

Fifteenth Annual Study Tour.

WEXFORD was the headquarters for the Fifteenth Annual Study Tour. Once again the Society was favoured by fine weather and a party of over thirty members enjoyed three days in very pleasant surroundings examining and discussing the problems of a wide range of State woodland properties from sanddunes at Curracloe through fertile estate woodland at Camolin to poor exposed moorland on Forth Mountain. In the evenings a room was reserved at White's Hotel where members relaxed in comfort and savoured (amongst other things) the art of conversation at its best.

The Study Tour will be remembered as a marked success especially in the interest of the technical discussions and in its instructional value, thanks largely to the excellent preparatory work of the Excursion Committee and the generous co-operation of the Forestry Division.

Tuesday, 3rd June, 1958.

Curracloe Forest.

The President of the Society, Mr. D. Mangan, welcomed the members who had assembled on the morning of June the 3rd at Curracloe sand dunes, and summarised the history of the property of 530 acres which was acquired in 1931 and planted during the following two years.

When acquired the area consisted of dry ridges bearing marram grass, etc. which gave way to *Holcus* and various herbs on lower, permanently fixed ridges. Silverweed, sedges, etc. occupied flat "slack" areas.

The main species planted were Scots, Corsican and Maritime pines, with smaller amounts of *Pinus radiata* (*insignis*) Sitka spruce and alder (on boggy flats) and mountain pine on the least stable areas of blown sand.

Maritime pine was direct sown, the others were planted.

The sandhills were described as low (none over 30 feet) and irregular, and rainfall was estimated to be about 38 inches per annum, with a tendency to summer drought.

Mr. Mangan introduced Baron von Vietinghoff of Göttingen University and on behalf of the Society wished him a happy and interesting visit to Ireland.

The Baron replied, conveying the greetings of German Foresters.

Mr. T. McCarthy, Divisional Inspector welcomed the party on behalf of the Minister for Lands, and described the present condition of the plantations.

Corsican pine had formed cleanly-grown, healthy stands of 31 ft. mean ht. and 3½ ins. Q.G.B.H. with a stocking of 1,200 stems per acre which amounted to 1,440 H. ft. over bark. This corresponded to Quality Class III by British Forestry Commission Yield Tables, and represented some measure of overstocking by that standard.

A small plot of *Pinus radiata* of 26 years now stood at 300 stems per acre: 46 ft. top ht. and 7½ ins. mean Q.G.B.H. Volume per acre was 2,295 Hoppus ft. giving a productivity of 72 cu. ft. per acre per annum.

It was mentioned that cow dung had been placed in the pits at the time of planting.

A stand of Scots pine nearby contained 920 stems per acre at 25 ft. top height and 3½ ins. Q.G.B.H. This amounted to 828 Hoppus ft. and corresponded to Quality Class III of the Yield Tables.

On a comparison between these three species *P. radiata* was much the best volume producer: Corsican pine showed the best form of growth; Scots pine was poor in the beginning but had recovered well during the last six years.

Mr. Hanan described a plot of Japanese Black Pine, (*Pinus Thunbergii*) planted as an experiment in 1948.

This species is used in Japan for sand dune fixation, and is slow-growing and hardy.

Two year seedlings were used, and the plants are healthy, though stocking is uneven.

The party were shown prostrate mountain pine which had successfully "fixed" blowing sand over a considerable area close to the sea.

Pinus contorta has been successful and is the only species which has so far regenerated itself; though a very thick crop of maritime pine seedlings were established under a stand which had been burnt some years ago.

During the early years slugs were a problem and caused much damage; later the pine shoot moth gave trouble and the pine shoot beetle for a short time. Mr. N. O'Carroll gave an account of the life cycle of the insects.

There appeared to be no serious pests or disease at the present stage of development; but we were shown a group of dying Corsican pine in a hollow near the edge of the sea. No certain cause can be ascribed for this as yet, but opinions were given by various members. Some suggested that sea water percolation through the sand barrier could be a cause and others that salt water from storm waves might have spilled over the dune into the hollow. It was observed that some side branches which had layered themselves in the sand were living.

In general it was noted that the sand dunes had been successfully fixed, that a grassy and herbaceous vegetation was well developed over almost all the area, with a good deal of bramble (*Rubus* spp) under the Scots pine.

