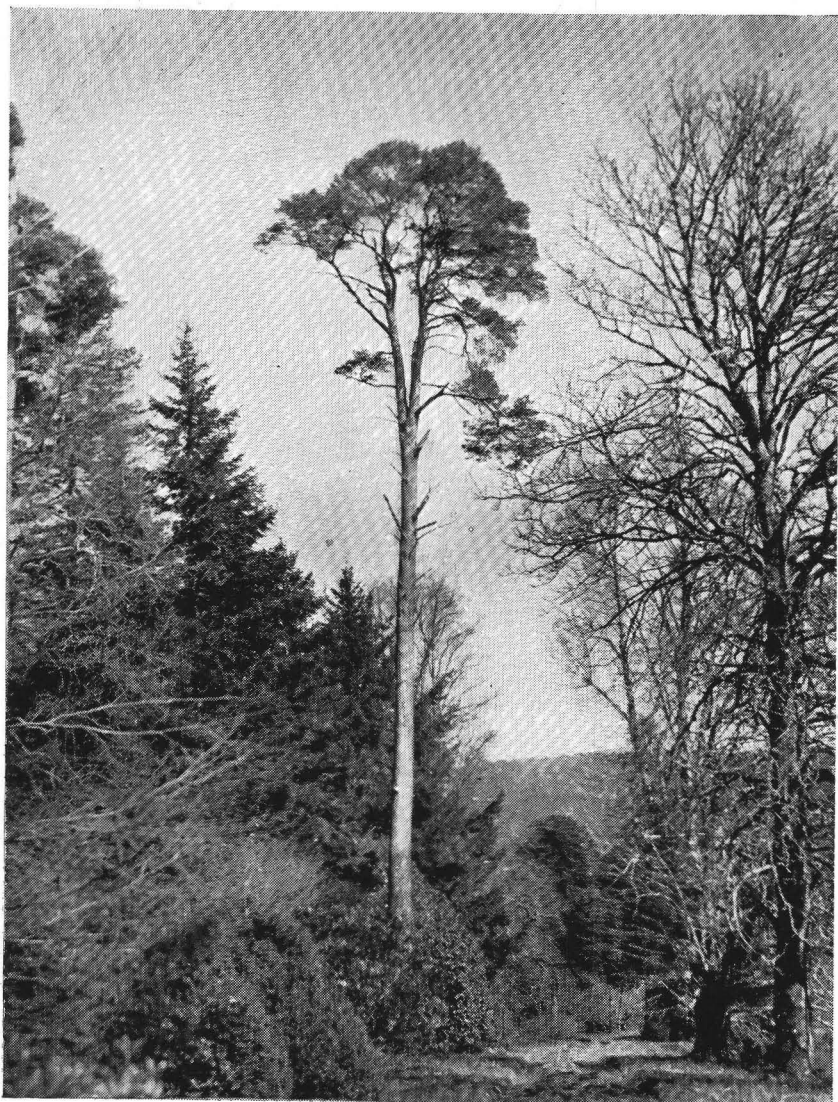


IRISH FORESTRY

JOURNAL OF THE SOCIETY OF IRISH FORESTERS



VOL. III, No. 1
JUNE, 1946

PRICE TO NON-MEMBERS
3/-

IRISH FORESTRY

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IRISH FORESTRY

VOLUME III

JUNE, 1946

NUMBER I

NATIONAL PARKS IN STATE FORESTS

By Sir SHANE LESLIE.

*(Paper read before the Society at its Annual General Meeting,
29th January, 1945).*

MR. CHAIRMAN, FELLOW FORESTERS,

It is really a milestone in my life as a Forester, if I am a Forester, to meet the real Foresters of Ireland. When I think of the work I have done I have felt I have been working in the dark, unadvised, often laughed at, and never encouraged. It has been wonderful to me lately, having taken a few trips through parts of Ireland that I had not seen for thirty or forty years—for I am of an immense age—to see beginnings of forests. At all hours, day and night, I find myself running into little belts of forests, but I never meet Foresters. They seem to be something as fascinating and invisible as the fairies but their work is there and if I am speaking to any one of them to-day, let me congratulate them.

I am not going to talk about Forestry. I am going to put as briefly as I can the idea of a national park. I have not come to receive the usual praises and bouquets which are handed around at Irish meetings; in fact I expect that my suggestions will be torn to shreds, and out of the discussion something useful, not merely laudatory, will arise. I spoke of my immense age. Now that I look back, during my own lifetime I seem to have touched on the beginnings of the national park, not only in England and Scotland, but even in America. Since the year 1903 I have had an intense, overwhelming interest in trees. That year there was a great wind and a very famous wood in my grandfather's place was toppled over. It made an enormous impression on me to go out and see a magnificent wood of conifers 60 and 70 years old in a state of dereliction and, filled with sorrow and amazement, I ran out that afternoon with a small tree in a flower pot and planted it. I have been planting ever since, and I hope that I shall attain to the ambition of every Forester and be buried in a coffin made of planks from trees that I planted with my own hands. What interested me in my early visits to America was to get in touch with the great lumber kings and their crusading enemies, those who revived forestry in the United States on a scale of magnificence. I knew the great Theodore

Roosevelt and his great lieutenant, Gifford Pinchot, afterwards Governor of Pennsylvania, and I was able to go about America and saw a few stands that had been saved of the great original woods, sights that you have no idea of and which I cannot describe but which I have seen as a result of journeys difficult indeed, away from railways. I have seen the last stands in Wisconsin and I have seen the Warren Woods which a Mr. Warren snatched from the power of the lumber kings saying: "I will show posterity what a great part of America looked like when it belonged to God Almighty."

But I have seen the terrible districts in Canada and the United States where the lumber kings went through, reaping disaster and wreckage to make their fortunes and leaving stagnation and horror impossible to describe. Against that, you have the new woods, the new forests, and you have a man like Theodore Roosevelt who could say to them: "Destroyers! Thus far shalt thou go, and no farther." And finally, I have seen in my own time great portions of the American public becoming tree-conscious to an extraordinary degree—States where great and famous trees are scheduled, named and marked and no man can touch, and where forestry and the science of trees enters a great deal into the education. So that, in my own lifetime, I have seen the worst happen in America and then the tide turn, and it is turning more every day.

I have followed as well as I could the developments in England and Scotland and tried to reproduce them, if I could at all. I live on the Ulster borders. I think you could reach me. I am half in and half out, on my famous bog, half of it republican and the other half monarchical! You have only got to travel the well-trodden track of the smugglers and you will find your way there. I have lived too much in that corner and it is only recently I have been going out into other parts of Ireland and trying to estimate things as they are. I have known two public men in this country, each of whom, I think, was a milestone; each of whom, if he did not actually reverse a side of our life, certainly altered it for all time. One was George Wyndham, whom I knew when he was passing the Land Act which, I think, changed this country as far as he could, and the other was Horace Plunkett, who changed farming. The great disaster is that neither of them was interested enough to change forestry, and of course the time of the George Wyndham Act was the time when great parks could have been set aside and sites of national parks might then have been devised. But perhaps the man who will make Irish forestry a reality, a monument to himself and a delight to posterity, is not yet on the horizon. But I feel certain he will come and take your labours and mine and our ideas and make Ireland what she should be, a normal timber-growing country.

Now I have promised to stick to the idea of the national park. During my travels I have always avoided towns and the sights that were shown one—the buildings and the civic life—they were all

well enough in their way but I have always struck out to see the national parks. Of course there is no doubt the Americans have got ahead of the world. The Yosemite Valley of the great trees, and the Yellowstone—yes, those are the greatest national parks that will ever be made, greater even than the Kruger National Park in South Africa, which is more of a sanctuary for fauna. It is interesting that the idea sprang up in my own lifetime almost. Take the Yellowstone. Why, that idea was given to the Washington Government by a traveller, a pioneer, a cattle puncher from Canada, an uncle of mine, who prospected in Wyoming before it was a State. It was General Sheridan who sent him out there and he brought back this idea and the Washington Government, acting with their usual promptitude, made this a Garden of Eden, one of the most beautiful sights on this earth. The natural rock, the natural forest fauna and flora, all survive over an enormous area of hundreds of square miles. The idea, of course, has gone right through America and every time I return there is a new national park. I have not seen that of the Adirondacks, but it is a very wonderful one, among the lakes. There is a new one in Maine and, incidentally, there is another in the Rockies—Estas Park—which was simply the prospecting ground of another Irishman, the late Lord Dunraven, who bought up a few thousand acres at, I think, a few cents an acre, and only sold it when they proposed to tax him something like half a dollar an acre. This park is now worth millions and millions, but it all belonged to one Irishman at one time.

What I feel is that the idea is not a slow idea, once it gets root, and Ireland is not stagnant, whatever people may say. The changes in my lifetime have been astonishing, and the face of the land is changing. It is our business to see that it changes for the better.

Well, now I want just practically to tell you what the Scots expect to do and what the English are already doing and then, I am not going to be dogmatic, I am going to leave it to you. You know these things much better than I do. Let your minds think in parallels of the places in Ireland which are suitable for national parks. You must know corners of Ireland that others do not know at all. You must know the condition of the soils, the contour of the mountains and, though of course, forestry is largely commercial and I expect to be naturally heavily attacked on that point, I hear the national park drags in a number of interests which I hope we shall extend to those who are interested in them, e.g., the forest interest, the naturalist interest, the sporting interest, even the medical interest. I have seen the great balsam woods where, in America, they lay out the sufferers from consumption to receive the healing of nature. I am sure that if I ever developed this disease I should flatly decline to go into any of these hospitals but would go into the woods and lie down under the trees, and if Nature did not heal me, I should not care to go on.

I propose just to deal with the places roughly which the Scots, who are entirely separate from the English in this matter, have set aside as suitable sites for national parks. I dealt with this in *Studies* as well as I could. The English have appointed a Standing Committee and the Scots a Council. In this I think the English are moving much faster. The Scots are following and I am sure we in time, with a certain dignity of slowness, will come after. They tell me in Tipperary that the devil was never able to tempt the Irish people. He offered them half of the world, he offered them empire. They were not taking any of these. When he was in despair he turned to them and he said: "There is no hurry," and they unfortunately believed him. It is for you gentlemen to know and decide whether the question of the national parks is a question for hurry or not. I do not mean a question of weeks and months, but a question of our own generation. I do not know if you know Scotch geography at all, but what I have worked at is the Scotch report and I am speaking of it. You see, there are only two or three of the sites that I have been able to get a glimpse of. I have compared the English report of what is already done with the Scotch and I have been able to see most of these and thus I have, with some effrontery, more like a schoolboy, drawn up a list of possible Irish sites—ten of them, corresponding with the ten English. The type of Scotch national park is certainly very different from the type the English expect. I shall give you the five selected.

Lough Lomond which, of course, has a good deal of afforestation in process and which is well organised with hotels. That is a place where romance is going to lead the tourist. Then, a place which I have not seen, is Glen Affric—those three enormous glens each 20 miles long, which run along the other side of the Caledonian canal. This, if they make it a park, will, of course, only attract the most adventurous—the explorer type. Then, what is more likely to be their great central park, is that large massif of Ben Nevis and Glencoe. That will be where the naturalists will find their treasure. The Cairngorms are also selected because they cover the remnant of the old Caledonian forest, and now I want to ask whether there is any remnant of the old Irish forest left in Ireland. I have always been trying to see for myself if there is. I have sometimes been taken on an expedition to see remnants of the ancient forest which I knew enough to see were not so. The other Scotch proposal is Lough Torridon which, of course, is largely geological and I should think would cause a heavy mortality among rock climbers, but it has deer forests which are thick with most interesting flora and fauna and I should think afforestation will have a very difficult time there.

I turn now to England and I should have said Wales, because in this matter Wales is apparently going to throw her lot in with England. Ten districts there are proposed, and if I know the English will, we shall live to see some of them in existence. Things

are moving with enormous speed, interesting things, which I heard one of the speakers talking about. The thing which interested me most during the war was seeing the fen country, which I have known as marsh, very reminiscent of some of our corners of Ireland, simply turned, by powerful drainage and determination by men and machines, into corn land—the most astonishing change-over. Now if the English are going to pour that same practical power and determination into forestry as they threaten and dig their wastes and their sand dunes, dig their Scotch mountains and re-forest them, they will do something on the same gigantic scale, but they never seem to do anything till their backs are against the wall and then they are stronger than most. I am going to give you the areas instead of giving you a wordy discourse. I am trying to leave with you the fundamental seeds of an idea which is germant on the other side of the channel and with us is still dormant, but in your minds I am certain it will work out and I do not think that anything will be done unless the minds, or rather the experience, of many are put together. Well, now, nobody has the slightest idea what the face of England is going to look like in fifty years, or even in twenty. The country is in a state of enormous confusion. It does not know where it is, either financially, politically or culturally, in art or in agriculture. Now I am not mocking at that very great and hardly-used country which has come through what nobody expected it would come through, but I am wondering, and I am often admiring them. The English countryside is in a pretty sad state at the present moment in many cases but you get glimpses that call for the greatest admiration. As I said, the way they dug their fens and the way they are already building up and trying to secure their agricultural assets which they built out of almost nothing during the war. If to their agricultural programme their Government really decides to add one that should appeal to the Socialist ideas in force, they should really tackle it and we may see the beginnings of the first national parks. Some may be failures, but somehow or other, they generally achieve success.

Their proposals are, first of all, to take the Lake district. That I know extremely well. That would be 860 square miles and it could probably look after itself. Afforestation is beginning there, the tourist element is secure there. I might say that the enormous volume of English tourism is now limited to what are called sterling areas, that is to say that Switzerland is no longer going to be the playground of England's thousands of holiday-makers. The Riviera and Monte Carlo districts are "broke" for all time. The question is, what we can do to take their place. The English, I am perfectly certain, are going to put up the equivalent of the Riviera attractions in their own country. The Lake district, as I say, is going to be the easiest, because they have the population unanimously behind the idea. The great landowners and the powers that be are quite

certain that the Lake district is No. 1 priority, National Park of England.

Secondly, there is Snowdonia. This, of course, is the massif of Snowdon and the great mountainous district around. I did not realise till I went to see it that it covers 200 square miles and is the nearest I have ever seen to the Rockies.

Then, Dartmoor is the third and, down in the centre of England, the Peak district and the Dovedale, which amount to 500 square miles. They want to preserve the coastline in parts and have planned to lay out about 100 square miles of the Pembroke coast—a certain amount of this will be inland of course—selected parts of the Cornish coast, the Craven Pennines, embracing an area of 470 square miles; the Black Mountains and the Brecon Beacons; Exmoor, and, last of all, a smaller area which covers the Roman Wall, that famous wall which still stands in many parts of England, by which the great Emperor Hadrian made the first determined attempt to keep the Scotch out of England.

I should, of course, have provided myself with a large hanging map with the districts I am about to mention coloured, but you are probably good geographers. At any rate, you must have the map of Ireland in your mind, and this is my very humble—I would say, schoolboy—parallel to those ten.

Corresponding to the Lake district—well, it leaps to the mind. There could only be Killarney. Snowdonia?—The nearest to this, I think, is the North Donegal Highlands. I don't know if you know them well. I have explored them when I was young and walked and lost myself on those wonderful mountains; in fact one of my best walks in my walking days was from Finntown up into the Poisoned Glen where I was overtaken by the night and, by all proper folklore, I should never have come out alive! But that magnificent part of Ireland, as far as I know, is as I knew it when I walked through it. I remember once walking for six hours without meeting a human being. Well, of course, I have never been able to explain, but I did meet one being, but he was not a human being, but that is another story.

Dartmoor—perhaps the Curragh; the Peak district and Dovedale—I think the Wicklow mountains. Of course the Wicklow mountains have changed in my time. I have walked through this in the day and in the night and have seen a great deal of Ireland, when I was young, because the great Standish O'Grady who, I suppose, started all the literary Irish movement, told me: "You will never see Ireland or know Ireland or understand or feel the peace or the beauty of it unless you walk around Ireland and walk at night." I took his advice and I never regretted it but I lost myself in the Wicklow mountains. I must go back to them, however, because to me, the most fascinating map is the map that hangs in Dr. Anderson's room. When I come to Dublin I go and look at it

and see forests and woods painted in and I feel I would like to get reproductions of it and it should be in the schools and colleges and everybody who is interested in forestry, when they feel discouraged and the rabbits and the goats have destroyed trees and fences and they have endured all the miseries and disappointments the Forester has to endure, will get marvellous encouragement by looking at the map and feeling: Well, there is somebody trying to do the same there, and here, and on that mountain and in that glen—and then one goes back and one lays down the wire again and starts once more.

Well, to go back—the Pembroke coast—I suppose the immediate parallel is the Clare coast, with all that exotic flora; the Cornish coast—I have put down Achill Island. Now, it is a very curious thing, about 60 years ago a great African traveller, the late Sir Harry Johnson, wrote and printed a most interesting plea that Achill Island should be set aside as a national park and a sanctuary; that the fauna and the flora, all the interesting things, should be preserved there and that people would come from all over the British Isles and Europe to see them. I think the article may be read in the English *Spectator*. I just came across it by pure chance. Instead of the Black Mountains and the Brecon Beacons, the Galtees perhaps; for Exmoor, the Dingle peninsula . . . and there I leave it.

As for the Roman wall, I do not think we have got anything like it except the Black Pig's Dyke. That causes such controversy that I had better ask you to consider that I have not mentioned it. As a Northerner I can tell you that there is a Black Pig's Dyke, although you may not believe it, and that the original people of Ireland were contained in it.

I have given you a very rapid sketch of my ideas, but there is one last thing that may be of interest. Amongst Foresters in the south of England, instead of putting up a stone monument to those who had died during the second world war, it had been decided to plant a tree for every man who had been killed, and this would amount to a forest of 120,000 trees. I think this is a splendid idea, and that it would please you to hear of it.

