorta* while in other areas the opposite was the case while yet again *Pinus contorta* and Sitka spruce were observed growing uniformly in mixture.

The main theme of discussion concerned the various treatments (mainly experimental) which had been applied to the crop in order to relieve the Sitka which was in danger of being suppressed by the *Pinus contorta.* This course was adopted due to the fact that there was an unlimited and growing market for Sitka spruce material while there was practically no market for the *Pinus contorta* at the moment.

Where the Sitka spruce seemed likely to come away if given enough light, the tops were cut off the *Pinus contorta* about three or four feet above ground level allowing the branches to remain on the standing portion of the *Pinus contorta* stem in order to suppress the heather. Where there appeared to be less possibility for the retarded Sitka spruce, the centre portion of the stems of adjoining and overshadowing *Pinus contorta* were brashed, to relieve the Sitka spruce by allowing the necessary light to infiltrate. In this case also, the lower *Pinus contorta* branches, which were not competing with the Sitka spruce, were retained to suppress the heather. In both cases the branches and tops removed were used to mulch the Sitka spruce.

At the next stop an area of checked Sitka spruce was inspected. This area was planted in 1927 and beaten up in 1929. At the moment total height is not more than 4 ft.—5 ft. and a discussion arose as to the future treatment of the crop.

Some experimental treatment had been carried out over the area e.g. pulling the heather and mulching the plants with it but this proved rather expensive and was not very successful. Nitro chalk was also applied but this was not a success. The placing of the spoil from deepened drains around the plants proved to be the most successful treatment carried out on the area.

Mr. Parkin expressed the view that the heather competition caused the check. He said that a good response had been obtained from the application of nitrogen and phosphates in other areas.

Mr. Phillips said that on a similar site the use of hormone weed killer had been very successful on heather, the cost being 25/- per acre for labour and material. He also said that Paraquat which was very satisfactory for the control of grass might be recommended.

A short stop was made at Glengawna Property where an area was being prepared for the 1962 planting programme. Here a tine plough was being used as a preliminary operation to ploughing, with the Beggs plough. The aim here was to have the ploughed ribbon inverted on the lines made by the tine plough, thus producing better medium for root stability and drainage. This tine plough is normally attached to a tractor which has a four-wheel drive for use in soft ground.

On returning to the yard the party were given a demonstration of fire-fighting equipment and the members were shown a chart depicting the three fire control sections into which the forest is divided, with their three controlling watch towers, which are placed at strategic points on the hills overlooking the forest. These are linked to the main

forest office by a telephone communication system. On this chart also were marked the positions of the fire dams, 8 ft. × 8 ft. concrete structures built at convenient points on streams.

Mr. Fotheringham demonstrated the use of a mist spray fire pump which was mounted with its water tank on an Austin Gypsy. The main characteristic of this pump is that it produces a cooling effect, by developing a fine adjustable spray, while giving a low output of water and takes about three-quarters of an hour to pump 45 gallons.

Professor Clear, President of the Society, thanked all those who made the tour so enjoyable and such an outstanding and memorable occasion for everybody. On behalf of the Southern members he congratulated the foresters of the North on the management of their forests and on their handling of the tour.

M. MacG.

Review

Identification of Hardwoods

A Microscope Key
Bulletin No. 46
Forest Products Research

Published by Her Majesty's Stationery Office, London, 1961.
Price Ten Shillings.

THIS is the third in a series on timber identification issued by the Department of Scientific and Industrial Research for Forest Products Research Laboratory, Princes Risborough. The previous two publications, "Identification of Softwoods" and "Identification of Hardwoods —a lens key" and its supplement "An Atlas of End-grain Photomicrographs", are invaluable to the worker on timber identification.

The Bulletin includes descriptions of the anatomical features, as seen with a microscope, of about 380 commercial hardwoods which are of economic importance in the United Kingdom. The features are set out in coded form for recording on marginally perforated cards and a sample can be identified by sorting the prepared cards according to the features observed in it.