A light layer of dead needles covers the sand under *Pinus radiata* and soil profiles reveal good root penetration, but very little tendency for any definable soil profile to develop.

It was stated that the area planted in 1931 was better stocked, and more productive than that planted in 1932, although both sites were similar, with the P. 31 site the more exposed. It was suggested that more favourable weather conditions in the first year may have allowed of better establishment and that the advantage in vigour of growth had been maintained.

The party were given much valuable information on the detailed history of the plantation by Mr. Michael Kehoe, who has been Head Labourer and caretaker of Curracloe throughout the 27 years since work commenced.

—J. E. JOHNSTON.

Forth Forest.

The party was welcomed by Mr. McCarthy who introduced the forester, Mr. J. T. Cooney, and gave details of the forest. At present it comprises 1,470 acres of which 1,100 acres is planted and 47 unplantable. Planting started in 1933 with 700 acres of *Pinus contorta*. Recent acquisitions have been of a better type of ground, more suitable for the growing of Sitka spruce.

Mr. Hanan provided the historical background. Art, son of Conn of the hundred battles, succeeded Conary and immediately banished his uncle, Ohy Finn Fohart, from Munster. Ohy and his sons went to Leinster where they were given some districts by the king. The inhabitants of these districts were known as *Fotharta* after their ancestor. Two of these districts still retain the name (Forth in Wexford and in Carlow). Up to 150 years ago the inhabitants of the Forth district in Wexford spoke an English dialect, older than Chaucer's English, which had been brought over by Strongbow's settlers.

An interesting situation arose when the area was being acquired, explained Mr. McEvoy. There was no local opposition to the acquisition but, being common land, there were doubts as to the legal title. It was then discovered that the fee simple was held by the crown and that this was transferred to the state at the time of the treaty.

The party then moved on to see an experiment initiated by Mr. Mooney, in which phosphatic manure was placed in the bottom of the pit and alternatively scattered on the ground around the base of the plant. So far no appreciable

differences in growth have been detected. Here also Mr. Mooney gave a short talk on *Pinus contorta* in general, treating of its native habitat, its introduction to Ireland, and the types. He preferred the coastal type for the suppression of heather and on deep western peats.

Mr. Galvin mentioned that a slight but consistent difference is noticeable between the two types even in the nursery stage. He also commented on the fact that one sometimes gets an apparently mixed crop of seedlings from the same seed lot, suggesting that the seed is mixed before export. Typical plants of both types were seen here by the party: the coastal with its short dark green needle attached at a low angle to the leader, and the inland with its longer, paler needle attached at a higher angle.

Next to be seen was an experiment comparing two lots of *Pinus contorta* from home collected seed (Pettigo and Ballygar, grown from seed said to be of Lulu Island origin) with a British Columbia provenance, each type manured and unmanured. A large response was got from manuring in all cases. There was no significant difference in the growth of the two home-collected lots, but both were significantly better than the British Columbia provenance.

Before moving on to the next stop there was a long discussion on the potentialities of the site for tree growth. Mr. MacNamara was strongly of the opinion that with modern techniques of ground preparation and manuring, a more rewarding crop than *Pinus contorta* could be grown.

Compartment 4 contained a crop of *Pinus contorta* planted in 1933, seed origin said to be the "sea coast of Washington". The details were as follows:

Stems per acre	...	950
Mean Q.G. at b.h.	...	4 ins.
Mean height	...	30 ft. Hoppus
Volume per tree	...	1.41 Hoppus feet
Volume per acre	...	1,340 Hoppus feet

The question of the future management of this stand evoked some divergent opinions. Mr. Butler thought that the crop had served its purpose as a pioneer and should be felled and replanted with Sitka spruce, while Mr. Mooney thought that it should be pruned and treated as a normal timber crop. Mr. Butler then brought up the question of putting an economic price on the timber in twenty years from now. What would it then have cost to grow?

The next stop was in Compartment 5, at the "diamond beds". This experiment was initiated by Dr. Anderson in 1933. Diamond shaped areas (7 ft. side, 18 ft. from centre to centre) were picked over and manured with $\frac{1}{2}$ lb. of phosphate. Every tenth bed was left unmanured as a control. At present there is no apparent difference between the manured and unmanured beds although earlier reports recorded the manured beds as distinctly superior.