As you see, I have not tried to force any of my ideas but have thrown it out in its first, most fundamental shape. If this is the first meeting in Ireland where the idea of the national park has been broached and developed, perhaps it may prove to be one of the historical meetings in our history—historical, not because of the lecturer, but because I have had the kind attention, sympathy and, I hope, the keen, clear criticism of the handful of men who, I think, and shall continue to think, are doing more for Ireland than any other handful.

FOREST PATHOLOGY:

ITS SIGNIFICANCE IN RELATION TO IRISH FORESTRY PRACTICE.

By DENIS A. QUIRKE.

(This article is based on data collected during a survey of Irish Woodlands in respect of Insect and Fungous Pests carried out by the writer during the years 1942-45).

Forest Pathology comprises those branches of biological science which deal with disease of forest trees for the purpose of preventing or controlling it.

THE CHIEF CAUSAL AGENTS OF DISEASE.

The majority of diseases in the forest are caused by the activities of living organisms, viz., Animals, of which the most important are Insects and Mites; Fungi; and Bacteria. Insects and Fungi may be regarded as being the most important causal agents of disease.

THE EFFECTS OF DISEASE ON TREES.

During every stage of their growth, trees are liable to be subjected to attack by Insects and/or Fungi. As seeds, they may be attacked by nut-weevils or seed-flies. As seedlings and transplants, they are open to much damage from defoliators and root-feeding insects, and from fungi which cause leaf-cast diseases, girdling of stems, and damping off. From the transplant stage until the end of the sapling stage (i.e., until the canopy closes) is the period in the life of trees during which Insects and Fungi may, and can, cause most serious diseases; this may be accounted for by the fact that young trees are naturally less resistant than older trees, both because they often have difficulty in establishing themselves, and because of their tender tissues. After that period, trees are relatively immune to insect attack, except for occasional attacks by defoliators; trees which have passed the sapling stage seldom die as a result of fungous attack; the fungous diseases on such trees are usually of a chronic nature, and tend to reduce the commercial value of affected trees.

When trees have passed their prime, and growth is less vigorous, they once again become more susceptible to the onslaughts of insects of the bark-beetle and the wood-boring types, and to the fungi of the wood-rotting type. Insects and Fungi may also destroy dead timber and forest products.

Furthermore, the different organs of a tree may be attacked. Roots may be eaten or cut off by Insects or rotted by Fungi.

Stems may be burrowed or have their bark consumed or relieved of its sap by Insects; or, stems may be rotted or have their bark killed by Fungi. Shoots may be cut off or shoots and buds burrowed or galled by Insects, or shoots may die-back as a result of being invaded by Fungi. Leaves are usually more often attacked by Insects or by Fungi than any other organ of a tree, their tissues being either consumed or distorted by Insects; or spotted, distorted, or caused to die-back as a result of being attacked by Fungi.

Trees seldom die as a direct result of insect or fungous attack. It is usually necessary for plants to be weakened by other insects or fungi, or by unfavourable environmental conditions before they succumb to the attacks of major insect or fungous pests.

The ultimate aim of Forest Pathology is to make possible the regulation, in the interest of man, of the activities of Insects and Fungi in forests and forest products. In the control of forest pests, directly protective measures can seldom be applied, because of the excessive cost of such operations, with the result that preventive measures have to be resorted to. This preventive pathology calls for a more profound knowledge of both pests and of forest environment than if direct curative measures could be largely depended upon.

A SHORT CLASSIFICATION OF THE INSECTS AND FUNGI RECORDED AS PESTS OF IRISH WOODLANDS.

INSECTS, which have been found injuring trees in Ireland, are included in the following 5 orders:—

1. Order Lepidoptera (Moths). Many species of Moths are important pests. It is in their larvæ (i.e., caterpillar) feeding stage that Moths assume the role of pests of woodlands.
2. Order Coleoptera (Beetles). This Order includes some of the most serious pests of Irish Woodlands. In their adult stage, in their larval stage, or in both stages, Beetles may cause injury to trees.
3. Order Hemiptera (Sap-sucking Insects). The Sap-suckers injure trees by sucking sap, by disseminating plant diseases, or mechanically, by ovipositing in them. This Order includes Aphids, Adelges, and Scale Insects.
4. Order Hymenoptera. This Order includes Sawflies, Wood-wasps, Seed-flies, and Gall-wasps, all of which, in their larval stage, have been found injuring trees.
5. Order Diptera (Two-Winged Flies). This Order includes March-flies, Crane-flies, and Gall-Midges, whose larvæ feed on trees.

FUNGI, which have been found injuring trees in Ireland, are included in the following 3 Classes:

1. Class Ascomycetes. The fungi of this Class have been found causing canker of stems and branches, die-back of stems,

branches, shoots, or leaves, and leaf-spotting diseases of trees in Ireland.

2. Class Basidiomycetes. This Class includes the Wood-rotting Fungi ; the Rusts ; and Leaf-cast Disease of Larch.
3. Class Deuteromycetes (Fungi Imperfecti). The fungi of this Class have been found causing canker of stems and branches, and die-back or spotting of leaves or shoots of trees. The fungi of this Class are not Major Pests of trees in Ireland.

Insects and Fungi have been found attacking hardwood and coniferous trees in Ireland. The most widespread and severe attacks of both Insects and Fungi have been recorded on trees less than 20 years old.

Insect Pests of Irish Woodlands.

Our most serious Insect Pests include :—

1. *Rhyacionia buoliana*, Schiff. ;
2. *Prays curtisellus*, Donovan ;
3. *Hylobius abietis*, L. ;
4. *Adelges* spp. ;
5. *Neomyzaphis abietina*, Walker ; and
6. *Chionopsis salicis*, L.

1. *Rhyacionia buoliana*, Schiff. (The Pine-Shoot Tortrix Moth) is one of the most serious pests of Pines in Ireland. It occurs very commonly on Scots Pine and Lodge-pole Pine, fairly commonly on Corsican Pine and Mountain Pine, and occasionally in *Pinus insignis* and Austrian Pine. It has also been noted on *Pinus rigida*, Banks Pine, and Maritime Pine. The most severe attacks have almost invariably been recorded on Scots Pine.

Trees less than two years planted in the forest are not attacked. Trees planted between 2-5 years in the forest are usually attacked in their terminal leading bud. Leading and lateral buds of trees planted between 5-25 years in the forest may be attacked ; the attack is usually confined to the lateral buds of trees planted longer than 25 years in the forest.

Areas of Pine pure are usually more severely attacked than areas in which Pine is mixed with other species. In cases of very severe attacks, practically all terminal lateral buds in the upper half of affected trees, including the terminal leading bud, may be attacked.

The fact that leading buds of Pine are so frequently subjected to attack by *R. buoliana*, especially in cases of severe attack, precludes the employment of efficient control. One of the subtending lateral shoots takes the place of the leading shoot whose terminal bud has been burrowed by *R. buoliana*, but such substitute leaders may subsequently have their terminal buds burrowed. In areas in which the attack is common and severe, this repeated burrowing as the terminal buds of substitute leaders stunts growth so severely of to preclude the production of any but inferior grade timber.

2. *Prays curtisellus*, *Donovan* (The Ash Bud Moth) is the most serious pest of Ash in Ireland. Its caterpillars attack and burrow the buds of Ash. Ash of all ages may be attacked, but the attack is most severe on Ash less than 20 years old, on which leading and lateral buds may be burrowed. On Ash 20 years old and older the attack is usually confined to buds on lateral shoots.

On account of the death of the terminal bud on any shoot, the two subtending lateral buds are stimulated into growth, resulting in a forked type of growth. When terminal leading buds are burrowed, the resulting main stems of Ash are forked. Most of the forked pole-stage and older Ash throughout the country result from attacks of *P. curtisellus* early on in their life.

The attack of *P. curtisellus* is widespread in the country. Usually it is not as common or as severe on artificially-regenerated Ash as it is on Ash naturally regenerated. This may in part be accounted for by the fact that artificially-regenerated Ash suffers less (on account of being spaced well apart) from competition from its neighbours than naturally-regenerated plants (which are usually crowded together on an area).

As the terminal leading buds are so frequently burrowed by *Prays curtisellus*, no efficient control measures may be applied.

3. *Hylobius abietis*, *L.* (The Large Pine Weevil) is the most important Coleopterous pest of Irish Woodlands. In its adult stage, *H. abietis* does most damage. The adults first remove and discard the coarse outer bark of its host plants, and then consume the soft bark and cambial layer.

Attacks of Large Pine Weevil are most common on Scots Pine, fairly common on Norway Spruce, occasional on Lodge-pole Pine and Sitka Spruce, and are rarely recorded on Corsican Pine, European and Japanese Larches, and Common Silver Fir.

Injury due to attack of the Large Pine Weevil occurs on stems and branches of young trees, being usually most severe on the lower part of the main stem. Trees less than 8 years planted in the wood are commonly attacked in this manner, but the attack is most common and most severe on trees during the first three years after they have been planted out in the wood. Trees over 8 years planted in the wood are usually attacked on branches only, but may be attacked on the main stem in areas where growth is stunted. In many woods the attack is confined to those young plants planted in the neighbourhood of isolated trees or patches of trees of old Scots Pine.

H. abietis usually breeds in dead Scots Pine, but it has also been recorded breeding in dead Lodge-pole Pine, Corsican Pine, and Norway Spruce. Breeding activity has occurred on young trees (7-20 years planted-out in the wood) when they have been about one year dead. Breeding activity has usually taken place on stumps of old Scots Pine, when the stumps were between one and two years old.

The percentage of young trees which die, as a result of being attacked by *H. abietis* is usually very small. Sometimes, however, when trees have been severely attacked for three consecutive years, the number of trees fatally injured is significant. Trees, which have been consistently attacked in the young stages for a number of years are stunted, and will probably never reach saw-timber size. The combined attacks of *H. abietis*, *Rhyacionia buoliana*, and *Myelophilus piniperda* (The Pine Shoot Beetle) on old Pines result in a distortion of their crowns. A reduction in the quantity of seed which old Scots Pine could produce may be attributed to the pruning action of those pests in the crowns of seed-producing trees.

As it is almost impossible to exterminate any pest from a country, the next best method of procedure is to confine it within such narrow limits that its attacks will be of small consequence. In the case of *H. abietis*, this latter result may be most easily achieved by destroying its breeding-grounds. This involves the removal of dead Pines and logging waste and the barking of fresh stumps of old Scots Pine in woods being cut over, before replanting such areas, and the trapping of adults of *H. abietis* in areas in which they are attacking young plants.

4. *Adelges spp. on Spruce, Larch, Pine, Silver Fir, and Douglas Fir.*

(i) *Adelges abietis* Ratz. The primary host of this species is Spruce, on which it produces globular galls. Those galls occur at the base of the spruce shoots, generally encircling only half the shoots, which normally grow beyond them. The galls usually occur on lateral shoots; occasionally they occur on leaders. The amount of injury caused to Spruce by *A. abietis* is usually of small consequence. The fact that galls have been found on leaders of spruce in a number of areas lends a new importance to *A. abietis* on Spruce. An epidemic of this type of damage, although it is highly improbable that such will occur, would give a very severe check to Spruce-growing in Ireland.

(ii) *Adelges strobilobius*, Ralt. The primary host of this species is Spruce, on the shoots of which it produces terminal globular galls, which kill the shoots on which they occur. They occur most commonly on poles and older Spruce, being rarely present on trees less than 20 years planted; Spruce less than 10 years planted have not been attacked. The pruning effect of *A. strobilobius* on Spruce limits the quantity of food which trees can take, thus reducing the rate of growth. As the most severe attacks occur on trees which are almost mature, and thus putting on quality increment, this reduction in the rate of growth is highly significant.

Both *A. strobilobius* and *A. abietis* occur on Norway Spruce, Sitka Spruce, and *Picea morinda*, and occur commonly in Ireland.

The secondary host of both *A. abietis* and of *A. strobilobius* is Larch. The Adelgid lice occur on the needles of Larch in the case

of *A. abietis*, and on the shoots and needles of Larch in the case of *A. strobilobius*. They occur on Larch throughout Ireland, and are usually present in such abundance that the drain of sap from infested trees must cause a significant retardation of growth. Although they may not kill trees, they may be the cause of serious ill-health to the infested trees by allowing spores of *Dasyscypha calycina* (Larch Canker) to enter shoots and branches through the pores made by their sucking mouth-parts.

(iii) *Adelges pini*, Koch. The presence of this species on Pine is indicated by the fact that white woolly secretions (which cover the Adelgid lice) occur on stems, branches, or shoots of trees. It occurs on Pine throughout Ireland. It is most common and severe on Scots Pine, fairly common on Corsican Pine, and has been noted on Weymouth and Mountain Pines, and *Pinus insignis*. On Lodge-pole Pine it has been found only on nursery stock and on plants recently planted in the forest.

The disease is most common and severe on nursery stock and on trees less than 15 years planted out in the forest. It is most severe in areas where exposure is severe. The withdrawal of sap from the shoots results in the die-back of the needles, which are then usually attacked by *Lophodermium pinastri*. The holes made in the bark by *A. pini* give spores of *Dasyscypha* spp. (canker) access to the stems and branches of Pine. When current year's shoots are severely attacked in early summer, the needles of those shoots are foreshortened, and of a sickly yellow colour. This curtailment of the carbon-assimilating surface of plants results in a reduction in the amount of food available for the plants, and hence, stunts the growth of infested plants.

(iv) *Adelges nüsslini*, Börner. White woolly secretions (covering the Adelgid lice) on shoots and branches (and in summer, on needles) of Silver Fir, indicate the presence of *A. nüsslini*. The disease is very common on Silver Fir throughout Ireland, occurring on *Abies pectinata*, *Abies Nordmanniana*, and *Abies cephalonica*. It has also been recorded on *Abies concolor*, *A. lasiocarpa*, *A. grandis*, and *A. nobilis*.

When the attack is severe, the needles become mottled green and yellowish-green on their upper surface; they are drawn backwards and lose their rigidity on account of the drain of sap from their undersurface. The drain of sap from shoots and needles causes them to die-back. In the case of *Abies pectinata*, trees of all ages are subject to infection. The most severe attacks occur on trees 40 years old and younger. The attack is generally of a mild nature on old trees, shoots only being affected.

[The primary host of *Adelges pini* and of *Adelges nüsslini* is Oriental Spruce, on which, however, I have not noted those diseases.]

The secondary hosts of *A. pini* and of *A. nüsslini* are Pine and Silver Fir, respectively).

(v) *Adelges picea*, Börner. The secondary hosts of *A. picea* are *Abies* spp. It has no primary host. Its presence on Silver Firs is indicated by the presence of numerous white woolly secretions (covering the Adelgid lice, which suck the sap) on the bark of the main stem. It has been found on trees of 30 years and older of *Abies pectinata*, *A. Nordmanniana*, *A. cephalonica*, and *A. concolor*.

A. picea also takes the form of spindle-shaped galls on branches of poles and older *Abies pectinata*. This type of injury is of small consequence on Silver Fir in Ireland.

(vi) *Adelges cooleyi*, Gillettee. The primary host of *A. cooleyi* in Ireland is Sitka Spruce, on the shoots of which it produces median, elongate galls, which completely encircle the shoots on which they occur. The galls occur on lateral shoots, but have been recorded on leading shoots of Sitka Spruce in two woods. Trees, 6 years and older, in the forest are attacked, but the most severe attacks occur on trees from 12-15 years planted. The gall-stage of *A. cooleyi* on Sitka Spruce is usually of little consequence; however, the fact that leaders have been galled is worthy of note, as an expansion of this type of damage would seriously injure the value of Sitka Spruce in Irish plantations.

The secondary host of *A. cooleyi* is Douglas Fir, on which the damage caused is of a much more serious nature. Its presence on Douglas Fir is indicated by the presence of white woolly secretions (which cover the Adelgid lice) and/or minute wingless lice on the undersurface of the needles. The attack occurs on Douglas Fir, of all ages except on plants which have been less than 5 years planted in the forest; it is generally very severe on trees 9 years and older in the forest. The withdrawal of sap from the needles causes them to turn brown and die-back. In cases of severe attack, trees lose all but the current year's needles, so that they have to depend on those needles, which may themselves be also attacked, for the carrying out of their vital processes. This leads to a serious retardation of growth, which is especially noticeable on trees on exposed hill-sides.

5. *Neomyzaphis abietina*, Walker (The Green Spruce-Aphis) is a small green aphid which sucks sap from the underside, usually, of needles of Spruce throughout Ireland. This pest attacks Spruce of all ages, both in the nursery and in the forest. It is more severe on Sitka Spruce than on Norway Spruce.

Where the attack is mild or fairly severe in any area, occasional plants, usually the more vigorous ones, may be severely attacked. When attacked, needles at first turn yellow, later to brown, and finally die and fall off. Where attack is severe, buds of Spruce remain dormant until early summer.

The attack of *N. abietina* is least severe in areas suitable for the growth of Spruce. It is most severe on Spruce (i) planted in

shade or partial shade of older trees, (ii) planted in frost hollows, and (iii) planted in very exposed areas. The fact that Spruce is seldom completely defoliated as a result of being attacked by *N. abietina* ensures that its vital functions are not completely arrested ; it will survive unless attacked by some other agency of disease. Stunted plants are the aftermath of severe attacks of *N. abietina*.

6. *Chionapsis salicis*, L. (The Willow and Poplar Scale) is a small louse which, under the protection of a small white scale, sucks sap from the bark of stems, branches, or shoots of Ash, Willow, and Alder throughout Ireland. It has also been noted on Sallow, White American Ash, *Fraxinus oregona* and *F. pubescens*.