The book contains explanatory notes on the construction and use of the card key and sections on definitions of the diagnostic features used in the key, on standard reference works and on coded descriptions. The section setting out the coded descriptions of the several timbers forms the body of the work. The diagnostic features are numbered so that sycamore or maple is represented thus :—

Acer spp. 6, 9, 18, 30, **30,** 33, 44, 45, 46, 47, (48), 62, 69, 70, 74, 80, 84

Supplementary notes expand the information when further clarification is necessary. Where timbers are similar in anatomical structure as in Liquidamber, Magnolia and Tulip-tree wood a key within the Key has been given to separate these. A sample card for a common timber, say sycamore, on which the anatomical features had been punched would have illustrated more effectively the explanatory notes on cards used in the key than the fragment of notched card figured.

Whereas the Lens Key is more useful in the field, office or timber yard the Microscope Key reaches out to the worker having laboratory facilities. To use this key it is necessary to cut thin sections in three planes with a microtome knife. Microanatomical differences often have an important bearing on the technical properties of timber so that detailed work is essential for distinguishing timbers which appear similar.

Only botanical names are given. This seems a pity as trade names are widely used by laymen and specialists in timber matters. One looks in vain for ebony or teak; one must know that they are *Diospyros* sp. and *Tectona* sp.

Photomicrographs of transverse, radial-longitudinal and tangential-longitudinal sections of wood magnified up to 400 illustrate the Bulletin. The plates are evidence of skilled techniques in photomicroscopy; they are also of high artistic merit.

The book, of 96 pages and bound in paper, is moderately priced at ten shillings. There are 32 plates (in the review copy plates 1-16 are missing), a line drawing and a map showing the geographical regions. The cards cost £1 1s. 0d. per 100; it is estimated that 900 cards are required to prepare the key.

Bulletin No. 46 provides a long needed guide to the identification of hardwoods. It can be highly recommended.

M.S.

Report of the Minister for Lands on Forestry for the Year ended 31st March, 1960

Published by the Stationery Office, Dublin. Price 3/-.

THIS report covers a year of record achievement by the Forestry Division of the Department of Lands. The Department's planting target of 25,000 acres was achieved; this was the highest figure for area planted in a single year since State forestry operations began. Other record figures claimed are—201 miles of forest roads constructed in the year, and income at £380,295, the highest income level achieved for any year up to then.

There is a welcome return of some features, the absence of which was commented on by the reviewer last year. The table showing the area and condition of State forest lands at the end of the season 1959/'60 included in the appendix is a welcome and most interesting addition to the report, as is the map showing distribution of forest units in each county. A further refinement that it might be possible to include and which would be interesting to general readers is a table showing the percentage of forest to total area of each country.

While on this question of additional tables, it is still very difficult to get information on statistics of forests and forest industries in Ireland. It is laid down in the Forestry Act 1960 that the Minister may undertake the collection, preparation, publication and distribution of statistics relating to forestry and that he may disseminate, or aid in the dissemination of, information likely, in his opinion, to arouse, stimulate, or increase, public interest in forestry or woodland industries. I have to hand data about Forestry in the Netherlands in English, which gives, for example, information on the State Forest Service, including a chart showing the organisation and staffing and the numbers and grades of forest officers. Here also one can get all information on woodland area and ownership with private woodlands as well as State woodlands listed according to size category, as well as figures for the woodland area giving percentage of species and also yearly production, total growing, stock and increment and so on. A booklet on Statistics of Forests and Forest Industries of New Zealand (3rd Edition, 1961) gives 'in the language of figures' the story of New Zealand forestry during the last forty years, with close on ninety pages of statistical information.

While the Report of the Minister gives much information, it still leaves the general reader very ignorant of many aspects of forestry, and there are many examples from other countries of the type of information that would be of value to all interested in forestry in the country, particularly foresters, economists and students.

It is only when one reads, for review purposes, reports from other forestry services, where there are similar programmes of forest extension, that one misses in our own reports in recent times any reference to forest policy or any statement by the Minister on the aims and targets of forestry in this country. No doubt there is a well-defined forest policy for Ireland and the case for this can be backed by convincing reasons but there is no mention of policy in this report. Even when we come to target figures, there is some doubt as to what is meant. The report for the year ended 31st March, 1959, states that the planting target of 22,500 acres for the year was met. The present report, for the year to the 31st March, 1960, states that the Department's planting target of 25,000 acres was achieved! There are people who appreciate that this is the target set by the Government and is the average the Department must maintain to achieve the programme approved by the nation. There are also many people in this country and abroad who

do not know what is the aim of Irish Forestry or why we should be planting 25,000 acres each year and spending nearly £2½ million on State forestry.