The perimeter of each bed was planted with *Pinus contorta* (origin recorded as "sea coast of Washington") with Sitka spruce, Japanese larch and Scots pine in varying mixtures in the centres. Only the *Pinus contorta* now remains, for which the following figures were given

Stems per acre	...	493
Mean Q.Q.	...	5½ in.
Mean ht.	...	42 ft.
Volume per acre	...	1,848 H. ft.

This is slightly better than Scots pine, Quality Class I, of the same age.

The trees are rather coarse and somewhat sabred due to their initial wide spacing.

A pit in the undisturbed soil showed a typical iron podsol, which is widespread in this area over the very infertile quartzite and quartz rock.

Wednesday, 4th June, 1958.

On the second day we travelled along the course of the Slancy via Ennis-corthy and Bunclody passing close to Vinegar Hill, the scene of a famous battle during the 1798 Rebellion.

Clonegal State Forest.

On arrival at Coolmeelagh Property the party was again met by Mr. T. McCarthy, Divisional Inspector who introduced Mr. O. Grant, Head Forester-in-Charge and his assistant Mr. A. Gilligan. Mr. McCarthy in describing the forest pointed out that this property was originally part of Bunclody Forest until Clonegal was established as a separate unit in 1941. The Forest at present comprises a total area of 2,858½ acres of which 2,668 has been planted to date.

Our first stop in Compartment 5 was at a stand of Sitka spruce planted in 1928, which though heavily thinned in the past is now marked for a further thinning of approximately 30 stems per acre.

The figures given for this stand were as follows—

<i>Main Crop</i>		<i>Thinnings</i>	<i>Total</i> (<i>Main Crop + Thinnings</i>)
Stems per acre	240	30	270
Q.G.B.H. (av.)	7½	5¾	—
Total Ht. (av.)	62	56	—
Vol. O.B.	2,800	200	3,000

Comparable figures from British Forestry Commission Yield Tables were given which showed the stand to be Quality Class III, but very much understocked by comparison. Everybody agreed that the stand did not look overthinned and that the increased Q.G. and fuller crown development obtained was something to be desired. A boring taken from one of the dominant stems showed an average ring growth of 6 to the inch which was considered adequate for good quality sawlog timber. Final crop stems had been pruned to 20 ft. and a discussion followed on the desirability of high pruning up to 30 ft. at this stage. It was pointed out however that this would add approximately 4d. per cubic foot to the second length of timber at the end of the rotation and it was felt that the price obtainable then would not compensate for the additional expense.

During a short stop in a stand of 70 year old Norway spruce a discussion developed in which Baron von Vietinghoff readily joined. Data for the stand was—

Stems per acre	...	...	230
Q.G.B.H. (av.)	...	...	8¾ ins.
Total Ht. (av.)	...	...	70 ft.
Vol. O.B. per acre	...	...	4,025 Hoppus feet.

This corresponded to Quality Class III of the B.F.C. Yield Tables for Norway spruce. The trees were heavily branched indicating the desirability of high pruning at an earlier date. However, Baron von Vietinghoff confounded everyone by stating that they do not prune Norway spruce in Germany since the timber merchants do not reduce the price because of knottiness; neither do they prune Scots pine but attain reasonably good quality timber by close espacement. Baron Von Vietinghoff intimated that only those trees suitable for veneer purposes such as Douglas fir, Larch, Poplar, etc. are pruned and then only to the extent of approximately 80 stems per acre. In no instance do they prune living branches.

At our next stop many theories were advanced as to what was damaging the buds of Sitka spruce planted in 1957. Some members were of the opinion that the buds were hollowed out by birds, of which the Gold Finch, Grouse and Crossbill were listed as likely culprits. Eventually Mr. Michael Fahy came forward with the most likely suggestion that slugs were attacking the young

shoots and the discovery of a number of large black slugs under an old Scots pine top added weight to his argument.

The next item of interest was a plantation of Scots pine at 900 ft. elevation which had failed and had been replanted in 1953 with Sitka spruce, *Abies nobilis* and Beech. A pit showed the soil to be a Brown Earth type over-lying mica-schist, which seemed sufficiently fertile for normal growth. A discussion then developed as to whether failure was due to exposure or provenance with Baron Von Vietinghoff holding the view that it could not be exposure since Scots pine grows on the bogs of Eastern Germany at extreme exposure.