As the period during which *C. salicis* is developing corresponds with the period during which the host trees are in the active growth stage, it is only natural that the drain of sap causes serious injury to the hosts. The attack of *C. salicis* on Ash is most significant. As a result of severe attacks, the wood of Ash becomes fairly brittle, and snaps more easily under strain than Ash which has not been attacked. The scales of *C. salicis* are most numerous on stems of Ash from 3"-8" in diameter at breast height. Middle-aged and old Ash are not attacked on the main stem, but smooth-barked branches of those trees may be affected. This pest is most severe on Ash under over-crowded conditions, and also in areas where drainage conditions are bad.

Other species of Insects, which (although widespread in occurrence in Ireland, but whose attacks so far in most areas have not been of economic importance) under favourable conditions for their reproduction in abundance, may yet be classed as Major Pests of Irish Woodlands under an expanding system of Forestry here, include :

1. Bark Beetles ;
2. *Diprion pini*, L. ;
3. *Strophosomus melanogrammus*, F. ;
4. *Otiorrhynchus picipes*, F. ;
5. *Orchestes fagi*, L. ; and
6. *Phyllobius viridiaeris*, L.

1. *Bark Beetles* pass through all stages of their life-cycle under the bark or in the wood of trees. In Ireland all our Bark-Beetles use dead trees, felled trees, or dead branches of living trees as breeding-ground. The adults and larvæ of Bark-Beetles make tube-like galleries between the bark and the wood, the characteristics of which indicate the species of Bark-Beetle that made them. The Bark-Beetles occurring in Ireland include : *Myelophilus piniperda*, Eich. (The Pine-Shoot Beetle) ; *Hylastes ater*, Payk. ; *H. opacus*, Er. ; *Pityophthorus ramulorum*, Perris ; and *Pityogenes bidentatus*, Herbst., all of which occur on *Pinus* spp ; *Hylastes cunicularis*, Er. on Norway Spruce ; *Hylurgops palliatus*, Gyll. on Norway Spruce

and European Larch; *Tomicus laricis*, F. on European Larch; *Dryocötes villosus*, F. on Oak; *Hylesinus crenatus*, F., and *H. fraxini*, Panz. on Ash; *Trypodendron domesticum*, L. on Beech; and *Eccoptogaster scolytus*, F. on Elm. *Myleophilus piniperda*, Eich. is our most important Bark-Beetle.

Most of our Bark-Beetles are secondary enemies of trees, their attacks being associated with adverse influences reacting on plantations. Our immunity from extensive outbreaks is possibly due to the limited extent of our forests.

2. *Diprion pini*, L. (The Pine Sawfly). The caterpillars of this species, feeding in companies, eat needles of *Pinus* spp. back to the needle-sheaths. They have been found attacking Scots and Lodge-pole Pines fairly commonly throughout Ireland; occasionally they have been found on Corsican and Mountain Pines, and rarely on *Pinus insignis* and Maritime Pine. The most severe attacks have been recorded on Pine 4-12 years planted in the forest. As a rule, throughout Ireland, less than 3 % of the Pine in any area are either completely or partially defoliated. Severe attacks have been noted in a limited number of areas. The reduction in foliage due to defoliation naturally retards growth to a certain extent.

3. *Strophosomus melanogrammus*, Fo. is a small greyish-black weevil which eats bits out of leaves of conifers, but, on hardwoods, skeletonises small isolated patches of each leaf it attacks. It is widespread in occurrence in Ireland, occurring very commonly on Beech, *Tsuga* spp., Birch, Spruce, Hazel, and Mountain Ash; occasionally on *Pinus* spp., Douglas Fir, *Thuya plicata*, Cupressus spp., Oak, and Willow, and rarely on Elm. The most severe attacks occur on trees less than 12 years old, especially when they have been planted in partial shade. On older trees, the attack, though widespread, is usually of a mild nature. Shoots of Spruce, and of Birch may be ringed at their base by adults of *S. melanogrammus*.

4. *Otiorrhynchus picipes*, F. (The Clay-coloured Weevil), is a small grey-brownish-black weevil which eats bits out of leaves of conifers, but, on hardwoods, usually eats leaves back to the main vein. It is widespread in occurrence in Ireland, being very common on *Abies* spp., *Thuya plicata*, *Tsuga* spp., and Mountain Ash; fairly common on Douglas Fir, Beech, Birch, and Hazel; occasional on Willow, Oak, Cupressus *Lawsoniana*, and Scots Pine, and is rare on other Pines, and on Ash, Larch, Hornbeam, Sycamore, Lime, Horsechestnut, Yew, Elm and *C. macrocarpa*.

The attack is most severe on trees less than 12 years old, especially when they have been used for underplanting in older wood, and is usually mild on older trees. Adults of *O. picipes* also ring shoots of species of *Abies* in pole stage.

As severe attacks of *Strophosomus melanogrammus* and of *Otiorrhynchus picipes* have been recorded on the continent of Europe, it is quite possible that such should occur here in the future.

5. *Orchestes fagi*, L. (The Beech Leaf-Miner). The larvæ of this weevil mines in the developing leaves of Beech, and the adult weevils cause shot-holing of the leaves of Beech. The adults occasionally occur on leaves of Ash, Birch, Sycamore, and Elm, portions of whose leaves they skeletonise. *O. fagi* attacks Beech of all ages, but is usually most abundant on older trees. The attack on nursery stock is generally of a very mild nature. Although the health of trees, even when their leaves bear numerous larval mines and adults' shot-holes of *O. fagi*, does not seem to be seriously impaired, their food-supply must be seriously curtailed as a result of the injury to their foliage, which occurs so early in the growing season.

6. *Phyllobius viridiaeris*, L. is a small bright-green weevil. It eats leaf-tissues of beech and oak plants, being usually found on plants less than 8 years old. The most severe attacks have been recorded on Beech, which has been almost completely defoliated in many woods. An increase in the population of *P. viridiaeris* would form a definite threat to the artificial regeneration of our woods with Beech and Oak.

Most other species of Insects, which have been recorded in Ireland are not of much economic importance, either because of the limited nature of their occurrence, or due to the fact that their attacks are confined to accessory species of trees.

Fungous Pests of Irish Woodlands.

Our most serious Fungous pests include :—

1. *Armillaria mellea* (Vahl.) Fr. ;
2. *Fomes annosus*, Fr. ;
3. *Dasyscypha calycina*, Fuckel ; and
4. *Nectria ditissima*, Tul.

1. *Armillaria mellea* (Vahl.) Fr. (Honey Fungus) causes the most serious root-rot of broadleaved and coniferous trees in Ireland ; it has also been found on certain shrubs. The fructifications of the fungus are toadstools, and occur in clumps at or near the base of dead trees or stumps, which had been killed by attack of *A. mellea*. They are borne on rhizomorphs. Two types of rhizomorphs have been noted, (i) round black ones, which occur in the soil, and cause infection of fresh host trees by entering through wounds on roots, and (ii) black flattened ones, which occur between the bark and the wood of trees in the advanced stages of infection.

The development of the disease is slow in the case of older trees, and may take years in the case of broadleaved trees. Young trees, however, may be killed in less than a year after infection has begun. The needles of young conifers, which have been attacked, at first turn to sickly yellow, later to brown or red, and finally die. Under the bark at the base of recently killed trees a thick white web of mycelium occurs ; when the trees have been dead for some time,

this weft segregates into flattened strands (the subcortical rhizomorphs).

That the disease occurs on patches of plants, which gradually enlarge, indicates that the cylindrical rhizomorphs in the soil play an important part in spreading infection. Those rhizomorphs, which form a network in the soil, emanate from trees which have succumbed to attack of *A. mellea*, and attack all susceptible trees in their vicinity. Once in a susceptible host the fungus produces a dry rot in it. This rotted dried wood is permeated with black zone lines. The rotted wood eventually disintegrates into cubical fragments. All infected trees eventually die due to complete girdling at the base.

The disease is widespread in Ireland. It has been found very commonly on Beech, Oak, Ash, Scots Pine, Sitka Spruce, Japanese Larch, and Norway Spruce; fairly commonly on Birch, Elm, Sycamore, *Abies pectinata*, Douglas Fir, European Larch, *Cupressus Lawsoniana*, and *Cupressus macrocarpa*; and rarely on Lime, Hazel, Spanish Chestnut, Willow, Poplar, Alder, *Abies grandis*, Corsican Pine, *Pinus insignis*, *Pinus contorta*, *Tsuga* spp., *Wellingtonia gigantea*, and *Sequoia sempervirens*. It has also been recorded on *Aurucaria*, *Eucalyptus*, the golden form of *Cupresses macrocarpa*, Holly, and *Rhododendron*. In the case of Conifers, trees of all ages, except those less than one year planted in the wood, have been found attacked. In the case of broadleaved trees, trees of all ages, except those less than 8 years old, have been found attacked.

In most woods examined in Ireland, less than 3 % of the trees have been found infected by *A. mellea*; rarely more than 10 % of all the susceptible species of trees in any area are involved in the attack, and only in 10 woods have more than 25 % of the trees been infected.

Under our conditions, the disease is not of a serious nature in fresh plantations. It has been most severe in replanted areas, particularly on young coniferous plantations on old hardwood sites. In cases of isolated outbreaks, such as are usually found in the different forest properties in this country, the Trench System, as originated by Hartig, would be useful to stem the attack.

2. *Fomes annosus*, Fr. (Heart-Rot of Conifers) is the most important cause of butt rot of Conifers in Ireland. The fungus enters through the roots of its host species, and passes into the heartwood, on which it produces a rot. Trees less than 19 years planted in the wood, when attacked by *Fomes annosus*, succumb to the attack. On trees older than this, the attack of *F. annosus* causes a rot in the heartwood; eventually the rotted heartwood disintegrates, resulting in pipeness of the butt of affected trees; such trees are not usually killed, but may be suppressed by their unaffected neighbours. Zone lines are present in the rotted wood; and beneath the bark of dead trees, a very thin sheath of white mycelium has been noted.

The fructifications of the fungus (brown, perennial, bracket-shaped structures) occur in concentric rings, and are found at the base of dead trees or of stumps of trees which had been infected prior to being felled.

F. annosus is widespread in Ireland. It has been found most commonly on European Larch, Scots Pine, Japanese Larch, Douglas Fir, Sitka Spruce, and Norway Spruce; occasionally on *Abies pectinata*; and rarely on *Thuja plicata*, and Corsican Pine. It has also been recorded on *Abies grandis*, *Isuga* spp., and Lodgepole Pine. In most of the areas in which *F. annosus* was recorded, it had attacked less than 3 % of the host species of trees; rarely were more than 10 % of the host trees in any area attacked, and only in 2 areas were more than 25 % of the host trees infected.

3. *Dasyscypha calycina*, Fuckel (Larch Canker) causes cankers of stems or branches of Larch. The canker appears as a depression on the bark of the stem or branch, this deformation being generally accentuated by increased growth in thickness on the other side of the stem and on the sides of the canker. The cankers occur on the stems and branches of Larch of all ages except trees less than 1½ years planted in the forest. On trees less than 15 years planted in the forest the canker occurs at the lower portion, or at the base, of the stem, usually one canker per stem, and the portion of the stem apical to the canker dies-back; trees older than this seldom die as a result of attack. Trees in the pole-stage are most commonly attacked, and may bear 1-20 cankers per stem. On older trees, the cankers are usually found on branches, which usually die-back as a result of infection. Branches of saplings and poles of Larch may also be cankered and die-back. Young trees, during the first six years after they have been planted in the woods, may be attacked and killed by *D. calycina*, no cankers being formed in such cases, but the surface of the bark of such trees is covered with apothecia (i.e., the fructifications) of the fungus. Apothecia are also numerous on dead branches of saplings and older Larch, and on bark on the edges of canker.

D. calycina is widespread on European Larch in Ireland, the cankers and/or the fructifications being present to a greater or lesser degree in all plantations of this species. Japanese Larch is also attacked, but usually to a lesser extent than E. Larch. European Larch of Scottish, Irish, and Silesian origin, and West American Larch are also susceptible to infection by *D. calycina*.

It is the most serious disease on Larch in this country. It is most severe on Larch (i) in very exposed sites, (ii) in sheltered valleys, especially where proper silvicultural treatment has not been given soon enough, and (iii) on unhealthy trees. Larch in mixture with other species of trees appears to be just as susceptible to infection as pure plantations of Larch. Larch attacked by *Adelges* spp. is very susceptible to infection by *D. calycina*.

Any measures which promote the production of a vigorous healthy crop of Larch will tend to reduce the incidence of Larch Canker.

4. *Nectria ditissima*, Tul. Cankers caused by this fungus are found very commonly on Beech, and occasionally on Ash, throughout Ireland. The cankers are rarely produced on trees less than 8 years old.

The most usual types of injury resulting on Beech and Ash from attack of *N. ditissima* include :

- (i) Cankers on branches of poles, middle-aged, and old trees, usually not causing die-back of such branches.
- (ii) Cankers on stems and branches of saplings, poles, middle-aged, and old trees which, as a rule, do not cause die-back of such stems and branches.
[Types (i) and (ii) are widespread in occurrence on Beech in Ireland ; but, in the case of Ash, usually less than 3 % of the trees in any area are involved in the attack].
- (iii) Die-back of branches and shoots of saplings and older trees to the point on the branches at which the cankers occur. (This type of injury has usually been found on Beech, but is present to such a limited degree on Beech in any area as to be of small consequence).
- (iv) Canker at base of stem of young Beech and Ash, resulting in the death of such trees. (This type of injury has been recorded on less than 3 % of the trees in a limited number of forests).
- (v) Canker on stems of young trees, causing the death of the portion of the stem apical to the canker. (This type of injury has been recorded on less than 3 % of the saplings of Beech and Ash in a number of widely-distributed areas in Ireland).

Cankers on stems and branches of Beech and Ash tend to distort affected trees, and to reduce the quality of the timber produced so much that it is suitable only for firewood.

Other species of Fungi, which may yet be classed as Major Pests of Woodlands here, include :

1. *Fomes applanatus*, Pers. ;
2. *Dasyscypha* spp. on Pines ;
3. *Microsphaera quercina* (Schw) Burrill ;
4. *Meria laricis*, Vuill. ; and
5. Rusts of Pines and of Larch.

1. *Fomes applanatus*, Pers. (White Mottled Rot) causes a butt-rot, and at times a trunk-rot, of broad-leaved trees. The disease occurs on trees which are mature or almost so. The heartwood of infected trees becomes soft and spongy, pale brown in colour, and woven through it occur black strands of mycelium (reminiscent of the rhizomorphs of *A. mellea*). In the case of most of the infected trees noted, the rotted wood had disintegrated, leaving the centre of the bole hollow.

The fructifications of *F. applanatus* are hard, woody, perennial structures, which are usually bracket-shaped, but are sometimes ungulate in shape. They are usually attached at or near the base of infected trees in the advanced stages of decay; they are also common on dead trees and on stumps.

The disease occurs commonly in Ireland. It has been recorded most commonly on Beech, fairly commonly on Ash and Oak, occasionally on Elm, Sycamore and Birch, and has been recorded on Spanish Chestnut, Lime, Walnut, Horse-chestnut, and Poplar. It has also been recorded on old *Abies pectinata* in two woods. In most areas in which the disease has been recorded, less than 3 % of possible hosts were infected; rarely more than 10 % of the possible host trees in any wood are involved in the attack.

2. *Dasyscypha* spp. on *Pines*. Cankers, similar to those caused by *D. calycina* on Larch, are caused on Pines by *Dasyscypha* spp. Those cankers occur on stems of saplings and poles of *Pinus* spp., and on branches of saplings and older Pines. They have been found most commonly on Scots Pine, but also occur on Corsican, Lodgepole, and Mountain Pines.

Pine canker has been found in a number of widely-distributed areas in Ireland. Except in a limited number of areas, less than 3 % of the Pine in any area were infected by *Dasyscypha* spp. An expansion of this type of injury on Pines in this country would have serious results.

3. *Microsphaera quercina* (Schw.) Burrill (Powdery Mildew of Oak). This fungus, appearing on leaves of Oak as a whitish mould, kills such leaves.

This disease is widespread in occurrence on Oak in Ireland. It is generally particularly severe on Oak less than 8 years old, especially on suckers of Oak, and on seedlings and transplants of Oak in the nursery. Saplings of Oak are occasionally severely attacked. On poles and older Oak, *M. quercina* is usually present on leaves on epicormic branches, and on leaves on the current year's shoots on the lower branches of the crowns.

One of the consequences of severe attack of *M. quercina* is the death of the current year's shoots of Oak. Such shoots, when they have dried out, are shrunk, brown in colour, and are brittle.

M. quercina has also been recorded on Beech in a limited number of woods.

4. *Meria laricis*, Vuill. (Leaf-cast Disease of Larch) causes browning and death of needles of European Larch. Needles on the apical portion of shoots do not become infected, and so, contrast with the dead brown needles lower down on the same shoots. Affected needles usually fall early in Autumn.

M. laricis has been noted fairly commonly on European Larch in Ireland. It has been found most commonly on nursery stock and

on plants less than 10 years planted in the wood. Needles on lower branches of host trees have, as a general rule, been affected.

5. *Rusts of Pine and Larch.* The most important Rusts on those trees include :

(i) *Coleosporium senecionis*. The primary host of this rust is groundsel. The secondary hosts are species of the 2-needled Pines ; on Pine the disease is known as *Peridermium pini* rust. The fungus causes delicate white blisters (called æcidia) on Pine needles. Those æcidia enclose the spores, which, when liberated, cause infection on groundsel. When the disease has passed through its cycle on groundsel, the spores liberated from pustules on the groundsel leaves re infect needles of Pine. Pine needles, which bear æcidia, die.

This disease is widespread in occurrence in Ireland. It has generally been recorded on Scots Pine, but has also been recorded on Corsican Pine in a number of woods. The disease has been found only on saplings and younger trees in the forest, and on nursery stock.

(ii) *Melampsoridium betulinum*, *Kleb.* (= *Peridermium laricis*). The primary host of this rust is Birch, the leaves of which it causes to die-back.