On this matter of public relations and propaganda, the report states that, during the year, the Department continued to keep the public informed of the objectives and progress of the national afforestation programme by various means, but it is suggested here that it should be appropriate to include matter of this kind in the report.

T.C.

Trees for Town and Country

Compiled by B. Colvin and S. R. Badmin for The Association for Planning and Regional Reconstruction.

Published by Lund Humphries, London. Price 30/-.

THIS book is, as the title suggests, essentially for the landscape artist and town planner. Nevertheless it immediately commends itself to all tree-lovers as opposed to silviculturalists, though the latter could learn, through this book, that there is a lot more to trees than mere cubic feet and £ s. d.

The five-page introduction speaks in glowing terms of the past traditions of lanscape planting in Britain and the effects of the Forestry Commission's encouragement to small woodland owners, in producing the well-timbered character of the English countryside which depends on scattered spinneys, groves and hedgerows, alternating with open spaces and farm-land.

We foresters, and indeed, all those connected with urban and rural planning would do well to study a work such as this before embarking on indiscriminate "road-side planting" and "landscaping". The practical and psychological effects of well-selected and well-sited trees on factory and office workers is brought to our notice, as is the lack of visual appreciation shown by those who lay out housing estates (which so often degenerate into ribbon development) and hope to cover their shortcomings by planting a few pink cherries and crab-apples.

There follows a detailed description of 60 of the better known and decorative trees. For each of these there is a full page photograph which together make up what must, undoubtedly, be one of the best collections of tree-photographs brought together in one book. The photographs show the trees in their full summer foliage, while on the opposite pages are skilful drawings depicting the appearance of the same tree in the winter, as well as scale drawings showing its likely height and spread at various ages. Sketches of the twigs, leaves, flowers and fruit are supplied also, along with details of the likes and dislikes of the particular species as to soil, climate, atmosphere and shade.

Sixteen lists are provided at the end of the book dividing the species into a variety of classifications such as rapidity of growth, hardiness and suitability for various sites and purposes.

In conclusion the A.P.R.R. are to be complimented on the excellence of the production and layout of this book which makes it almost a collector's piece while at the same time being good value, for the planning specialist.

A.M.S.H.

Forest Products Research, 1960

Department of Scientific and Industrial Research

Published by Her Majesty's Stationery Office, London. Price 5/-.

THERE is something in this report for everyone who is associated with timber and timber products, but the items of most interest to foresters are the investigations dealing with Sitka spruce and lodgepole pine (*Pinus contorta*) species which now constitute approximately 70% of our planting programme.

Different quality classes of Sitka spruce were drawn from eleven geographical regions mainly to study the variations in the strength and specific gravity of the timber to see if these properties were related to the region of growth or were associated with site factors.

The analysis of variance showed no significant difference between regions, but significant differences were found between sites within regions and between trees within a site, indicating that differences in strength and specific gravity arise more from site factors than from various climatic conditions.

An assessment of the permeability of Sitka spruce showed its resistance to impregnation with wood preservative. This peculiarity was observed by the E.S.B. many years ago when they hoped to use it for transmission poles and resulted in its rejection for such purposes. A rather disturbing feature is its tendency to collapse under the treatment used. While this is most undesirable, it is pointed out that under slightly milder temperature/pressure combinations there should be no trouble from collapse, so presumably it is a question of too severe treatment rather than a reflection on the material.

Sawmillers could profit from the chapter on air-drying. A comparison is made between roofed and unroofed stacks. Commencing in October the investigations showed that the roofed material began to dry immediately and was down to 30% moisture content by the end of the year. During that period the unroofed material did not dry-out at all and in fact no drying took place until towards the end of March. It is suggested, however, that the influence of the roof on the rate of

drying is less marked in the spring and summer months than in the autumn and winter.