Lower down the slope a stand of Scots pine planted in 1928 and comparable with Quality Class III British Forestry Commission Yield Tables provoked further discussion. Mr. McNamara was in favour of clear felling and replanting with one of the faster grown conifers such as Sitka spruce which he estimated would yield a volume in 30 years comparable with Scots pine in 50 years. Messrs. McEvoy and Grant thought this method too drastic and advocated marking approximately 80 selected stems per acre in a protective ring and under-planting with *Tsuga*. Following a brief stop in a Sitka spruce stand where comparisons were made as regards stocking and av. Q.G.B.H. with the first stand of Sitka spruce visited, the party adjourned to the old nursery for a picnic lunch.

—P. M. JOYCE.

Mechanised Nursery.

Our party next visited the Department's Nursery at Ballintemple where we witnessed a demonstration of modern machinery as applied to this highly specialised field. Much that we saw here was surprising indeed and in all it proved to be one of the highlights of the tour. We are particularly indebted to the Department for the excellent arrangements made.

It was surprising to see for ourselves, how efficiently modern agricultural machinery has been adapted to the intricate and all very costly work of weed control, lining out, preparation of seed beds, etc. Time, we know, is the all-important factor here and the speed at which this work can now be carried out is most impressive.

Implements for the most part are hydraulically mounted giving ease of access and a switch from one to the other can be made in a matter of moments.

The weed sprayer is a battery of cowed jets, that using common liquid sprays under pressure, can work six rows or so of transplants at a time, at a nice walking pace. The inter-row weed cultivator, very topical this season, is on the same principle. Little damage is done either biologically or, let it be said, mechanically, though it calls for the most exacting care on the part of the tractor driver.

The system of lining out was the envy of many members who know of the 'fever' normally associated with this work. In this operation only the loading and placing of the lining out boards was done by hand. All the other work was carried out by an ingenious machine, the 'Ledmore' plough, which is really a combination of several implements. Given a good soil, well pulverised by the rototiller this machine can earth up the seedlings, plough, roll and cut, to leave all in order for the next line. Gone apparently are the days when a muster of "all hands to the lines" was the call throughout the countryside. Here a team of 15 men, with a tractor etc. can cope with a line 120 yards long, at the rate under optimum conditions of 8,000 seedlings per man per day. In these circumstances the work may be got through in any reasonable period of fine weather and at perhaps half the cost.

The demonstration of making seedbeds was spectacular also. The whole operation was carried out by simple methods, rototilling being the principal preparation, followed by a ridging cum raking appliance. It was only a matter

of moments then to mount the roller. The whole thing reminded us of the speed at which macadam is laid—on the main roads of course. Beds may be sown broadcast but experiments are being tried with an adaptation of the common seed sower for band sowing. This latter method appears to have advantages for mechanisation all through the life of the seedbed.

In all we were rather bewildered at the speed and apparent ease at which a bare piece of soil can be transformed into rows and rows of plants and ribbons of seedbeds. Granted the right conditions a revolution in this sphere seems well on the way in and great credit is due to all concerned.

—P. J. BUTLER.

Thursday, 5th June, 1958.

Bree Forest.

The forenoon was devoted to Bree Forest and in particular to a demonstration of mensuration instruments and methods in a 60 foot high Sitka spruce stand.

At Compartment 8, Bree Hill, Mr. Swan, in introducing Messrs. Hanan and Joyce of the Department's Assessment staff, emphasised the importance of accurate measurements when prices per cubic foot were reckoned in shillings.

The first method demonstrated was by Tariff Tables as now used extensively in standing sales of thinnings in Britain. Mr. Joyce explained that the tables gave volumes per tree based on Q.G.B.H. alone and were applicable to even aged conifer stands up to 80 feet in total height. Volume per tree in a crop is found to give a straight line graph when plotted against Basal area, the 'steepness' of the graph varying with site, age and species. There is a separate Tariff Table for every interval in volume of one Hoppus foot at 12" Q.G.B.H.