On needles of European Larch, the fungus produces delicate white pustules (the æcidia) in which the orange spores are borne. Those spores, when liberated, infect leaves of Birch ; after running its course in the Birch, the spores liberated from pustules on the Birch re infect needles of Larch. Infected needles of Larch turn brown and die. On Birch, the disease may be seen throughout the growing season, but on European Larch, the disease has been identified by me with certainty only during the latter half of April and during the summer months. So far, the disease has not been of much consequence on European Larch, except in a few isolated cases.

Most other species of Fungi, which have been recorded in Ireland, are not of much economic importance, either because of the limited nature of their occurrence, or due to the fact that their attacks have been confined to accessory species of trees.

Ireland's Position with regard to Forest Pests.

The actual amount of injury caused to Irish Forests as a result of the onslaughts of Insects and Fungi is very small as compared with the ravishes of those pests in woodlands in other countries. This is in part due to the limited extent of our woodland area, and, also, due to the fact that many of the Insects and Fungi which cause serious injury to woodlands in other countries have not, so far, been recorded in this country. Many of those foreign Insect and Fungous Pests may, with the passage of time, be introduced into this country through the medium of imported timber supplies.

Some of those pests may be present here, although their presence is not, so far, a recorded fact.

With the progressive increase in our forest area, many Insects and Fungi, which at present are regarded as of minor importance, may assume the role of major pests.

Proper silvicultural treatment of woodlands from their inception onwards would serve, better than any other treatment, to reduce the amount of injury, resulting from attacks of Insects and Fungi, to a minimum.

TO OUR NEW READERS.

The Society of Irish Foresters has for its object "to advance and spread in Eire the knowledge of forestry in all its aspects."

With this end in view, meetings are held at which papers are read and forestry problems discussed; excursions are organised to forest areas of special interest; the Journal is published at least twice a year; a Register of Notable Trees has been opened; and, with the co-operation of the Central Students Library, a library service is available to members.

Members receive gratis one copy of each part of the Journal and are entitled to be present at every meeting and excursion of the Society.

Membership consists of two Orders, Technical and Associate. The former consists mainly of whole-time foresters; the latter of persons desirous of promoting forestry but not qualified for Technical membership.

Rates of subscription are as follows:—

Technical Member, Grade I, £1 per annum.

Technical Member, Grade II, 10/- per annum.

Associate Member, 15/- per annum.

The Society is anxious to extend its Associate Membership as it is mainly through it that it hopes to create and maintain an informed public opinion on forestry matters.

Forms of application for membership are obtainable from the Secretary.

ROADSIDE TREES

*Extract from an Address given to the Irish Roadside Tree Association,
9th November, 1945.*

By H. M. FITZPATRICK.

The origins of the first town and village trees are obscure. Perhaps a few were remnants of natural forests which were caught up in the spread of the streets but probably most of them were the result of deliberate planting. We know that the fashion of formal lines of evenly spaced trees bordering private avenues was popular in France and other continental countries during the seventeenth century and it seems likely that it was brought to England by Le Notre who was employed by Charles I in improving the royal estates. Certain it is that the lime was introduced by Le Notre and that from his coming to England date many of the famous avenues of this tree which was already common in such formal plantings in France. It seems likely that the first avenues planted were those on private ground as part of the geometrical patterns of the parks and gardens of the period and that they were later extended to embrace the roads approaching the mansions and the streets of the neighbouring villages. From this to town planting by the municipal authority was a natural step and nowadays roadside trees are considered an essential part of the decorative scheme of all important cities.

The fashion in landscape gardening has changed greatly since the days of Charles I and Le Notre and the straight and regular avenues of that time were less and less planted and gave way in the following century to the curving drives through tree dotted parks which are now a feature of nearly all demesnes in Ireland. Only along public thoroughfares did formality persist. In the nature of things curves and groves were not feasible in such places and the style, and to a great extent the species, employed three hundred years ago by the French gardeners are still used in schemes of roadside planting.

It is accepted by all that trees of the right kind can be a feature of great beauty in towns and that they do much to brighten the lives of the inhabitants by reminding them of the green countryside which lies beyond the pavements. The soft outlines of trees tone down the sharp angles of the buildings and their restful colours are a relief from the harsh glare of stone and metal. In the country, too, roadside trees are an attractive feature at all seasons and planting will in a few years beautify stretches of newly made roads which, without trees, would remain stark and ugly for a long time.

Although all are agreed about the desirability of trees in public places, the way of the roadside planter is not an easy one. He has

many people to please and many problems to solve in the course of his work and is subject to much criticism, often of an uninformed kind. His critics are inclined to overlook the paramount purpose of streets and roads; that is to act as thoroughfares for the easy passage of vehicles. Trees must take second place to traffic, to lighting and to the convenience of those who use the streets or who live in the buildings adjoining. In these interests it is sometimes impossible to plant at all or changing times make necessary the severe lopping or total removal of trees which have become too large for their positions. The widespread use of overhead wires for telephones and electric transmission and the tendency for lorries and buses to get larger and larger make the task of the roadside tree cultivator yearly more difficult and call for ever more skill in the selection and placing of new trees and the treatment of old.

The conditions for tree growth along roads, and especially in town streets, as can be imagined, are not ideal. Often the soil is extremely poor, due to excavation or filling for the purpose of levelling the surface at the time of construction. In such cases a large pit must be opened and refilled with good soil brought from outside. Lack of soil aeration and drought are common impediments to health. Both are caused by the impervious surface of road and footpath which surround the tree and effectively cut off the percolation of rain water to the roots. This evil can be mitigated by retaining a patch of open soil around the base of each tree and by artificial watering during lengthy periods of dry weather.

The subject of vandalism is a sore one with all who have charge of trees in public places. Bark is damaged, branches torn and even heads of trees pulled off by thoughtless persons who in a short time utterly destroy the work of years. Metal tree guards are some protection against such wilful destruction but the only sure cure is the spread of a spirit of civic pride and responsibility. To be effective this must start in the schools so that children may learn to respect communal property such as street trees.

In many up-to-date cities there is a special staff of skilled men to care the trees in the streets and parks. Their wages are a charge on the rates and each year a plan of planting, tending, pruning and other necessary work is budgeted for. Trees need unremitting care if they are to thrive and become objects of beauty. They must be trained and pruned to a symmetrical shape in keeping with their artificial environment to avoid the brutal lopping which is the fruit of years of neglect. Stakes and ties need regular inspection and adjustments to prevent damage to the bark by rubbing. Cultivation of the soil around the stem and the addition of leaf mould, bone meal and lime may be necessary to keep trees in health and watering may be called for in dry summers especially with newly planted specimens.

The aim of the Irish Roadside Tree Association is to direct attention to the need for such maintenance of existing trees in our

towns and cities and to encourage further plantings in streets, parks and along suburban and rural roads. A departure from many established customs is desirable. Geometrical exactness may be demanded in the placing of specimens in city streets but it is hardly essential in the spacious surroundings of the suburbs and the country where a natural treatment may be more effective. Large growing species like London Plane, English Elm and Horse Chestnut are out of place in narrow streets as their spreading boughs soon become a nuisance. For any except the most open spaces where a tree can be allowed to attain its normal size, or something approaching thereto, trees of smaller habit and with compact narrow crowns are to be preferred. Fortunately they are numerous. Whitebeam, Sorbus, Mountain Ash, Birch, Ginkgo, Hawthorn, Flowering Cherry and Pyrus, Almond and Ailanthus may be mentioned. All are ornamental and capable of growth under difficult conditions and none reach a stature likely to prove an embarrassment to traffic or other street interests.

Road widening and improving and the construction of new roads can provide opportunities for ornamental planting. A wide road gives scope for ambitious schemes. It is possible to set aside a strip between roadway and footpath where root and branch will have room to grow and spread unhindered. Centre planting on a series of islands may be adopted. Groups may be planted on odd pieces of ground left unused as a result of straightening or easing bends and, where an extensive scheme is contemplated, special species of distinct shape such as Lombardy Poplar may be planted to denote road junctions and such like.

The main points in successful roadside tree planting are selection of the right species, proper planting and maintenance and continued protection.

THE COVER DESIGN.

The photograph reproduced on the cover of this issue was taken at Curraghmore, Co. Waterford, seat of the Beresford family. The grounds are noted for their fine selection of native and exotic trees, many of which have attained unusual size. The Scots Pine illustrated is probably one of the finest specimens of that species in Ireland. Its height is 120 feet and its girth at 4 ft. 3 ins. is 120 inches.

SOME NOTES ON COASTAL AFFORESTATION IN CO. WEXFORD

By J. J. DEASY.

I

INTRODUCTION.

From time to time since I took up duty as forester for the State lands at Curracloe, some foresters and others interested have made enquiries of me concerning afforestation in that area. In these notes I have endeavoured to give an idea of some conditions affecting tree growth there, the silvicultural methods practised, etc.

My own connection with Curracloe dates from October, 1942, and since then I have visited the area once every few months.

In submitting this paper for publication in *Irish Forestry* I have to acknowledge indebtedness to the following: Mr. T. McEvoy for first suggesting to me that I should write it; the Forestry Division for permission to publish it; Mr. T. Clear for furnishing the names of some of the plants; some of my predecessors, namely, Mr. D. McGlynn, Mr. D. Corboy, and Mr. E. Munnely, as well as the workman-in-charge, Mr. M. Kehoe, for giving me some information about the area (Mr. D. O'Brien who was forester for the area at the opening of the centre, I have not met); the Director of the Meteorological Service, Department of Industry and Commerce, for supplying tables of rainfall data; and Mr. M. Swan for a helpful suggestion concerning my comments on the future tree crop.

II

HISTORY.

A new note was struck in the State afforestation of wasteland in this country in 1931. In that year the Forestry Department purchased and undertook the planting of a tract of sand dunes at Curracloe, Co. Wexford (see Figure I).

This area consisted of a strip of ground running in a North-South direction, a little over two miles in length and about half a mile in breadth at its widest part. The sea washed its eastern and southern boundaries along their entire length. Outside, along the total length of its western boundary was an expanse of slobland extending to a maximum depth of two miles, which area was once a shallow arm of the sea but was reclaimed during the fifties of the last century. It can be assumed that prior to the reclamation of those sloblands the ground purchased by the Department consisted of a narrow tongue of land jutting into the sea.

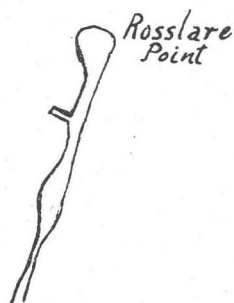
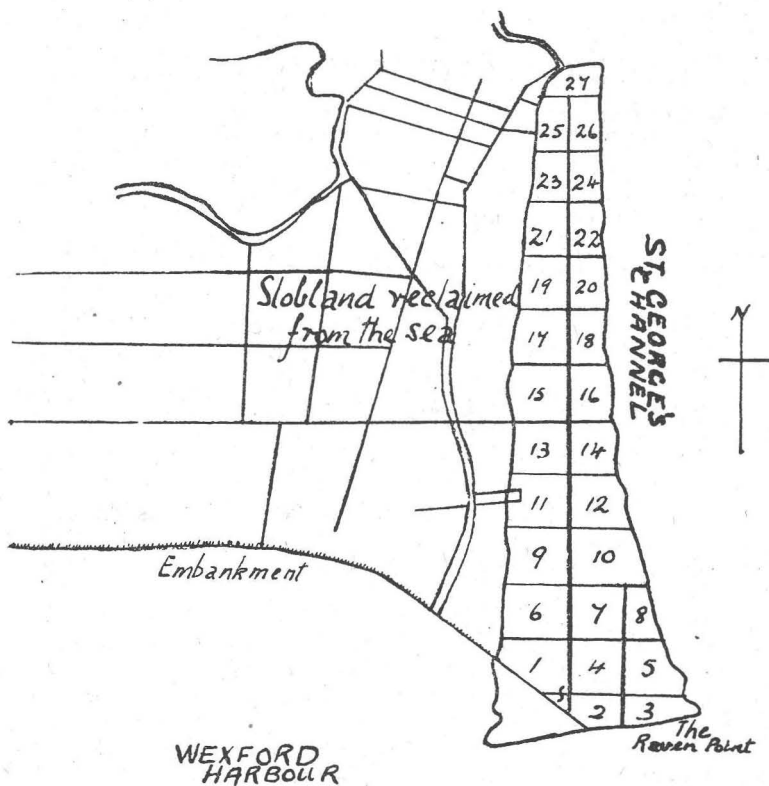


FIGURE I.

Scale — One and a Half Inches
to One Statute Mile.

At some period sand thrown ashore by the waves of the sea was blown on to this area forming dunes which varied in height from a few to fifty feet. These dunes which were widely and irregularly scattered were connected by ridges of sand. Most of the dunes and ridges were covered to a greater or less extent with vegetation; others or parts of others were destitute of any growth whatsoever. Between these dunes and ridges were low lying flat areas. Some of these areas were well covered with vegetation; some were only sparsely covered and contained pockets of loose sand; some were under water for part of the year.

It is a matter of doubt when this area was overwhelmed by sand. Except in the case of littoral dunes there has been little movement of sand here over a long number of years.

On the landward side of the area within the boundary there was a narrow strip of marshy land.

Vegetation.

At the time of acquisition the dominant vegetation was Marram Grass or Sea Matweed (*Psamma arenaria*) on the greater number of the dunes and ridges, Bracken (*Pteris aquilina*) and Yorkshire Fog (*Holcus lanatus*) on the lower well "fixed" ridges, Silver Weed (*Potentilla anserina*) and poor meadow grasses on the drier flat areas and Creeping Sally (*Salix repens*) and Rushes (*Juncus communis* and *J. acutus*) on the wetter flat areas.

Marram Grass by its rhizomes was capable of spreading quickly and was very tenacious in holding its grip once it gained a foothold. In this way it was an important factor in maintaining the stability of the sand.

Selection of Species.

The species used mostly were Scots Pine, Corsican Pine, Maritime Pine (*Pinus maritima* or *P. pinaster*) and Sitka Spruce. Other species used were *Pinus contorta*, Mountain Pine, Austrian Pine, *Pinus radiata* (*insignis*) and Black Alder.

On the bracken-covered areas a mixture of Scots Pine and Corsican Pine was made with the Scots Pine in the higher proportion; on the definitely fixed non-bracken areas (excluding the swampy ground) a similar mixture but with the higher proportion of Corsican Pine; and on the less fixed portions which included most of the plantable dunes, pure Corsican Pine. Some ground was set aside for Maritime Pine seed, mostly in dry well-fixed troughs on the seaward side of the area.

Unstable dunes, flat areas under water for part of the year and pockets of loose sand were considered unplantable.

For the swampy ground Sitka Spruce was selected with two rows of Black Alder along its western side, the outer row of which also corresponded to the western boundary of the plantation.

Cultural Operations.

A serious hindrance to the establishment of vegetation on the sands was the presence of stock and rabbits. The number of rabbits was immense. By burrowing and grazing they were responsible for much loosening of fixed sand and killing-off of young vegetation. On that account and owing to the fact that rabbits kill young trees by biting off the shoots and nibbling the bark, the first step taken was the fencing of the area with a stock-rabbit fence. It was not considered necessary to continue the fence along the whole coastline so it was erected along that line for only a certain distance at each end. The selection of the site of this coastal fence was a ticklish problem. It was a matter of trying to select a line where the fence would not be buried with the movement of sand nor yet left hanging by the sand being blown from under it. It did not prove possible however, to find such a line and repairs to parts of the fence on that side have often been necessary since.

The necessary fencing having been completed, the extermination of the rabbits by trapping, snaring and the use of fumigants was carried out pretty thoroughly.

Permanent rides were laid down dividing the area into compartments which ranged in size from 12 ac. to 27 ac.

Draining of the swampy ground was carried out, six and a quarter miles of main and sectional drains being made. The turves produced were inverted and spread at a spacing of 5' x 5' in preparation for the planting of Sitka Spruce and Alder.

The total area considered plantable was planted in the two seasons ended April, 1931 and April, 1932. Pitting and planting was done with the ordinary planting spades, the spacing for the pines being $4\frac{1}{2}' \times 4\frac{1}{2}'$, and the age of the plants being two-year-one. The cost of this work, excluding the cost of the plants on the ground, was on an average 18/- per acre. The pines were planted rather deeply with roots straight down as this was considered to have a good influence on the future windfirmness of the trees.

There were failures. Plants on partially stabilized sand were in some cases blown out of it completely, some were buried in sand-drifts, drought accounted for others, and hares for some more. In some areas the losses were as high as 50 %. Losses on well-fixed dunes were not heavy. Beeting-up of the definitely fixed areas only was carried out.

A small area of loose sand about an acre in extent was planted with Marram Grass with a view to stabilizing the sand. The grass for planting was thinned from parts where it grew thickly by the sea-shore. The tufts of grass were planted at a spacing of about 3' each way. They were quite effective in forming a cover.

It was decided at this stage that some time should elapse so that the position could be reviewed before further expense would be incurred in replacements.

Cleaning of the young plantation from grass and bracken was necessary during the first few summers. This consisted in switching over the bracken fronds before they opened fully and trampling or cutting the grass where heavy. That operation was necessary twice a year until the young trees became well established.

Direct Sowing of Maritime Pine Seed.

An area of approximately thirty-six acres was sown, some in 1931 and the remainder in 1932, with Maritime Pine seed. Some preparation of ground was necessary. This consisted of lightly skimming with nursery spades the surface vegetation off patches about 9" square. The minimum of sand was removed in this operation as it was found that blown sand tended to accumulate in the depressions thus formed and if these were made too deep, the seed was too heavily covered. The spacing of the patches was $4\frac{1}{2}' \times 4\frac{1}{2}'$. This work was done immediately before the sowing of the seeds.