A brief report is given of the general investigation on a consignment of *Pinus contorta* supplied from Ballyward, Blessington Forest. This species which has long been thought of here as the Cinderella of the conifers, planted only where no other species could be expected to grow, is now being regarded as a useful constructional timber. It saws well, is found to be very tolerant of severe drying conditions and shows very little tendency to check or split when kiln-dried.

In addition the report deals with current research in entomology, mycology, chemistry and physics which will be of special interest to the research worker.

P.M.J.

General Volume Table for Pinus contorta in Ireland

Department of Lands, Forestry Division

by P. M. Joyce

THE author accepted F. C. Hummel's assumption that "the regression of volume on basal area can be adequately approximated by a straight line within each height class" and prepared this table on the basis of this relationship of volume to basal area, the latter being the sectional area at breast height. This method of volume estimation, known as the Volume-Basal Area Line method, was first used by Gehrhardt and Kopezky for determining sample plot volume and is now widely used in Europe for permanent sample plot investigations. F. C. Hummel in preparing a series of volume tables for the British Forestry Commission was the first to use the Volume—Basal Area Line method as the basis for volume table preparation.

Mr. Joyce's decision to use the same method seems a wise choice, especially in view of S. H. Spurr's conclusion, after reviewing all the different methods in his book "Forest Inventory", that Hummel's method was the best when working with more than 300 trees (2,081 trees were used in the preparation of the *Pinus contorta* table).

To those of us, who have been using the British General Volume Tables for volume estimation of timber, the inclusion by the author in a separate column of the basal areas—an added feature on the British tables—will be of great practical help and is, in itself, in a small way indicative of the awareness, on the part of author, of the requirements of a volume table for use by the timber estimator.

The Publication by the Department of Lands (Forestry Division) of this volume table is an event in Irish Forestry and is deserving of the gratitude of all forest personnel.

It is indeed fitting that the first volume table for this species, published in Europe, should come from the Irish Forest Service, who are much to the fore in the investigation of the suitability of this tree for the poorest forest soils.

The author emphasises that the table is for use with the coastal form, now regarded as a better prospect than the inland form, for afforestation here.

The arrival of this, the first Irish volume table, is a further sign of our growing forest industry with the coming on the market in recent years of the ever increasing amounts of Irish timber. The accurate estimation of wood-lots is of paramount importance to an organised timber trade and the provision of volume tables, probably the most accurate practical method of estimating standing timber volume, is a boon to the timber estimator.

The publication of this table is indicative of the Irish Forest Service's recognition of the rôle of the volume table in Forest Utilisation and we can therefore hopefully regard the *Pinus contorta* table as the first of a series of general volume tables, with possibly a subsequent series of regional tables—but this latter may be hoping for too much.

S.C.

Report of the Director of Forestry New Zealand Forest Service for the Year ended 31st March, 1960

By authority, R. F. Owen, Government Printer, Wellington. Price 4/-.

IN the prologue to this report of the Director of Forestry, the Minister for Forests makes a very important statement on forest policy as follows—

> "This year, the fortieth anniversary of the New Zealand Forest Service, we are preparing to commence work on one of the most important developments in the evolution of forest policy. This is, we are now ready to plant exotic forests at an ever-increasing rate which will mean that the area will be doubled by A.D. 2000 and trebled by 2025."

He states further on—"Our prosperity stems from a copious and well distributed rainfall and uniformly mild temperatures. The same soils that have made our dairy, wool and meat production world famed could also lead to making our forests and their products into a source of much greater wealth and prosperity. . . . Surely we have not set our sights too high when we speak of trebling our exotic pine forests in 55 years." The New Zealand Minister then comes forward and makes a powerful plea for his Department and gives his direct personal

approval and backing to the work. "The report which follows is one which echoes my confidence in the future of New Zealand's forests."

In his report the Director of Forestry make a remarkable and strong claim for more land and more finance for forestry development in New Zealand. He argues the need for a dynamic forest policy, backing his statements by facts and figures. He sets the target for exotic forest plantation at 3,000,000 acres by 2025 A.D. and aims at a figure for export of 150,000,000 cubic feet.