The application of the Tariff system is simple: all trees to be included in the measurement are counted; every tenth tree is girthed and every hundredth tree felled and its volume obtained from the Hoppus tables by using mid Q.G. and timber length to 3" top diameter. The Tariff Table and number which corresponds most closely to Q.G.B.H. and ascertained volume is entered in field book for each felled sample and the average Tariff number obtained for the crop. The volumes of every tenth tree can then be read off from the Table and the volume of the crop found by multiplying the total for the girthed trees by ten. For satisfactory use the population to be sampled should contain not less than 2,000 inhabitants giving 200 girths and 20 felled samples. In thinning a good plan was to have a team of four, one to indicate trees for marking, two markers, one to count and measure. Such a team could deal with 2,000 trees per day.

In the course of a discussion to which Messrs. Mooney, Mangan, Enright, J. O'Donovan and Loughrey contributed several further points emerged, e.g., that separate species must be separately booked; that the Tariff system was superior to Volume Tables for large numbers of small trees; that volumes were readily available by Q.G. classes thus facilitating pricing.

The next demonstration was the Sample Plot Method, girthing all trees in sample, finding 40% tree, ascertaining average height by hypsometer and using form factor or Volume Tables to get volume of average tree. Volume of wood was then obtained from formula:

$$\text{Vol. av. tree} \times \text{No. in sample plot} \times \frac{\text{area of wood}}{\text{area of sample.}}$$

The weakness lay in the personal factor of choosing a sample plot but this could be eliminated by using a grid system or random plots. Thirty trees was the minimum for a satisfactory plot so in stands with less than 300 stems per acre a plot larger than 1/10th acre was advisable. This method was very useful

for thinning forecasts when a standard thinning was marked in the plot and thinnings booked separately. Mr. Johnston made the point that the 40% tree was often a sub-dominant in Sitka stands and therefore not altogether satisfactory.

The use of a simple Relascope to give a quick estimate of Basal area per acre was also demonstrated. If all trees which appear larger at breast height than a blade 0.5189 ins. wide held two feet from the eye are counted and the number multiplied by four the answer corresponds to the Basal area per acre. This multiplied by average total height and form factor (from yield tables) gives a very quick approximation of volume per acre.

The Blume-Leiss hypsometer with built-in range finder was also demonstrated.

After the mensuration demonstration the party moved up the Hill led by Mr. Murphy, Forester, and his Assistant, Mr. Breen. Mr. McCarthy, Divisional Inspector, gave particulars of the Forest: started in 1927 it now ran to 1,180 acres of which 960 were planted, 50 acres were in planting reserve and 35 under Nursery. 200,000 H. ft. had already been removed in thinnings.

Interest was centred on a Corsican pine plot, 28 years old on a steep, rather exposed slope, at 400' elevation. It proved to be Q.C.IV as against Q.C.III in sand at Curracloe and discussion turned on the economics of retention on a site considered capable of much higher yields with other species. As the area was small and the stand formed a useful windbreak to better crops retention was generally favoured especially as the area of woods in 30 year age class was so small in Ireland. Mr. Mangan mentioned that creosote penetrated deeply into C.P. giving it a long life as a transmission pole but that the process was more costly as it absorbed more creosote than, say, Scots pine. It was very prone to 'blue stain' after felling and required very careful stacking.

The next stop was at an open 70-80 year old stand of European larch (80 stems, 1,800 H. ft.) and Scots pine (50 stems, 890 H. ft. per acre). Owing to lack of demand for this type of material at planting time the stand was retained but underplanted in 1948 with beech. In the course of discussion it was suggested that the larch would not improve and that it and the poorer S.P. be removed in lengths as soon as market conditions were favourable as the beech were now well established.

Before leaving Bree Hill the President thanked Mr. Murphy, Forester-in-charge and Mr. Breen, his Assistant and Messrs. Joyce and Hanan for providing a most interesting and instructive morning.

—T. McEvoy.

Camolin Forest.