The seeds were prepared by soaking in water for a week. They were then given a dressing of red lead powder as a protection against birds. The sowers carried the seed in light cans and followed those who prepared the patches, and the seeds, at the rate of 4 or 5 per patch, were lightly pressed into the sand with the foot. They were then covered with sand to a depth of a half inch. Sowing was done during the month of May.

The first year's sowings germinated well on the whole and as it was a favourable year the losses were not heavy. The second year's sowings also germinated well but the losses were heavy due to drought. The temperature of the sand rose very high on hot days with the result that many seedlings were scorched and killed off. Slugs accounted for more. Slaked lime was used effectively against the slugs. They were also collected in the early mornings. The blue-grey woodlouse (slater) was another pest of some importance and probably accounted for more than did the slugs. Many patches were left without any seedlings. These were beaten-up by re-seeding. It was found that transplanting the seedlings from patches where they were too thick tended to loosen the remaining ones too much.

The progress of most of the seedlings was disappointing during the first few years. About 5 % made satisfactory progress but the remainder lagged behind. The conditions affecting the weak ones seemed to be the same as the conditions affecting the strong ones. After four or five years, however, the seedlings that survived the check period came away satisfactorily. Where the clumps were too thick they were thinned by breaking over the superfluous seedlings. The fact that the seeds germinated well but that most of the seedlings spent a long period in check, with heavy losses was rather discouraging and resulted in this method losing favour to some extent so far as the quick establishment of a crop was concerned.

A trial was given to some well-rotted leafmould which was brought some distance from an old hardwood stand. This was placed on the prepared patches before the sowing of the seed and was also used in covering them. It seemed to have been effective to some extent in conserving the moisture but apart from that no great benefit seemed to have been derived from it.

MANURIAL EXPERIMENT.

A small manurial experiment was carried out on an area of seedlings in Compartment 27. The manures used were :—

- (a) 1 oz. Nitro chalk per patch ;
- (b) 1 oz. Nitro chalk and 2 ozs. Semsol per patch ;
- (c) 2 ozs. Semsol per patch ;
- (d) 2 ozs. Basic Slag per patch.

A separate plot was set apart for each manure, the conditions in each of the four plots appearing as nearly identical as possible. The manures were applied to every second row in the year of sowing when the seedlings were well up. The seedlings thus treated do not seem to have benefited, however. In all cases the patches of seedlings had to be weeded each summer until they reached the stage when they were safe from damaging weed growth.

Experiment in Planting Seedling Types.

In 1940 some experimental plots of Maritime Pine were planted in Compartment 27. The seedlings were raised at Avondale and were planted out as one year seedlings. They were divided into four lots, each lot having received different nursery treatment as follows :—

- (a) Seedlings wrenched once during the summer, lifted and lined out in October following ;
 - (b) Seedlings wrenched once during the summer, “ balled ” (i.e., roots covered in a ball of nursery soil with an outer covering of moss tied on to hold the soil in place) and lined out in October following.
 - (c) Seedlings wrenched twice, balled and lined out in October.
 - (d) Seedlings not wrenched but balled and lined out in October.
- The four plots were planted on a site where conditions appeared to be uniform throughout. The losses were lightest in the case of (c) and heaviest in the case of (d). Losses in (a) and (b) were the same.

At present the growth of the surviving plants in (a) and (b) is about the same. Growth in (c) is better than in either (a) or (b) and growth in (d) is better than in (c).

Some further planting of Maritime Pine, some plants balled, some with naked roots, has since been carried out. The former are making better progress, sometimes rather strikingly so.

Insects and Fungi.

In 1938 the Sitka Spruce, planted in 1931 and 1932, was attacked by *Neomyzaphis abietina* and was partially defoliated. They were free of them by 1940.

In 1939 there was the first evidence of the caterpillars of the Pine Shoot Moth (*Evetria buoliana*). The Scots Pine was the first to be affected. The attack spread along the landward side of the area and caused great devastation. The Corsican Pine which at first appeared immune was attacked to a limited extent where it grew in mixture with the Scots Pine. Very few trees of the latter escaped. The caterpillars were still at work in the summer of 1945 and had by then turned their attention to the *Pinus contorta*. At that time no insect parasitic on these caterpillars seemed to have put in an appearance.

This outbreak was a rather unfortunate occurrence as the affected trees can never be expected to be more than firewood.

It is uncertain how this pest reached this area as there are no coniferous trees within a few miles of it. It is probable that it was introduced with a consignment of plants.

The presence of the Pine Needle Cast Fungus (*Lophodermium pinastri*) was apparent in the Scots Pine and Corsican Pine mixtures but no serious damage was caused.

Fire.

The danger from fire here is real enough. In most cases, however, the blocks are separated by wide strips without trees and surface fires are easily controlled by the use of sand. As regards sources of danger it is the old story here. The worst offenders are the careless holiday makers who go into the plantations and nonchalantly throw away lighted cigarette ends or leave picnic fires to burn themselves out unattended.

There was an outbreak of fire in September, 1943, when a small number of Corsican Pine on the slope of a dune was destroyed.

During the danger periods the area is patrolled as a precautionary measure against fire.

Climate and its Effects.

The nearest Rainfall Station where climatic conditions approximate to those at Curracloe is at Courtown Harbour which is about twenty-five miles to the North. There the average rainfall over the ten years 1935 to 1944 inclusive was 37.64 inches per annum. For the period during which active shoot growth of pines and spruces is apparent each year, the average monthly rainfall recorded at the same station for years 1940 to 1944 inclusive was as follows: March 2.76 inches, April 2.09 inches, May 2.60 inches, June 1.24 inches, July 2.22 inches, August 1.98 inches.

Once the trees are established here there appears to be little danger from lack of moisture as there is nothing in this ground to impede the downward progress of the roots. An example of the depth to which tree roots penetrate in the sand can be seen where the side has been blown out of a partially stabilized dune. On the section of the dune can be seen the roots of Corsican Pine which have penetrated downward as much as 30 feet in search of moisture and nutrients.

Wind force is the most important limiting factor in the production of a good crop here. Shortly after the plantation was laid down severe east winds caused considerable losses by blasting the foliage on the eastern half of the area. Later when the trees came up the Scots Pine and even the *Pinus contorta* over the whole area suffered from blast due to strong gales from S.W. and W. Practically all recovered but there were losses among the Scots Pine.

Frost caused some damage to the needles of the Scots Pine in January, 1940, and some *Pinus radiata* were killed outright at the same time. The Sitka Spruce has occasionally been damaged by late spring frosts but in most cases the growth of the leading shoots was not sufficiently advanced to be susceptible.

III

PRESENT POSITION.

Tree Crop.

Some very good blocks of Maritime Pine and Corsican Pine are now to be seen, especially in sheltered places. Some trees of these species sown or planted in 1931 are now (Autumn, 1945) 20' high with a b.h.q.g. of 4". A big percentage of the Maritime Pine, however, are leaning, curved and heavily branched. The *Pinus radiata* are looking very healthy and seem well able to withstand salt spray and strong gales. On parts of the marshy ground the Sitka Spruce, having penetrated the top layer of peaty soil which was about 8" deep, has struck the pure sand, and, as a result, trees that once seemed promising are now anything but healthy looking. In parts where the layer of peaty soil is thicker, the growth of this species is still vigorous. Mountain Pine made very poor progress and in some cases are only bushes about 2' high. Austrian Pine looks healthy but the growth has been rather slow.

Vegetation and Fixation.

The vegetation on the area at present is by no means a poor one and the dunes, ridges and flat areas abound in many of our well known inland flora as well as many species peculiar to the sea-shore. Dominant among the former in addition to those mentioned earlier are: Yellow Bedstraw (*Galium verum*), Hearts-ease (*Viola tricolor*),

Bird's-foot Trefoil (*Lotus corniculatus*), Rest-harrow (*Ononis arvensis*), Sun Spurge (*Euphorbia paralias*) and Portland Spurge (*Euphorbia portlandica*), members of the family *Orchidaceæ*, and many relatives of the Dandelion and Daisy. Mosses and Lichens are also to be found as well as some Fungi such as Puff-Balls. Conspicuous among the flora of the sea-shore is the Sea Holly (*Eryngium maritimum*).

There has been a big advance in the fixation of the loose sand areas inland since the area was fenced and planted. There is no doubt that the absence of stock and rabbits has been responsible to a great extent for the spread of vegetation. The shelter produced by the tree crop has also had a favourable influence as the commotion of sand produced by the wind is not as great as when the area was bare of trees and exposed to every breeze.

There has not been much improvement in the case of littoral dunes, however. The shapes of these are often changed. Holes are torn in their sides by violent storms. These holes, mostly basin-shaped, are deepened by the sand being whirled around in them by the wind and then as a result of a gust the sand is whisked out and deposited elsewhere.

In 1939 a violent storm caused drifting of a littoral dune which resulted in closing the entrance of a small inlet of the sea, thereby reclaiming some 5 or 6 acres. It cannot be stated, however, that this area is permanently reclaimed as one never knows when, by some vagary of the weather, this dune blocking the entrance will get yet another shift.

Seed Production.

Good crops of seed are at present being borne on Scots Pine, *Pinus contorta*, Maritime Pine and Mountain Pine sown or planted 1931 and 1932. So far no natural regeneration of any species has occurred. Even though the direct sowings of Maritime Pine seed have not been very successful, the fact that the seed is so readily available and that this method of stocking the area is cheap, has resulted in an effort to fill the suitable blanks by sowings of Maritime Pine seed collected and extracted on the spot. The seed is extracted during hot spells in summer, or at other seasons on a sheet of iron over a well-fenced fire. The temperature at the iron is not allowed to rise above 120° F. The cones open fairly easily and the seeds are then shaken out and the wings rubbed off before storing. About 10 lbs. of seed are ready for sowing each season.

IV

FUTURE TREE CROP.

As I have not seen any mature plantation-grown trees on like or nearly like situations, it is not possible for me to forecast with any

certainty the probable yield. The production of good class commercial timber during the first rotation cannot be regarded as a guaranteed success, however.

It is not known if or when the attack of the Pine Shoot Moth will peter out nor is it known which species it may attack next.

It can be expected that as the trees grow taller they will suffer from blast. Scots Pine shows much signs of blast at present and on that account even if it had never been attacked by an insect pest, would not be a good yielder on this area. Damage by wind to the edges of the plantation can be expected. As the plantation is made up of a series of small blocks with rather extensive unplatable areas between, it can be expected that the marginal trees for some depth in these blocks will be blasted. The trees on high dunes may also be expected to suffer. Taking all factors into consideration the safest species now appear to be Maritime Pine, *Pinus radiata*, Austrian Pine, Corsican Pine and *Pinus contorta* in that order.

Apart from the production of commercial timber this plantation will play an important part in the role of protective forest which in itself is sufficient justification for the expense incurred. By the use of the "selection system" at the time of felling (i.e., gradual removal of trees and planting or encouraging natural regeneration in the shelter of standing trees) it should be possible to prevent or greatly minimise wind damage to the succeeding crop.

The plantation will act as a defence against the possible sudden encroachment of sand on the valuable flat sloblands to the west and also shelter them for some depth in from cold east winds.

The plantation already has an æsthetic and ornamental value. It is thus a good example of how forestry operations, by the exclusion of stock and ground game, can greatly increase the number and abundance of objects of interest to the naturalist and others.

To the regular visitor this dune land can be a dreary and depressing place in winter time. With the sky overcast and the clouds threatening, the sea roaring and shades of Sahara in the landscape the effect can be very melancholy.

There is some compensation, however, in the summer time. When the sun is high and the sky is blue there are many sights that can gladden one's heart and arouse one's interest. There can be seen the great number of butterflies that frequent this sandy land. Such beauties of the butterfly world as the Peacock and the Red Admiral can be found here in large numbers as well as many other lovely and decorative ones that are not often seen inland. Some flit energetically about, others flutter laboriously and after a short flight may flop at your feet as you walk along. The green and red Burnet Moths are very numerous here and may be seen in swarms at the time of hatching out, some flying weakly about, others hanging on blades of grass waiting for their wings to dry.

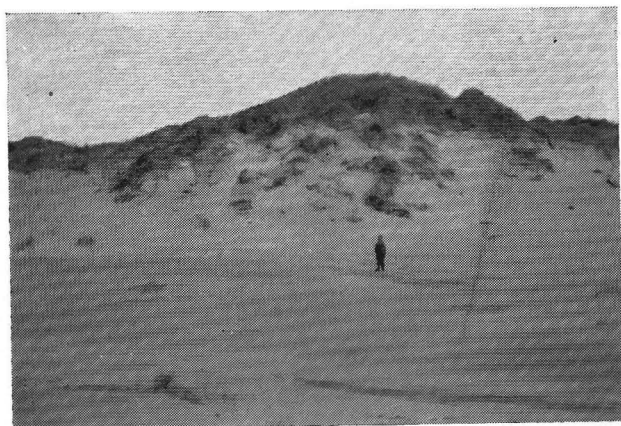


FIG. II



FIG. III



FIG. IV

Slugs and snails are here in great variety (not very attractive these, but interesting, even if some are harmful). In shady places or when the dew is still on the grass some fine specimens of the large black slug can be found. Up to 4" in length, it has a smooth neck and a corrugated back. If you watch it, it may sometimes rear its head high which would indicate that it is not such an humble creature as one might imagine!

Walking along through pockets of loose sand one is struck by the manner in which the sand has been rippled into the most fanciful wave-marks by the wind; or by the beautiful patterns created by the tufts of Marram Grass on the bare sand as they shoot up at regular intervals from the open network of rhizomes to form squares, diamonds and triangles sometimes very perfect in outline.

In general the scenery has improved considerably since the area was planted. Standing on the top of a high dune one is pleased by the picturesque pattern that meets the eye. Here can be seen blocks of young trees as they form canopy and transform this erstwhile semi-desert waste into what one hopes will be productive forest.

The bird population has increased with the growth of the trees and blackbirds and thrushes can often be heard in full song. Finches, sparrows and other small birds are plentiful.

Indeed, if no other purpose were served by the planting but the improvement of the amenities of this stretch of coast, it would, to many, be compensation enough.

NOTES ON FIGURES.

FIGURE I: The numbers 1 to 27 indicate the compartment numbers of the Curracloe plantation.

FIGURE II: Partially stabilised dune, some distance from the shore, looking south-west, compartment 17. Note the cap of marram grass.

FIGURE III: Maritime Pine produced from direct sowing of seed in 1931. Compartment 4. Note cones.

FIGURE IV: In the foreground, unplantable area, under water for part of the year; in the background partially stabilised dune surrounded by pine trees. Looking south, compartment 12.

NOTES ON THE CONSTRUCTION AND HANDLING OF SMALL PORTABLE UNITS FOR FIREWOOD CUTTING

By T. DONOVAN.

Most people know that timber in the round is one of the most troublesome and expensive commodities to move about, and generally speaking every mile further the wood is from a saw mill, the less the timber is worth to the owner till a limit may be reached where the margin of profit may disappear altogether. This applies particularly where the woods are not very extensive or the supply sufficient to make it worth a merchant's while to erect a mill for the conversion of timber in the wood. With a small portable mill, however, fencing posts, firewood and even smaller types of scantlings could be easily manufactured and readily sold. Besides, the value of a particular scantling when sawn may often exceed the price of a tree containing several such pieces of timber. In short, properly constructed portable mills of the smaller type could manufacture a great variety of materials in constant demand by different trades thereby utilizing the smaller and rougher types of timber.

The erection and maintenance of suitable portable mills are not such expensive nor elaborate undertakings as is generally supposed and are within the means of the majority of estate owners. In order to appreciate their importance and advantages, it is necessary to know something of their structure and care; hence the following suggestions which it is hoped may be of some little interest.

The writer's experience has been gained while working with the Forestry Division of the Department of Lands under Mr. Swords—for whose advice and instructions he acknowledges his gratitude.

Of portable mills there are several varieties—from heavy and cumbersome outfits to complete units not exceeding one ton in weight. Comparatively little progress has been made in bringing so important an article as a small mill to something more in accordance with the vast improvements which have taken place in almost every other variety of mechanical contrivance. The following notes are merely a plain record of observations based on experiments recently carried out in the construction and care of small saw units for firewood production. With certain alterations these are capable of manufacturing various types of smaller scantlings, though their primary use is for the manufacture of firewood blocks. They can be transferred from place to place with comparatively little trouble and expense.

Choosing a Site.

Because of the weight and size of these units choosing a site may not seem of any importance, still the following requirements are worthy of consideration :—

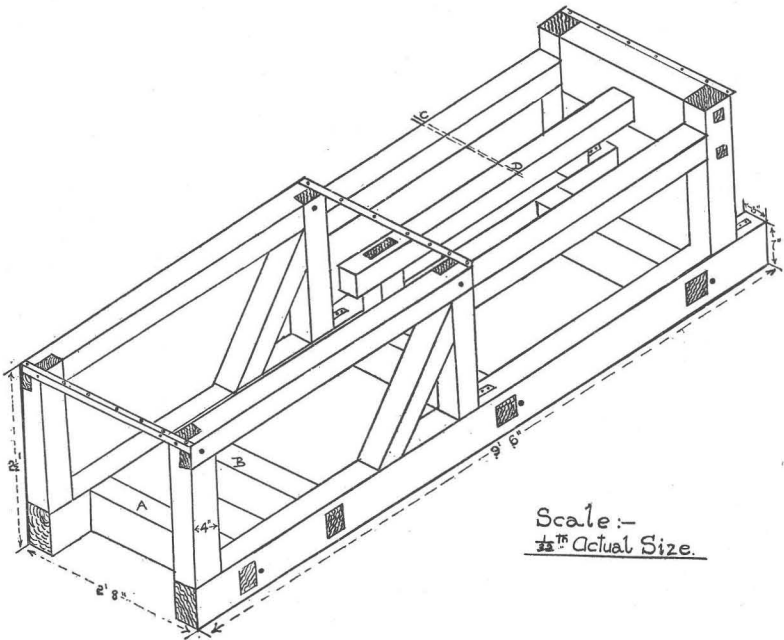
- (1) The unit should be placed as near to the timber as possible, thereby favouring haulage operations.
- (2) For obvious reasons special attention should always be given to ensure that the desired locations are always as near as possible to existing roads, tracks or passages of any kind.
- (3) The actual Mill site must be level and always so placed as to minimise haulage operations against the hill.