On private planting he states "extensive planting by farmers would relieve the State of an enormous financial responsibility, even to the extent of providing one out of the extra two million acres which should be planted".

This report contains, as well as the detailed statistical information in a series of 37 appendices, a statistical summary from which the following figures are of interest. Forest revenue £3,291,648; State exotic forest—net planted area 483,532 acres; planted during the year, 7,146; timber removed from State forests (exotic) 38,092 cubic feet. The total exotic forest of New Zealand—State and Private—is 930,000 acres.

One of the most interesting features of State forestry in New Zealand is the rôle it has played and is playing in the pulp and paper industry. Based on the Kaingarva State forest, the Murupara Scheme of the Tasman Pulp and Paper Co. Ltd., largely the brain child of the Forestry Service, is now a huge business with an output of newsprint, woodpulp and sawn timber, valued at £7,242,000 (net). In this connection the Director of Forestry comments "The Government likewise has been the sole promoter of the newsprint industry, selling locally and overseas at world parity in both price and quality. For several decades users and competitors scoffed at the prospects, but to-day it is the only sector of the industry in New Zealand so operating. All others rely on local sales, protection by duties, import licensing, and so on for the bulk of their profits. Governments, bearing in mind the need to diversify primary production, must take a far-sighted view that forest soils make their maximum contribution to the national economy only if they can support a competitive export and domestic market and earn overseas funds".

The Kaingarva forest is under working plan control and a most interesting account of the working plan is given by the Management Division of the Service.

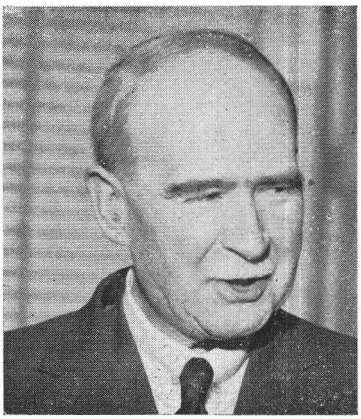
There are many interesting reports from the various sections, e.g. public and private forestry, research, engineering work, industrial, commercial and operational. The Timber Industry is reviewed in detail, including the home timber trade and the export timber trade.

It is obvious from this report that the New Zealand Forestry Service means business and is in business in a big way. It is dynamic and aggressive and remarkably successful and sets an excellent headline for other services.

T.C.

Obituary

THE death of Doctor Anderson, as he was always known during his stay in Ireland, will have a very personal impact on all Irish foresters who have served for more than twenty years in this country. To these foresters he is fresh in memory as is so frequently well illustrated in every day discussion even now when one may well hear such passages as "Dr. Anderson made the Selection of Sitka for this ground", or "Dr. Anderson directed that the road should go in that direction", or again "Dr. Anderson marked that particular thinning" and so on, and so frequently.



[*Photo by courtesy the "Irish Times"*

The fact is that not only did Dr. Anderson make a great personal impact on all foresters that served under him but also due to his indefatigable energy he had built up for each one a series of technical events or silvicultural occasions on the ground which are rarely forgotten. He was recognised here as a great and completely dedicated forester who earned the loyalty and esteem of those who worked with him and one who communicated a high sense of duty and forestry motive to all who served under him.

The term of a dedicated man applied to Dr. Anderson in the very highest sense possible, for practically all his time outside his long official hours was given to forestry and even when he went on holiday he was frequently to be found roving the nearby forests.

Born in Scotland in 1895 Dr. Anderson took up his studies at Edinburgh University Forestry School before the first World War. He served in the British forces throughout the first World War and was decorated with the Military Cross. He returned to his studies immediately after the war and took his B.Sc. in 1919 after reading brilliant courses in forestry; five years later he took his D.Sc.

He first went to the British Forestry Commission as a district officer and later as Research Officer in Scotland where he was concerned in important early work on peats, thinning, mensuration and in the nursery. From 1924 he was Research Officer for England and Wales, after which in 1926 he took an appointment as Forestry Inspector in the then Department of Agriculture in Ireland. He returned to Britain in 1928 as lecturer in the Imperial Forestry Institute in Oxford, but was back in the service of the Forestry Division in Ireland in 1932 where he was shortly promoted to Chief Forestry Inspector, in 1934.