On Thursday afternoon we visited Camolin Forest, where Mr. McCarthy introduced the Head Forester, Mr. P. Madden, and his assistant, Mr. Gleeson. Mr. McCarthy then gave us a brief history of the Forest. The main block, containing 640 acres, was acquired in 1907. Of this, 450 acres carried a mixed hardwood crop on a "brown earth" soil of silurian origin. By 1917 sales from this area had covered the cost of acquisition. The bare land occurred on the flats which now carry Norway spruce and Sitka spruce crops approaching maturity. As might be expected, the spruce suffered from damage by late frost in its early years, but it recovered well and now at 46 years of age, Norway spruce has a mean B.H.Q.G. of $9\frac{1}{2}$ ins. and a total height of 79 ft., and the Sitka spruce measures $11\frac{1}{2}$ ins B.H.Q.G. and 82 ft. total ht. The forest has now grown to a total area of $2,436\frac{3}{4}$ acres of which $2,283\frac{1}{2}$ acres is productive woodland, $71\frac{1}{2}$ acres unplatable and the remainder ($81\frac{3}{4}$ acres) is a plantable reserve.

Our first stop was at a crop of *Cupressus macrocarpa* and *Pinus radiata* planted in 1930 at 6 ft. \times 6 ft. spacing. The present stocking is 270 trees per

acre. The average tree has a B.H.Q.G. of 8 ins. and a total height of 56 ft. with a volume of 11.5 H. ft. giving a volume per acre of 3,100 H. ft. Mr. Hanan opened a discussion on *Cupressus macrocarpa* as a forest tree. He said that the species had a small range of natural habitat being confined to a strip 2 miles long by 200 yards in width near Monterey, California. The species is liable to damage by winter frosts under Irish conditions. Mr. S. Quinn agreed with Mr. Hanan's remarks about the frost-tender characteristic of the species. He said that he had seen a shelterbelt 15 ft. high which was completely wiped out in the winter of 1946-47. Mr. Ryan said that the species was a bad transplanter but it produced reasonably strong and durable timber. Mr. Madden said that direct sowing of *Cupressus macrocarpa* had given good results at Camolin.

Our next stop was at a plot of *Pinus radiata* planted in 1927. The present stocking is 190 trees per acre with an average B.H.Q.G. of 10 ins. and an average total height of 86 ft. The volume per tree is 27.6 H. ft. and volume per acre 5,073 H. ft. Commenting on the fact that the larger trees were on the outside of the plot, Mr. Swan suggested that a heavier thinning prescription would result in a bigger and more wind-firm crop.

A crop of Douglas fir which suffered from a severe Adelges attack in earlier years and was heavily thinned in an effort to restore its health and vigour, aroused a good deal of interest. The crop was planted in 1910 and it now carries 140 trees per acre. The mean B.H.Q.G. is $10\frac{1}{4}$ ins. and the top height is 75 ft. The volume per acre is 3,066 H. ft. As a contrast we looked at a disease-free crop of Douglas fir planted 12 years later (1922) which has a stocking of 150 trees per acre with a B.H.Q.G. of $11\frac{1}{4}$ ins. and a top height of 84 ft. giving a volume of 4,560 H. ft. per acre.

The main block of Sitka and Norway spruce aroused a discussion on silvicultural systems. Several members considered that large blocks of extremely uniform, conventionally-thinned monocultures were subject to an unnecessarily high degree of risk from wind, fungous and insect attack and that a more diversified crop would have many advantages. Mr. McEvoy at this stage mentioned an attempt in this direction which he had seen in the Forest of Ae in Southern Scotland which contained large even-aged blocks of spruce around 30 years old. From the beginning a type of crown thinning was practised aiming at relieving about 80 good dominants per acre from competition in the upper crown but controlling the lower crown by co-dominants in the middle distance. After three thinnings in Norway spruce a clearly defined stand pattern had emerged, the 80 tall dominants having deep crowns and much heavier girth than the remaining trees. The canopy was undulating and deep with promise of greater wind firmness and the prospect of opening gaps for group regeneration and the introduction of a variety of species in shelter. Incidentally the crown thinning of dominants and co-dominants leaving sub-dominants and suppressed trees for ground cover yielded a much larger average size of pole and was more economic.

In conclusion Mr. Mangan thanked the Divisional Inspector Mr. McCarthy, the District Inspector Mr. Crerand, the Assistant District Inspector Mr. Enright, the Head Forester Mr. Madden and the Assistant Forester Mr. Gleeson for their help and co-operation in making our visit such a pleasant and instructive one.

—M. McNAMARA.