Construction of Frame and Unit.

Equipment, to be serviceable, should be properly balanced for the work and to comply with the three main factors governing construction, i.e., the size, weight and power of the unit.

The accompanying plan is intended to illustrate a type of frame considered suitable for a small firewood unit, though, where it

—PLAN SHOWING FRAME OF SMALL PORTABLE UNIT—



is desirable to have one capable of sawing small scantlings, stakes, etc., a frame of similar design has given excellent results—the width in this case being reduced to 2 feet and the length increased from 16-20 feet to allow for the erection of the necessary Rollers and Bench. In principle, however, the two are almost identical, performing the same work in pretty much the same manner; the requisite power being also very nearly the same. The essential point is to ensure that any particular type of frame should be designed so as to provide a suitable foundation for the engine and saw bench. It should be so constructed as to have the necessary stability with the minimum amount of weight and to meet these requirements scantlings of the sizes illustrated—see plan—have been found most suitable. These are further strengthened by the addition of three or four half inch round iron crossbars threaded at the ends and fitted to the sides of the frame. The 4" by 3" uprights are more firmly secured when bolted to the frame by ordinary 3" iron brackets as shown on plan and ordinary 1½" angle iron will be found most useful for securing the engine cover and table to the frame. The type of timber generally used in construction is good, well seasoned Scots Pine, except for the table, for which clean Elm, Beech or Sycamore is recommended. To afford the necessary protection against wear and tear of these wooden tables the application of 1½" angle iron fitted to their outer edges has given excellent results and tables so fitted have given as good if not better results than the more expensive and heavier type of metal table. A pair of rubber shod wheels 14" to 18" diameter fitted with roller bearings and mounted on an axle 1½" square will greatly facilitate the transport of the unit from one location to another with the least possible delay.

The Engine.

When choosing an engine consideration should be given to three main points—namely, size, weight and power. It must be a handy convenient size and capable of being fitted to the standard type of frame—suitable engines are usually permanently secured to units and are bolted in the positions A-B on the accompanying plan. Engines should be capable of developing from 6-9 H.P. and have a speed from 800 to 1,500 R.P.M. The engine itself should be protected as far as possible from dust and when idle should not be exposed to the weather. To afford such protection sides and ends constructed of 3/8ths or half inch boards can easily be fitted to the frame by means of bolts or clips and if desired can readily be removed when the unit is working.

Spindle Bearings.

The type of Spindle generally used is 1½"-2" diameter fitted with roller bearings. The positions of the plummer blocks are indicated B-C on accompanying plan from which it may be seen that the

positions of the driving pulley and belt are centred within the frame, thereby affording additional security against accidents. The driving belt recommended should not be more than 4 ply and 4" in width and on no account should it be unduly tight. When fast and loose pulleys are used they should be so arranged that the belt is nearest the engine when working on the fast pulley and a similar arrangement should apply in the case of benches. Local circumstances will often decide on the size of circular saw to be used, though generally an ordinary gauge saw of from 36"-42" will be found most suitable.

Fitting of Circular Saws.

No difficulty is experienced in fitting a saw except for the "packing" and unless this operation is skilfully carried out the saw will not work satisfactorily no matter how carefully it has been sharpened and set. All circular saws—unless designed for some special purpose—require "packing" on both sides of the saw, sometimes extending from the base of the gullets of the teeth right up to the collars of the spindle. In the case of cross-cut saws less packing is required. The primary object of packing a saw is to supply the necessary support to prevent "wobble" and to maintain the correct "tension."

Different types of material are used for packing, the most generally used being (1) felt sewn together to the required thickness; (2) solid leather pared down to the proper fit; or (3) square gland packing.

Saws: Setting and Sharpening.

Good saw performance is a necessity if production is to be economical, so a few notes on the subject may not be out of place here.

There is no worse economy than neglect of and indifference to the proper "sharpening" and "setting" of an ordinary circular saw. Simple matters as these may seem, still they require great experience and skill besides careful and constant attention. Setting is the method by which the teeth are adjusted so that the necessary clearance is given to the body of the saw in its passage through the timber. Without proper clearance the timber will close or tighten on the saw thereby generating heat and eventually causing the saw to buckle. A well-sharpened saw is useless unless it is properly set; therefore it will be seen that "setting" is equally as important as "sharpening."

The amount of set which it is necessary to put on the teeth will depend to a good extent on the nature of the timber being sawn. Hard woods do not require as much set as soft woods—set is acquired by springing the points of the teeth with a saw set, but it is most important that only the extreme points of the teeth should be "sprung." In setting the teeth it must also be remembered that

every tooth is only pulled over to an equal amount because an evenly set saw will work with less set than one in which a few teeth have excessive set and the others too little or none.

Sharpening.

The main factor governing sharpening depends on whether the saw is to be used for "cross-cutting" or "ripping" as the function of the rip-saw is of a totally different nature from that of the cross-cut type. The rip-saw cuts its way longitudinally through the wood, whereas the cross-cut saw, cutting across the "grain," has to sever the fibres through which it passes or, in other words, scrape its way through the cut in the timber. Thus the teeth of a cross-cut saw instead of having a forward "hook" or "rake" have none at all, and the points of the teeth have a sharper angle than those of the rip-saw. The best results can only be got from any saw when all the teeth have an equal share in the work of cutting; therefore it is of major importance that the tips of the teeth of all saws should form a perfect circle and no tooth should project beyond the circle. It is therefore, always advisable—and necessary—to have saws properly "stoned" down before removal from the Bench for setting and sharpening.

Proper mill files should always be used and attempts at sharpening the teeth by filing their tops instead of their fronts is not recommended, as such a practice rapidly reduces the saw diameter and it is always the front edges of the teeth that get most of the work.

Cutting of Firewood Blocks.

With most logs a certain amount of preliminary work is necessary preparatory to the actual cross-cutting into blocks. Generally speaking it is always well to have the logs cut into handy convenient lengths of from four to eight feet—depending on their size and weight—and properly stacked adjacent to the unit. Such preparation will afford easier and quicker handling of the material to be sawn thereby reducing much unnecessary waste of time and labour. Long ungainly length of logs carelessly stacked and strewn about in the immediate vicinity of the unit are sometimes the cause of serious accidents and attempts to have such lengths manufactured directly will only result in excessive wear and tear of the unit.

With units of the types described, it is always necessary to have the heavier logs reduced by splitting, though the extent of this operation depends entirely on the size of the saw and the power of the unit.

Abstract

On the Structure, Ripening and Germination of the Fruit of the Birch. By Elias Mork.

From *Meddelelser fra det Norske Skogforsoksvesen* No. 30, Vol. VIII, Part 4. 1944.

Any fresh information concerning the character and behaviour of any of our native tree species is bound to be of interest. The following is a translation of the author's summary of research work into the structure, ripening and germination of Birch seed, carried out by him in Norway recently as part of the work of the Norwegian Forest Research Station.

1. What we foresters call Birch seed is a nut-fruit (or achene) which has a thin pericarp which is, however, very impervious to water. This consists of three cell layers. These cells are impregnated with fatty substances. On the outside of the achene casing there is, moreover, a cuticle which makes it extremely difficult for water to penetrate into the seed.

2. Air-dry Birch seeds can remain floating on water for several months. If the temperature of the water is sufficiently high (about 30° C.) the seed germinates quite normally as it lies on the surface of the water. Under such conditions the best germination results are obtained.

3. The investigation into time of ripening and temperature of ripening has shown that Birch seed in the lowlands in the south of Norway requires at least 300 growth-units in order to become ripe. Time of ripening is reckoned from the date of flowering. (The term "growth-unit" refers to an index of growth conditions devised by the author, which is based on the height-increment of Norway Spruce and the mean temperature of the 6 warmest hours of the day).

4. The catkins do not begin to fall off before a warmth effect of about 400 growth units has been obtained.

5. Well ripened Birch seed retains its germinative capacity when stored much better than poorly ripened seed. It can retain its germinative capacity much longer under unfavourable germination conditions than unripened seed. As the seedlings which are produced from well-ripened seed are moreover stronger, the plant per cent. is also higher. It is thus important that one should not gather Birch seed too early in the autumn.

6. In an extra warm summer the seed of lowland Birch may be very well ripened in the course of 2 months, in a moderately warm summer at least $2\frac{1}{2}$ months are required and in a relatively cold summer at least $3\frac{1}{2}$ months before the seed ripens.

7. A varying temperature during germination helps to bring about a higher germination per cent. than a constant one. This applies to both well and poorly ripened lowland seed.

8. The highest germination per cent. with well-ripened lowland seed is got with a varying temperature with a maximum temperature of 30-35° C.

9. At a constant temperature of 40° C. there is no germination. On the other hand well-ripened seed germinates very satisfactorily at a temperature varied from 17 to 40° C. Un-ripened seed seems to be more sensitive to such high temperatures.

10. The germination minimum for well-ripened lowland seed lies at about 20° C., but it is a very small percentage of the seed which can germinate at that temperature. At 25° C. about half of the viable seed germinates.

11. The minimum temperature for germination seems to lie about 5° C. lower for poorly ripened lowland seed.

12. For Birch seed from alpine forests a constant germination temperature seems to be unfavourable for the whole range of temperatures dealt with.

13. The minimum temperature for germination is the same as for well-ripened lowland seed, since germination first begins at 20° C.

14. The optimum temperature seems to be a little higher than for well-ripened lowland seed, since one finds a definite optimum at 17-35° C.

15. The range of optimum is more restricted than for lowland seed since half of the viable seed germinate within a temperature range of 17 to 30° C.

16. If Birch seed which spends the winter outside in the soil covering made as great demands in respect of germination temperature as air-dried and stored seed then it would very seldom be possible to get natural regeneration of Birch in our alpine forests, because the soil temperature is not high enough for the germination of the seeds. According to Helms and Jorgensen (1925), however, the seeds of our Birch species after spending the winter in the soil undergo changes such that they can germinate at lower temperatures than air-dried and stored seeds.

17. The reason why the Birch in the alpine forests usually reproduces itself vegetatively cannot be due to the poor ripening conditions for seed because in alpine forests well-ripened seeds can be found even in years in which the summer temperature lies 0.5° C. below normal.

18. Seeding plots in the form of 40 meter-wide strips from which are removed all bushes, which intercept much of the sunlight and rain reaching the soil, combined with burning, is the surest method of securing natural regeneration of Birch in alpine forests. The soil is warmed up more readily under such treatment and the Birch plants can germinate and develop earlier in the spring while the

moisture in the soil is relatively high. Such strips must be fenced against stock.

19. As the fruit of the Birch is a nutlet in which the seed itself lies well protected in a pericarp through which water penetrates with difficulty, in the nursery it is thus most natural to sow the seed in the autumn. In that way the seed should experience the best conditions for making use of the spring moisture.

20. Good results can also be obtained after spring sowing. The seedbed in that case should be watered so well before the seed is sown that the soil is completely saturated with water.

21. It can be presumed as a result of laboratory investigations that the best results are obtained when one sows under glass (cold frames or boxes covered with glass). In that way high air humidity and high temperatures are obtained. Under such conditions no covering of the seeds themselves is necessary.

22. If the seed is covered with sand or ashes, the covering layer must not be more than one millimeter.

23. The germination percentage of Birch seed seems to vary to some extent with the season of the year in such a way that it becomes somewhat higher in the spring. Germination goes on moreover a little more quickly at that time of the year (*cf. Schmidt, 1929*). The great variations with the season of the year which have at times been obtained in investigations made by the State Seed Control must to a considerable extent be due to the fact that the germination temperature during autumn and winter has been somewhat too low.

24. In germination tests of Birch seed, therefore, one should have a somewhat higher temperature than that which seems to be best suited for our cereal and forage plants.

M. L. ANDERSON.

Reviews

Forests and Forestry in Great Britain. W. L. Taylor, C.B.E. Crosby Lockwood & Son, Ltd., London. 12/6.

This is a handy little volume of 167 pages with twenty well chosen photographic illustrations. In his preface the author states that he has endeavoured to steer a middle course between the Scylla of generalisation and the Charybdis of technicality. The

decision was wise, as it would be impossible to compress a purely technical work within such a narrow compass, and we are presented with a book which will be regarded as light reading by the professional forester but ought to prove of absorbing interest to the general reader who may be desirous of acquiring some knowledge of silviculture.

In his fifteen chapters the author has covered a very wide field ranging from the incidence of surface vegetation after the Great Ice Age of some ten thousand years ago to the impact of two world wars upon British woodlands and his final chapter is devoted to a discussion of the possibility of a world timber famine.

To deal with each chapter in detail would require a review almost as long as the book itself and discussion must be confined to the major issues he raises and how far they are applicable over here. In his third chapter he commences with two definitions which deserve quotation *in extenso*.

“Forestry is the art of growing rotational crops of timber trees in forests and woods. Forests are tracts of land devoted to the growth of trees, and the clearest definition of a forest is that it is a very big wood, or a series of large woods, cultivated and managed for the production of timber, bark, resin, seeds, and all other items of minor produce we derive from forest trees.”

The main proportion of the woodlands in both Great Britain and Ireland are in the hands of private owners who almost invariably planted for amenity and sporting purposes. Great as the contribution has been from these woods to the timber reserves of both nations it would have been immeasurably greater had they been subjected to silvicultural management during the course of their lives. In his definition of a forest the author rightly emphasises the necessity of size. The forester must have elbow room if his working plans and felling cycles are to be designed to operate with maximum efficiency and in most cases the privately owned woodlands did not permit of this. Later he condemns in no uncertain terms the spendthrift policy of withdrawing from the woods a quantity of timber greater than the current increment. In forestry, as in any other business undertaking, continual encroachment upon capital eventually leads to bankruptcy.

In his fourth chapter dealing with land for new forests he has treated the subject briefly and effectively but could have said a great deal more. From his long experience with the Forestry Commissioners he could have quoted instances of dismal failures incurred by attempting to establish plantations on unsuitable sites. In fact he could have been very positive in stating definitely what types of land should not be accepted for forest purposes and this is about the only criticism that can be made about an otherwise excellent book. He is on very sure ground, and every experienced

forester will agree with him, when he states that exposure to wind is the dominant factor in assessing the possibility of land for afforestation. In Ireland this factor is even more potent than in Great Britain, where there is much more land shelter than here and where they are further removed from the prevailing wind. Mr. Taylor refers to the 1,500 feet contour as the plantable limit but except in such favourable situations as the Wicklow massif the Irish forester has to think in terms of 1,000 feet and even this progressively diminishes the further the land lies to the west.

Chapter 12 deals with fire and gives useful advice as to the precautions against its occurrence and measures to be taken to cope with an outbreak. It deserves serious attention from both public and foresters alike.

Elsewhere in his book the author dips lightly into Forest economics and on page 158 states that Forestry in Great Britain could be conducted on a basis of an expected yield of between 3 % and 3½ % per annum. It is difficult to reconcile these figures even with a much higher yield than the 40 cubic feet per acre per annum upon which they were based.

The final chapter deals with the prospect of a world timber famine. It does not attempt to supply an answer but it does enunciate two inescapable truths. One is that the timber producing nations will need to ensure that their annual cut does not exceed the annual increment and the other is that timber-consuming nations should take prompt steps to establish forest reserves within their own territories.

"National Parks for Eire." Sir Shane Leslie : *Studies*, September, 1945.

The use of forests for recreation is nothing new. The existence of many forests and indeed, organised forestry in Europe to-day is due in no small measure to the value placed on the outdoor sports of hunting and shooting. The sporting value of woods and forests at one time was reckoned to exceed all other benefits derived from them. The enjoyment of the out-of-doors was, however, the right of a privileged class. History is full of the struggle between noble and serf to assert their respective claims to their rights of enjoyment of the amenities of the forest. The forestry profession has grown up in the midst of this struggle. In many countries the original forester was a glorified game-keeper, water-bailiff and wood-ranger combined. His main concern was to prevent "the common people" from exercising their so-called rights to fuel, to game and to fodder for stock and it is only natural to find this "policing" sense more highly developed in countries with an old tradition of royal forest and where the pressure of right-holders and trespassers has been

severe. In the state forests of western and central Europe the forester is as much a policeman as anything else but the people, through long training have become sufficiently disciplined to be allowed free enjoyment of the forest just as we can enjoy the freedom of the open road. The forester in Britain and this country does not like to act the role of policeman and places his trust more in fences and trespass notices. It is, therefore, not surprising that Sir Shane Leslie's campaign for National Parks in Eire should arouse, not enthusiasm, but distrust among Irish foresters. The publication of his article on "National Parks for Eire" caused the first fluttering in the dovescotes. Here was a new danger to Forestry, whole regions containing much likely and coveted forest land to be thrown into protective custody for the benefit of week-enders with pockets full of matches and an inordinate desire for throwing cigarette ends into the driest tufts of bracken, furze or heather!

It is doubtful if the idea of National Parks will ever receive the whole-hearted support of the forester or farmer. Can the forester or the farmer be expected to throw open his woods or fields to an undisciplined horde or turn guide and host on Sundays and Bank Holidays when he feels that these very guests will leave behind them a trail of destruction, broken fences, trodden crops, unsightly and dangerous litter and—worst of all—smouldering embers of picnic fires to say nothing of deliberate incendiarism? The farmer and forester are, however, acting ostrich-like if they expect to stem the ever-growing desire of city folk for the out-of-doors. The appeal of the green fields and woods, the high hill and the waterside, is well-nigh universal and so deep-seated and strong as to be almost irresistible. After all the forester chooses his profession not because it is a lucrative one—it is far from that—but because it brings him the many satisfactions of the out-of-doors. The people will come to the country in ever-increasing numbers and the question of handling this "problem" will have to be faced, the sooner the better.