He held this post till 1940 when he was made Director of Forestry. In November 1946 he resigned and went back to the Imperial Forestry Institute in Oxford as Deputy Director and finally in 1951 he took the chair of Forestry at Edinburgh University on the retirement of Professor Stebbing.

From the time of his appointment as Chief Forestry Inspector Professor Anderson dominated the forest scene in Ireland. He was associated with the first upsurge in forestry in the early thirties when planting rose from a few thousand acres per annum to 7,388 acres in 1938. His period here was also associated with early expansion in utilisation, road making and thinning and the first Census of Woodlands, carried out during the war when planting had to be curtailed, was completed under his direction.

Little justice can be done to Professor Anderson's qualities in a limited space but his ability to cope with every facet of office work in forestry as Director and Chief Forestry Inspector and yet keep in close personal touch with all operations in the country was extraordinary. His grasp of detail and memory of that detail, was remarkable and up to the time of his retirement he held a rein on the individual forest within the total forestry programme each year.

Professor Anderson was a man of many parts and took as intimate a part in road making, bridge building, sawmilling as in the more orthodox forestry arts of silviculture and mensuration. In particular, Professor Anderson was a champion of the natural forest and distrusted what he regared the economic *cum* artificial approach, the supporters of which he dubbed 'yard a year foresters'. He was associated at least in part in the recognition of the part lodgepole pine could play in our forestry here and is well known for the system of planting hardwood groups with conifers—the Anderson groups. His interest in Eucalypts has given us some plantations of this species unique in Ireland and Britain.

The formation of the Society of Irish Foresters was largely due to his influence and enthusiasm and he was a foundation member at the inaugural meeting on 21st September, 1942. He was the Society's first President in 1943-44, Editor in 1945 and Council member in 1946, and he is remembered well in its annals.

Much of Professor Anderson's written work remains unpublished but his best known works here are "Selection of Tree Species" and "The Natural Woodlands of Britain and Ireland". An able linguist he translated many works from the Northern European countries and his translation of Dr. Syrach Larsen's Genetics in Silviculture in 1956 made available a most valuable work to readers in English language. It is understood that a "History of Scottish Forestry" is recently completed but not yet published.

When we met Professor Anderson on the occasion of his reading a

Paper at the 17th Annual General Meeting in 1959, although he protested that he could not go up the mountains as of yore he looked fit and we thought there were many years before him. His death on the 9th September, 1961, has saddened us all and our deepest sympathy goes out to Mrs. Anderson, his daughter and sons.

SOCIETY OF IRISH FORESTERS

Statement of Accounts for Year ended 31st December, 1960.

1959.	Income	£ s. d.	£ s. d.
£351 13 7	To Balance from last Account	159 13 1	
£7 2 8	Less amount due to Secretary	40 6 11	
			119 6 2
£344 10 11			
	„ **Subscriptions received :—**		
	5 Technical Grade 1. 1958	5 0 0	
	17 „ „ „ 1959	17 0 0	
	31 „ „ „ 1960	31 0 0	
	2 „ „ „ 1961	2 0 0	
	2 „ „ „ 1962	2 0 0	
	1 „ „ „ 1963	1 0 0	
	2 „ Grade 2. 1957	1 0 0	
	5 „ „ „ 1958	2 10 0	
	20 „ „ „ 1959	10 0 0	
	57 „ „ „ 1960	28 10 0	
	4 „ „ „ 1961	2 0 0	
	6 Associates 1958	4 10 0	
	13 „ 1959	9 15 0	
	48 „ 1960	36 0 0	
	3 „ 1961	2 5 0	
£174 10 0			154 10 0
£6 7 6	„ **Interest on Investments**		6 10 0
£202 0 2	„ **Journals sold and advertisements**		238 12 8
—	„ **Excursion Account—advance repaid**		40 0 0
£44 2 0	„ **Field Day receipts**		—
£771 10 7			£558 18 10