A closer study of the problem would suggest that the forester and the farmer are in many ways responsible for the ill reputation of the city hiker or vacationist. There are rules in the country just as in the city but the city authorities find it pays to put up signs and lights to tell one when to go and where to cross over. The farmer and forester put up signs too—but never "the Green light" to tell us where to go and what to do, always the "red" one. How the city person, unused to the out-of-doors, wishing to get away from the din and dust of motor cars would welcome notices and trails inviting him along, showing him pleasant vistas, sudden thrills like "lover's leaps," waterfalls and expanses of water or well farmed country. The city vacationist likes to know where he is going and likes to have the going easy. Rough forest rides and dense plantations offer no attractions, but winding, easy paths through tall timber, by running water, or along a mountain ridge will give him all he wants.

No one likes to climb fences if there is a stile handy, no one likes to start trouble when on pleasure bent.

Sir Shane Leslie opened the discussion on the subject in his articles in *Studies*, he carried it a stage further at the Annual General Meeting of the Society of Irish Foresters, but many came away from that meeting with the feeling that the idea was not fully explained and that the official attitude as expounded by Dr. Anderson and Mr. Nally was very sound, regrettably so, because the idea of bringing "the regions of our forest landscape into full public service, preserved in their natural beauty and kept or made accessible for open air recreation and public enjoyment and particularly for cross country walking" appeals to everyone who has savoured the beauties of this land.

Is it necessary to do anything spectacular to make, say, County Wicklow a national park? Do we require a great steel fence with gates at places in the Glen of the Downs or at the Scalp at which we can read the list of park regulations or be instructed in park etiquette by the uniformed state park ranger? I'm afraid some people got that impression from the reading of Sir Shane's article and the discussion at the Society's Annual General Meeting. Wicklow, and for that matter, all rural Ireland is open to the hiker. One could travel from the outskirts of Dublin city to Wexford without setting foot on a motor road if one knew the heather tracks and bohereens. Could we not open up those trails and tell more people about them? Could we not arrange to make beautiful paths or keep existing ones along the stream side or through old woodlands and tell the tourist and hiker about them as we do about the Devil's Glen and Powerscourt waterfall? We need never lead them through young plantations and only open such areas when the fire risk is small and the æsthetic value great. In fact the æsthetic value of a thicket of conifers is nil and few will leave the open road or heather track for the boulder-strewn woodland ride.

Nor is there sufficient justification for the contention that the opening up of State forests for recreational purposes is incompatible with good forestry. In Germany, and this no doubt applies to many European countries, one could hike for hundreds of miles through pleasant woods, along well-marked trails and yet these forests are all models of good silviculture and management. Admittedly the area of young woods under "normal" forest conditions is relatively small. We here are passing through a stage when all woods are young woods and no place for the trespasser. This condition of affairs is passing and with time, many forest areas may be "visited" without causing undue alarm to the forester.

It is possible then to have all the benefits of National Parks in Ireland without undue expense. Some organisation is necessary, however, and areas designated as National Parks would need special planning and be the special care of some body or association.

In Ireland the forest area though relatively small still, encloses much wild and beautiful country and any development of the National Park idea will involve the tree planter. At first glance the State Forestry Department would appear to be in the best position to supervise and manage the area designated a National Park, but on further consideration so many interests are involved that only a special association or development board could hope to handle the thing properly. There is the question of hotel sites, camping sites, sanitation, transportation services, and new roads and trails. The forester might consent to supervise camping sites or to co-operate as far as his woods were concerned but further than that forestry or foresters have no claim in Ireland to dictate whether National Parks are feasible or desirable but it would be unwise not to co-operate if the idea takes hold.

The idea is good but can only be made a reality by hard work, sound planning and some sacrifice on the part of all concerned, land owner and holiday maker alike. The development of National Parks would serve to bring our people into closer touch with the task of forestry and it would amply repay both the forester and the State to encourage this idea in every way.

The Thinning of Plantations. British Forestry Commission, Forest Operations Series, No. 1. London. His Majesty's Stationery Office. 1945. 40 pp., 9d.

This booklet is the first of what promises to be a series intended to deal with different silvicultural operations. It is stated in the introduction that it is concerned with Improvement Thinnings, but it does not say what that term covers. It is based for the most part on Forestry Commission experience.

The pamphlet is in three parts with an introduction. The first part is concerned with general considerations; the second deals with the treatment of individual species and the third with the handling of mixtures. The last two parts are over-ambitious in their scope as it seems clear that the somewhat limited experience of the Forestry Commission, so far, cannot be so extensive as to be competent to deal equally authoritatively with all the species and mixtures mentioned.

The proper technique of thinning plantations cannot be said to have become rigidly determined and certainly not in respect of the many exotic species and unusual and abnormal mixtures which have been artificially planted in these islands and it will be many decades before such a technique can be laid down with confidence. The writing of a practical treatise at this stage on such a subject is,

therefore, by no means easy. There is a good deal of inconsistency in the advice given, which should be accepted with great caution and reserve. With some of the more general observations on the value of and need for systematic thinning and with some of the general principles stated there will be little disagreement, but many of the detailed recommendations on the treatment of the various species and mixtures cannot be accepted as entirely sound.

The truth is that each plantation must be handled with reference to all the circumstances holding at the time when treatment is desired and that no text-book can possibly cover every case. It will be a long time before a machine is devised to take the place of the human intelligence in such matters.

The book has a number of rather serious defects. The most important of these is the complete failure to handle the extremely important practical types of thinning known as "crown thinnings." These are dealt with in three lines and in these we are referred to certain unnamed text-books.

Another fault is the tendency to stress the necessity for securing an even distribution of stems over the area, supported with tables giving average spacings and average numbers per acre for various heights. It is wrong in the first place to try to space stems and it is very questionable whether it is, in the long run, desirable to have any plantation at any stage with stems evenly distributed. A thinning deliberately aimed at introducing irregularity of stocking and height is sometimes of especial value in handling neglected stands.

Too much use is made of the terms "wolves" and "whips." They are frequent in badly managed plantations but in well-managed woods after one or two thinnings they should be very rare indeed.

It is not made clear, if it is admitted at all, that the strength of any thinning is gauged by the proportion of the canopy removed or by the proportion of the basal area removed. The definitions of light, moderate and heavy thinnings are very loose, in consequence. For the same reason the particular recommendations made remain obscure. For normal stands of all species, excepting pines, our experience is that early thinnings should be heavy in the true sense, and that later thinnings, until the regeneration stage is reached, become lighter. On the other hand the writer of this booklet in most cases recommends beginning with a light thinning and following on with moderate or heavy thinnings. The procedure outlined for the shade-bearing conifers, for Sycamore and for mixtures of Oak with coniferous nurses does not accord with our experience.

English silvicultural nomenclature includes a number of unfortunate weaknesses. We are introduced to a new technical term which scarcely seems necessary, namely "rack." This over-worked word has already seven different dictionary meanings, not one of which agrees with that which it receives here, unless it be the last,

which reads "the neck and spine of a fore-quarter of veal or mutton." The words "lane" or "alley" would seem to be more appropriate, preferably the former as the latter has application in the nursery. Moreover, the term "brash" should surely not include the operation of pruning off lower branches with saws since the real meaning of the word is to break into pieces, which correctly describes the process of breaking off dead and brittle branches from such a species as Larch—a rather different operation but with the same object in view.

On the whole, therefore, we find this production disappointing and somewhat amateurish. It would be improved by much pruning so that the subject matter is reduced to consist mainly of general observations, supplemented by particular reference to a few species only, the experience in handling which would warrant authoritative statements in respect of thinning technique being published.

Although the booklet cannot be classed as a valuable addition to silviculture literature, its price should not deter anyone from obtaining and perusing it with discrimination.

"Balsam in the Forest." E. MONGEY. *Irish Medical Journal*, September, 1945.

Because forestry in this country is the pursuit of a very small minority, the general public has very little contact with the details of the work. Although the farmer is quite prepared for an apparent city man who can discuss the merits of crop rotations and grass seed mixtures, the forester is quite taken aback when he meets someone "outside the ranks" who can discuss, say, the silviculture of the Scots Pine-Larch mixture. In fact, the public, while on the whole favouring a rapid expansion of our forest area, are unashamedly vague as regards the technical and practical aspects of the work. Hence the professional forester is unusually appreciative of the outsider's interest—although he retains a tendency born of experience to discount his suggestions and to become didactic.

Which brings us to the point. In Dr. Mongey's short article, we must wholeheartedly welcome his enthusiasm for forestry and his efforts to arouse a similar enthusiasm both in his own district of Castlebar and among his professional colleagues. It is unfortunate that he would appear to show a tendency to facile and dangerous generalisation against which his scientific training should have been proof. In addition his knowledge of forestry abroad appears wider than his knowledge of progress at home.

We are told of the laborious re-afforestation of French mountains and "sandy wastes"; of the financial returns from German and Swiss municipal forests; of the reduction of the forest area of the U.S.A. The references to what has been done here are sufficiently brief to be quoted in full: "So far there has been no

concerted effort to utilise our three or four million acres suitable for forest land, and now deteriorating to the point of exhaustion."

"The State will have to provide a corps of experts to act as instructors and advisers and to provide the seedlings from their nurseries. It can also take over large sparsely-populated areas such as Erris, Connemara, Burren, etc., to make National Forests, as well as providing demonstration forests in every county." (There is already at least one State forest in every county except Meath—how these differ from "demonstration forests" is not clear). Further on we are told: "A State grant is available to any land-owner planting forest trees. This grant more than pays the cost of seedlings, fertilisers and planting, but sufficient interest has not been aroused to induce farmers to take a long term view." We leave comment on this excerpt to the private planter. The quotations are sufficient to betray an extraordinary haziness regarding our forest position which vitiates the whole article.

To come to the questionable generalisations. The statement that the crop is fit for felling at 20-30 years does not accord with practice or economics. These ultra-short rotations reduce the quality of the produce and the Mean Annual Increment of the site unnecessarily, as well as involving frequent and equally unnecessary repetition of heavy establishment costs. Again "Disease during growth will likely be easily controlled by the new insecticides such as D.D.T." Such optimistic views are not shared by forest pathologists as reference to Mr. Quirke's article in this *Journal* will indicate.

"A forest area of 30 % of the land surface is considered necessary for climatic reasons." The best opinion is that forest will have a negligible effect on our insular climate.

"It is estimated that about half the area of our maritime counties should be under forest." We are altogether unable to understand this calculation. Could it possibly be a resurrection of that hoary chestnut of planting a shelterbelt around Ireland as if it were a mere "haggard"?

This article, typical of much popular literature on Irish forestry should give members of our Society food for thought. Have we foresters been remiss in the matter of propaganda? What is to be our attitude to the public? Is it to be "Provide the money, ask no questions, leave forestry to the forester" or are we to take the public into our confidence, provide it with full and up-to-date information on our position and encourage an interest in our technical problems? Our Society can help by enlarging its associate membership and thus fostering an intelligent public opinion but, in the last analysis, we must look to the State to provide in attractive and easily-digested form, the fullest possible statistical information concerning both state and private woodland, our timber capital, and current trends and policy.

OBITUARY

ALISDAIR GRANT.

26th March, 1896—25th September, 1945.

In the last issue of the *Journal* there was a brief notice of the untimely death of Mr. Alisdair Grant, who, although never a member of our Society, would without doubt have been an active member if he had remained with us. It seems fitting, therefore, that some tribute, however small, should be paid to his memory, the more so as he was well known to many of our members.

Mr. Grant was trained at the Forestry Commission's School at Beaufort, Inverness-shire, Scotland, from 1923 to 1925. He had some previous experience of forestry work on the Lovat estates. After completion of his training he was employed as foreman and later as forester with the Forestry Commission and as forester in charge of Benmore Forest in Argyllshire, he had much to do with the supervision of the practical work of trainees at the Benmore Forest School.

When the Department of Lands was looking for a competent person to take over the task of instructor at the re-opened Forestry School at Avondale, Mr. Grant's experience told and he was appointed to that post in August, 1936. He filled this appointment with every satisfaction until October, 1940, when he was transferred to Galway to take over District VI as its District Officer. He left the service to return to Great Britain in August, 1942, but he was dogged by ill-health and misfortune from then on to his death in September, 1945.

Mr. Grant was of a pleasant disposition and likeable character, which made him popular, not only with his subordinates but with all he came in contact with. He was quiet and somewhat reserved but took a keen interest in his work and was eminently suited for the position of instructor, which he held at a difficult time. He was a lively correspondent and his letters were couched in a cheerful strain right up to the last. It was with reluctance on his part and with sincere regret on the part of his colleagues and many friends that he decided to leave the service here and return to Scotland. He could scarcely have foreseen how short would be the time he would be spared to carry on.

The many foresters in the State service, who were so fortunate as to be trained under him, will be the first to acknowledge the benefit which they derived from his instruction and the debt they owe him.

T. A. O'CONNELL.

18th December, 1885—17th January, 1946.

The late Mr. O'Connell entered the Civil Service in 1912, after serving his time as a Civil Engineer with the firm of P. H. McCarthy

& Co. He began and finished his official career in the Forestry Division, and, except for a short period during the first world war, when he was engaged on the compulsory tillage campaign, his whole service was spent in that Division.

At the time when Mr. O'Connell entered the Forestry Service, it was still in its infancy and held a modest total of about 7,000 acres of land, had a headquarters staff of six, and employed nine foresters or foremen. During his career in his capacity of Surveying and Mapping Clerk, he supervised the mapping of more than 170,000 acres which have been acquired since then and saw the Service grow to include 149 foresters and foremen and a Headquarters Staff of 73.

Of Mr. O'Connell's abilities no one who came into official contact with him could have any doubts, but it is chiefly for his personal and human qualities that he will be remembered by his colleagues in all branches of the Public Service, and his extraordinarily wide circle of friends and acquaintances in other walks of life. In his younger days, he was an amateur footballer of some note and a member of Bohemians A.F.C., but his interests in sport covered many other branches and, until his health failed completely, he took a keen interest in football under all three codes, swimming, cricket, etc.

Nobody ever appealed to Mr. O'Connell's charity in vain and no difficulty was ever too great for him to tackle if it was to oblige a friend, or the friend of a friend. Of a sunny and hospitable disposition, and with a keen sense of the ridiculous, he was at his best when relating to a small gathering of friends one of his endless store of humorous memories of persons and things.

"Tony," as he was affectionately known to all and sundry, is survived by his wife and four daughters, to whom the sympathy of the Society is hereby extended.

GEORGE FARRELL.

1876-1945.

We regret to announce the death on 26th December, 1945, of Mr. George Farrell, forester to Lord Dunraven at Adare for 40 years. He was aged 69 years and had the distinction of being one of the first six foresters trained at Avondale.

His skill as a practical forester is reflected in the many fine woods at Adare. He also took a keen interest in Willow growing and supplied material for the basket-making industry which flourished there until interrupted by war conditions.

Last year he visited Avondale to take a last fond look at the trees he planted when a student and he expressed astonishment at the height of the *Abies grandis*, Douglas Firs, and many other species there. R.I.P.

Annual General Meeting, 1946

The fourth Annual General Meeting of the Society was held in the Engineers' Hall, Dawson Street, Dublin, on Tuesday, 29th January, 1946, at 7.45 p.m. In spite of a heavy downpour about 40 members attended. At the suggestion of the President, Mr. FitzPatrick, who was in the chair, the minutes of the previous Annual General Meeting, which had appeared in the *Journal*, were taken as read and were signed.

The report of the Council for the year ended 31st December, 1945, was then read by the Secretary.

COUNCIL'S REPORT FOR 1945.

Council Meetings.

Five meetings were held, four in Dublin and one in Aughrim during the Excursion. Out of a total of 13 members, 11 attended the first meeting, 10 the second and the third, and 8 the fourth and the fifth. Considering that many of the members who live in the country have to spend a night from home in order to attend, the numbers who came to meetings must be regarded as satisfactory.

Membership.

24 new members were elected, 2 Technical and 22 Associate. This substantial increase in our Associate membership is particularly gratifying and shows that the aims of the Society are receiving support among the tree-loving public. Membership now stands at a total of 185—39 Grade I, 78 Grade II and 68 Associate.

There are still many foresters who have not become technical members and it is hoped that a number may join during the coming year. Members are asked to obtain as many new members as possible, so that the Society may become in time fully representative of all foresters and forestry-minded people in Ireland.

Subscriptions continue to come in slowly and members in arrears are asked to forward the amount due at the earliest moment. Subscriptions are due on the 1st January and those for this year should now be paid.

Finance.

Members have received a copy of the audited abstract of accounts. It will be seen that income amounted to £121 9s. 2d. and expenditure to £103 14s. 9d. Taking into account the credit balance from 1944, balance in hands on the 31st December was £90 12s. 11d., an increase of £17 14s. 5d.

Journal.

Two issues of *Irish Forestry* were published, one in May and one in October, amounting together to 86 pages. These followed the lines of the 1943 and 1944 numbers. The design of the cover was changed, but the Council have not yet made a choice of a permanent design. They propose in the coming year to have a cover embodying a crest which might be suitable as the official crest of the Society and plans are being considered. It was decided to reduce the price to non-members from 5/- to 3/- in order to encourage sales.

It is hoped to bring out two issues this year and, if supplies of paper can be obtained, to have each number larger and in larger print. Some original articles and other material are already available and members wishing to have contributions published are asked to send them to the Editor at an early date.

Excursion.

An Excursion, to which 36 members came, was held in Aughrim in June. A full report is in the last *Irish Forestry* and there is nothing to add except that all who attended spent a profitable and pleasant three days in the State Forests and privately owned woods of the neighbourhood. A Meeting of the Society was held in the evening of the second day to hear a paper read by Mr. F. McMahon on "The Sitka Spruce in Irish Forestry" in which he dealt with the many attributes of that well nigh ubiquitous species in our country. This paper is published in the October issue of the *Journal*.

Library.

Following a suggestion made by a member at the last Annual General Meeting, the Council got in touch with the Central Students' Library and were fortunate in coming to an arrangement to have the resources of that library put at the disposal of the Society. As members have already been informed, books on forestry and allied subjects, if available, may be obtained from the Central Students' Library on application by our Secretary. Since the inception of the scheme a few months ago 44 books have been requested. It is hoped during the coming year to prepare a list of books on various branches of forestry, which are readily obtainable, and to circularize it to members.

The Council wish to express their appreciation to the Carnegie Trust and to the library authorities for the facilities granted.

Register of Notable Trees.

The project initiated last year to record in permanent form all the remarkable trees of Ireland has advanced a stage. The Committee have had printed a set of forms on which a full description with dimensions and other particulars of importance of every notable tree will be entered. These forms have been placed among

the Society's permanent records and the Council look to the co-operation of members in the location of trees sufficiently remarkable to warrant inclusion.

On the motion of Mr. T. McCarthy (Athy), seconded by Mr. D. A. Quirke, the report was unanimously adopted.

ABSTRACT OF ACCOUNTS.

The Abstract of Accounts (published elsewhere) was next considered, its adoption being proposed by Mr. J. J. Maher and seconded by Mr. Eoin O'Mahony who made an appeal for the institution of life membership subscriptions. He thought the annual annoyance of sending in a cheque might deter some people from joining. The Abstract was agreed to and the meeting proceeded to the next item, the President's Address.

PRESIDENT'S ADDRESS.

One of the tasks of the President of this Society is to review the advances in forestry and forestry knowledge during his year of office. With this in mind early in 1945 I started to take notes of what was happening in the forestry world but it soon became borne in on me that, though the year gave promise of many remarkable events, when its annals were written forestry would receive scant mention.

By midsummer only two or three small items of news had come my way in the newspapers and technical journals. During the autumn and early winter a few more cropped up. I have done my best with the little I got and must ask the indulgence of the meeting in retailing my meagre harvest.

State afforestation in Ireland, in spite of formidable difficulties of supply, continued at its wartime pace and an area of 4,000 acres was planted. The Minister, when asking the Dail for an increase of £93,000 in the vote spoke of two principal limiting factors, land for planting and fencing wire. It is presumed that now the war is over the second shortage is about to be ended and the Minister's remarks about additional acquisitions give rise to the hope that next year more land will be on hands for planting.

The report on post-war agriculture contains a few items of interest to foresters. The majority and one of the minority reports advocate the planting of sub-marginal farm land, which is uneconomic for agricultural production. This would place at the disposal of forestry a considerable area of excellent planting land if the proposal should become state policy. The extension of the Farm Improvement Scheme was urged and the adoption of this recommendation by the Government is bound to lead to an increased demand for poles and timber for fencing and other agricultural purposes.

The national census of woodlands was completed early in the year and for the first time data is available of our growing stock.

Realizing the importance of this information to all foresters, the Society has requested the Minister concerned to publish the figures at an early date.

Felling for firewood and timber continued in all parts of the country. Speaking on the scarcity of timber for house building, Mr. Lemass appealed to woodland owners to market all suitable trees and this appeal will hasten the disappearance of our few remaining stocks of merchantable trees. The provisions of the Forestry Act provide for replanting after felling and it would appear from the official report that vast numbers of young trees are due for planting as soon as the supply position permits. Norway Spruce ranks high in the totals of these enforced plantings and it is to be hoped that those members who can do so will take steps to provide the young trees.

In Great Britain a Forestry Act was passed by the Houses of Parliament. It reconstituted the Forestry Commission in the light of the experience gained since the last Act of 1919 and laid the foundations of post-war reconstruction in the forests. It was announced that a series of short courses would be held for men released from the forces and wishing to take up forestry as a career. Some debates took place in the House of Commons about the disposal of surplus plants by the Forestry Commission. The surplus arose from the policy of increasing the nursery area from 1,000 to 1,500 acres during the war in order to have on hands ample stocks for the expected post-war planting schemes and the prolongation of the war rendered disposal by sale necessary.

A few sidelights on forestry in France, Germany and the Netherlands were thrown by accounts written by foresters serving with the American Army. Woods seen in Normandy had suffered great destruction from shell fire but damage over France generally was less than might be expected. The French Forest Service functioned during the entire period of occupation and the staff was able to conform to the regular working plans to some extent at least in supplying the German demands for material. The woods of Belgium and South Holland suffered more from neglect than from war. One observer speaks of the dense masses of pole crops crying out for weeding and thinning. All were impressed by the orderliness of the German forests and the fine stands of sizeable timber. These woods are now in the charge of the American Lumber Corps who are drawing on them for military and civilian supplies. Let us hope, as foresters, that these unique forests will be spared total destruction however great the needs of the moment may be. They are the cradle of silviculture as practised in the world to-day and their felling would mean the loss of the accumulated knowledge of hundreds of years.

The President then announced the results of the election of Office-bearers for 1946, which are given on page 2.

EXCURSION, 1946.

Mr. O'Mahony said he thought Killarney would appeal to members as venue for this year's excursion; Mr. Mangan seconded his proposal. The President announced that this was also the Council's recommendation and Killarney was unanimously agreed on.

The President then introduced Sir Shane Leslie who delivered his address on "National Parks in State Forests" which is published elsewhere in this issue.

Discussion following Sir Shane Leslie's Address.

Prof. F. Hackett proposed a vote of thanks to Sir Shane Leslie for his great crusading address on behalf of national parks. He thought our Society was in a particularly favourable position to survey the problem in all its aspects and might be palpably more aware of the defects that lie ahead in the acceptance of the idea than any other body.

He reminded us that there already existed in Ireland a national park—the Bourne-Vincent Memorial Park at Killarney—a gift which so embarrassed the Government that they have quietly let it subside into the background lest this dangerous idea should spread amongst the people.

The segregation of land for the preservation of natural beauty, for the continuance of farm use, and also for accessibility to cross-country walkers, etc., would involve taking control of the planning of land use and would come up against the characteristic Irish individualism which has been fostered by peasant proprietorship. Outside Dublin the idea of planning, as embodied in the Town and Country Planning Act, had not taken.

To establish national parks there must be co-operation between all the interested groups; the Forestry Division was one; there were also the naturalists' societies, the Bird Protection Society, the Society of Antiquaries, the I.Y.H.A., and the tourist industry. He hoped that all present would take the idea to heart and encourage Sir Shane to lead this crusade further so that something definite might materialize somewhere inside the next twenty years.

Mr. Nally (Assistant Secretary, Department of Lands) in seconding the vote of thanks, conveyed to the meeting the apologies of the Minister for Lands and of the Secretary, Mr. Deegan, who were prevented by 'flu from attending.

He understood that the idea of national parks started in America. There large cities grew up as if by magic—in three or four years in one instance a town which is now the city of Detroit became a city of nearly a million people because of the activities of a single motor manufacturer. At the same time the Americans had sense enough to carry out development of another kind to provide their tired city and factory workers with open spaces. Their national

parks cover over 8,700 square miles. The Yellowstone Park alone amounts to about 3,300 square miles. In addition they have over 163 million acres of national forest. These parks have a magnificence which we could never hope to realise here. They have been provided by nature with geysers and hot springs and waterfalls, one of which has a fall a third of a mile in depth. The Americans had in their usual way developed their parks to an extraordinary degree and it would not surprise him in the least to hear that they had accommodation for electric plugs and slot machines to facilitate picnickers to boil a kettle or roast a joint in the open air!

He mentioned the Argyllshire National Forest Park established in Scotland before the commencement of the last war by the Forestry Commission in association with the Corporation of the City of Glasgow. Its establishment involved the State in a capital expenditure of over £3,000 and the running costs for a period of seven years amounted to £1,860 with receipts over that period amounting only to £570. A camp warden was in charge of the camping ground. In Great Britain, he explained, it is only the bare and unplatable ground of the forest that is open to the public and set aside for recreational purposes. It was possible for interested parties, however, to get access to the planted ground provided that every possible precaution was taken against damage by fire, etc.

Although the considerations involved in parks were much more than financial, he thought it would be hard to persuade the people that it would be worth while spending their money on recreational facilities which would not pay their way.

Dr. Anderson, supporting the vote of thanks, was very glad to have Sir Shane Leslie put his ideas before our Society and also to have him as a member. The excellent address to which we had just listened was the first advantage of that membership.

He was not sure that in this very free country there was much scope or necessity for large-scale parks. In the Killarney district, for instance, he knew of nothing to prevent the holiday-maker going where he or she wished, and the mountains of Kerry were still open to the walkers while at the same time affording a living to the sheep-farmer. That also applied to the Galtees, the Knockmealdowns, Donegal and elsewhere in the country. There seemed, therefore, to be little need for large-scale parks as a means of providing for free access for the holiday-maker.

In Britain the Forestry Commission had been extremely glad to form these parks from the high proportion of unplatable land which they happen to own and which has been a burden on them. We, fortunately, had a smaller proportion of unplatable land in the possession of the Forestry Division so that the same considerations didn't arise. However, he thought that our first national park would come into existence more or less automatically. The Forestry Division would find itself one day with a large block of unplatable

land, possibly some other Departments would have equally unusable areas, and it might be possible to combine these and so form a national park.

In his opinion the national park should not be administered by the Forestry Division. The two projects were quite incompatible; forestry was distinctly utilitarian, its one important aim being the production of timber and raw material for industry; the national park on the other hand was purely for amusement and æsthetic value and any effect economically was indirect and incidental. The task of maintaining the scenic amenities of the countryside, of deciding what was, or was not, beautiful should not devolve on the Forestry Division which was engaged in a purely commercial enterprise. He emphasised that forestry could not be made subsidiary to a national park project—he would be sorry that the national industry of forestry should be degraded to become a sort of adornment of vast pleasure grounds for the amusement and delectation of multitudes of workers from this or any other country. Although not entirely hostile to national parks, he was against them anywhere near a State forest, if it could be arranged.

He distinguished between a “ park ” and a “ reserve.” A park was essentially an enclosure which was enclosed solely with the object of keeping inside something which would otherwise be harmful to the community, e.g., deerparks for deer, zoo parks for wild animals and car parks for motor cars! The national park should be for those individuals dangerous to forests as, for instance, the youngster who, a short time ago, deliberately set fire to the vegetation in one of our forests in three different places. The reserve, on the other hand, was an enclosure made solely with the object of keeping safe inside something which, in the general interest, should be preserved and of keeping out anything which might be harmful to what was inside. A State forest was a good example of a reserve. It was enclosed against cattle, rabbits and, where possible, against undesirable humans, the intention being to preserve the trees.

He was in favour of national *reserves*—for areas of peculiar natural beauty or areas of vegetation in its natural state, etc. The Minister responsible for forestry could, in fact, purchase and form a national reserve of areas of native woodland with the object of preserving native tree strains as well as on account of their scientific interest to the botanist, entomologist, ecologist, etc.

The Forestry Division was anxious to be a conserver, not a destroyer. Whenever they had known that they happened to own a locality of scientific interest they had taken steps to preserve part of that locality untouched by their reclamation work. He failed to see how the Division had come to have a bad reputation in this regard.

The forester had to protect his charge against damage by harmful agencies, amongst which, he regretted to have to include *homo sapiens* and, more particularly, *homo adolescens*.

Mr. O'Beirne dealt with the combination of the amenities of a park with economic forestry which he had seen in German forests. He instanced such inexpensive and simple expedients as the placing of seats along forest roads where the traveller could rest his limbs and allow the eye to roam over a pleasing vista of woods and fields and mountain. Afforestation favoured the increase of certain birds and wild animals which were either recent immigrants or had been nearing extinction. Cases in point were the spread of the jay, the cross-bill and the pine marten in our woods.

Mr. Meldrum was not in favour of combining forestry and national parks. The young lovers who, in plighting their troth, hack out two interlocked hearts on the nearest tree had little regard for the property they damaged. Even more serious was the fire hazard. Untold damage could be done in one afternoon by a carelessly thrown away match or cigarette-end. He was not to be taken as against national parks, he was wholeheartedly in favour of them—but within boundaries and those boundaries should not include State forests.

Col. Magan, who was personally acquainted with some of the American parks, drew attention to the successful combination of reserves and forestry in the Yosemite Valley in California and the area of the Great Square. These were run as reservations—nobody was allowed into them with matches—and they paid their way. In fact there was a considerable balance every year. This was spent in planting with Sequoia large areas to the south-east of the Mariposa Grove. In the surrounding district 8,000 acres of Sequoia had been planted on land on which it never grew before. He suggested that we should make a combination between our reserves and forestry, using the surplus money to finance further afforestation.

Sir Shane Leslie replied briefly. As he had anticipated from an audience of practical foresters, his ideas had not been blindly accepted, but had been subjected to a critical analysis which he appreciated. He valued this, his first contact with the foresters of Ireland, and hoped to acquire in the future a fuller knowledge of the men and their work.

STATEMENT OF ACCOUNTS FOR YEAR ENDED 31st DECEMBER, 1945.

I have examined the above Account, have compared same with vouchers, and certify it to be correct, the balance to credit of the Society being £90 12s. 11d. of which £35 10s. 10d. is on Current Account and £55 0s. 0d. is on Deposit Receipt with the Ulster Bank, Ltd. Credit has not been taken for Subscriptions for 1943, £1 10s. 0d.; for 1944, £13 0s. 0d.; and for 1945, £28 10s. 0d. which were due at 31st December, 1945.

8th January, 1946.

REGISTER OF NOTABLE TREES.

The Society of Irish Foresters has undertaken the meritorious work of recording notable trees in Ireland with a view to having them protected. Such trees comprise rare specimens of exotic conifers and broadleaved trees and large and remarkable specimens of native trees, all of which are a national asset and should be protected. Forestry Inspectors, foresters, members of the Society and the general public should interest themselves in the work and report to the Secretary where these trees exist. In cases where there is doubt about the name of a particular species a branch and, if possible, a fruit should be forwarded.

The Tree Registration forms* contain the following headings: — Species, Year of Planting, Size, Health, Seed Production, Habit, Locality Description, Position, Botanical Notes. Information on these points would be appreciated. Information on the year of planting might be procured from the owners of the trees or the approximate age might be estimated. Height can be estimated mathematically or otherwise, circumference should be measured at 4' 3" above the ground.

A note might be given as to the general appearance of the tree and if producing seed. "Locality" used in the technical sense would comprise soil and local climate (elevation, exposure, etc.) The position might be given in relation to some building or other landmark in a particular townland.

By way of example the following tree is recorded at Avondale, Co. Wicklow :—

Species : Silver Fir (*Abies pectinata*).

Year of Planting : About 1776.

Size : 145' high, 19½' circ. at breast height (4½ ft. above ground).

Health : Good.

Seed Production : Cones frequently produced.

Habit : Clean stem and wide crown.

Locality : In sheltered valley.

Position : On right bank of the Avonmore river about a mile south of Avondale House.

Botanical Notes : Needles with bifid tips and sitting on the shoot in comb-like fashion in 2 ranks. Buds non-resinous, shoots grey with short erect scattered hairs.

M. O'BEIRNE.

(Convenor, Tree Registration Committee).

* These forms are obtainable from the Secretary on application.

SOCIETY OF IRISH FORESTERS.

NEW MEMBERS—ENROLLED IN 1945.

(A List of Members enrolled up to 31st December, 1944, appeared in Vol. II, No. 1).

(a) Associate Member.

- (a) Aldridge, Robert Beauclerk, Mount Fallon, Ballina, Co. Mayo.
- (a) Bayley, C. J., Ballyarthur, Woodenbridge, Arklow.
- (a) Boyd-Rochfort, Iris (Mrs.), Middleton Park, Castletown-geoghegan, Co. Westmeath.
- (a) Coffey, Thomas Malo, Forestry Department, Writers Buildings, Calcutta.
- (a) Doherty, E. D. (Mrs.), 7 Wellesley Terrace, Southern Road, Cork.
- (a) Dalgleish, T. W., Darkpath, Kilmarnock, Scotland.
- Egan, D. J., Woodford, Co. Galway.
- (a) Inchiquin, Rt. Hon. Lord, Dromoland Castle, Newmarket-on-Fergus, Co. Clare.
- (a) Lawlor, Major A. X., Officers' Mess, McKee Barracks, Phoenix Park, Dublin.
- (a) Morehead, Frederick T., Indian Forest Service, Burma, c/o Messrs. Grindleys, Bonders, Parliament Street, London.
- (a) McDermott-Swan, Scott, Stonewold, Ballyshannon, Co. Donegal.
- (a) O'Mathamhna, Eoin, Douglas, Cobh, Co. Cork.
- (a) O'Neill, R. Q., Earl Street, Dundalk.
- O'Searcaigh, M., O'Callaghans Mills, Co. Clare.
- (a) O'Meara, P. J., Killough Castle, Thurles.
- (a) O'Doherty, G. H., Kilrush, Co. Clare.
- (a) Pennefeather, R. K., Beakstown Lodge, Thurles.
- (a) Rosse, Rt. Hon. Lord, Birr Castle, Birr, Offaly.
- Thornhill, G. G., Kilavullen, Co. Cork:
- (a) Van Hoek, Kees, Cuil Aluinn, Killiney, Co. Dublin.
- (a) Walsh, Robert, Grove Hall, Rathdrum.

BACK NUMBERS.

The following is the complete list of back numbers of *Irish Forestry*, all of which are obtainable from the Secretary:—

- Volume I, Number 1 (1943)—Price, 5/-.
- Volume I, Number 2 (1944)—Price, 5/-.
- Volume II, Number 1 (1945)—Price, 3/-.
- Volume II, Number 2 (1945)—Price, 3/-.