1959.	Expenditure	£ s. d.	£ s. d.
£60 13 2	By Stationery and Printing ...		59 3 8
£211 19 0	„ Printing of Journal ...		104 15 0
£46 2 7	„ Postages		34 1 6
£33 10 9	„ Expenses re Meetings ...		34 16 3
£1 5 2	„ Bank Charges		1 5 2
£15 0 0	„ Honorarium—Secretary ...		15 0 0
£40 0 0	„ Excursions' Expenses ...		22 12 7
£43 13 9	„ Field Day Expenses ...		—
—	„ Badges		31 2 0
£200 0 0	„ Purchase of Prize Bonds ...		—
	„ Balance :		
	In Bank	248 10 4	
	„ Hands	7 12 4	
£119 6 2			256 2 8
£771 10 7			£558 18 10

I have examined the above account, have compared it with vouchers and certify it to be correct, the balance to credit being £256 2s. 8d. of which £248 10s. 4d. is on current account at the Ulster Bank Ltd. There is also a holding of £200 Dublin Corporation 5% Redeemable Stock 1968/73 and a holding of £200 Prize Bonds. Credit has not been taken for Subscriptions for 1957, £1; for 1958, £10; for 1959, £39 15s. 0d. and for 1960, £144 15s. 0d. which were outstanding at 31st December, 1960.

15th February, 1961.

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

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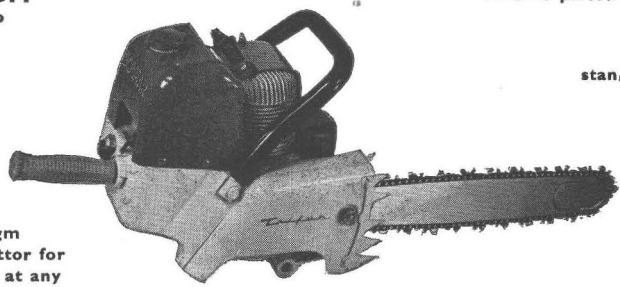

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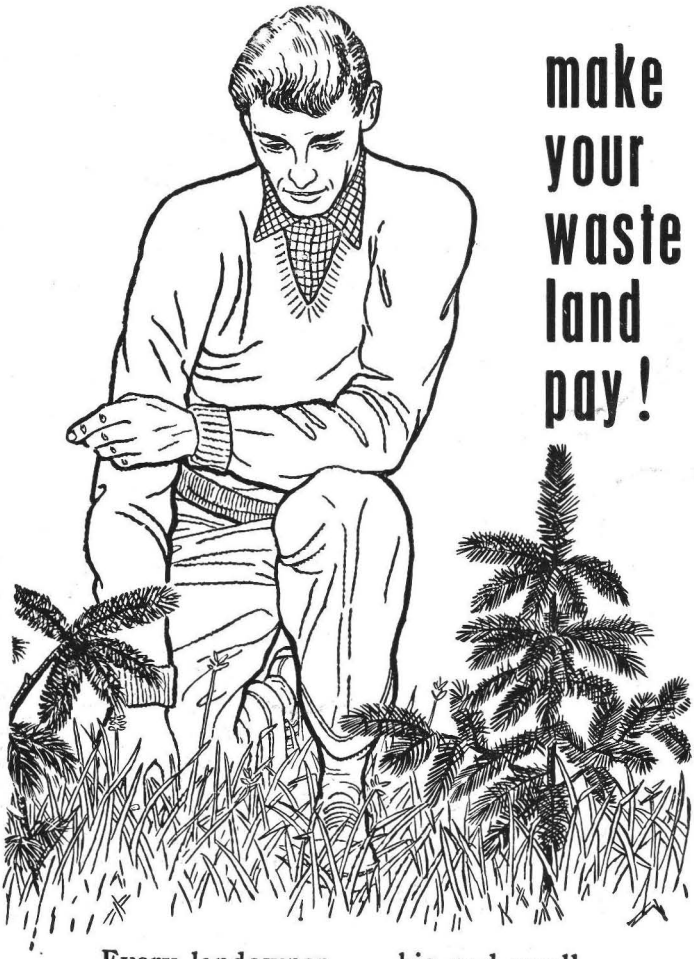

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