FORESTRY COMMISSION

HISTORY

OF

STRATHYRE

FOREST

W (S) CONSERVANCY

FORESTRY COMMISSION

HISTORY

of

STRATHYRE FOREST

1934 - 1951

WEST (SCOTLAND) CONSERVANCY

HISTORY OF STRATHYRE FOREST

Contents

	Page
GENERAL DESCRIPTION OF THE FOREST	1
Situation	1
Area and Utilization	1
Physiography	2
Geology and Soil	3
Vegetation	4
Meteorology	5
Risks - Fire, animals, insects, fungi	5
Roads	7
Labour	8
Supervision	9
SILVICULTURE	10
Preparation of ground	10
Choice of species	10
Planting	11
Method of planting	12
Annual rate of planting	12
Manuring	12
Establishment	12
Ploughing	13
Beating up	13
Weeding	14
Mixtures	14
Rates of Growth	14
Past treatment of established plantations	15
Research	15
Conclusions	16
APPENDICES: I Notes from Inspection Reports	18
II Supervision	22
III Nursery	24
IV Percentage of species planted	26

HISTORY OF STRATHYRE FOREST

GENERAL DESCRIPTION OF THE FOREST

Situation

The village of Strathyre, in the heart of the forest, is situated in south-west Perthshire, and lies about 24 miles north-west of Stirling. It is thought that the name may be derived from the Gaelic "strath-theo-thir" - the valley of the warm country.

The forest comprises two distinct sections, Strathyre and Tulloch.

(a) Strathyre Section

This lies along the main Strathyre valley, on both sides of the River Balvaig and Loch Lubnaig. It extends the full length of the west side of the loch and half of the east side.

(b) Tulloch Section

The plantations at Tulloch lie mainly in two glens which run southward to Loch Voil; these are Kirkton Glen and Glen Crotha.

Area and Utilisation

Acquisition was as shown in the following table:-

TABLE I

Unit	Owner	By lease etc.	Year Acquired	Area (Acs.)
Tulloch	J. Carnegie	Feu	1930	2000
Kirkton Farm	J. Carnegie	"	1932	535
Strathyre	J.E.B. Bailie Hamilton	Purchase	1933	6330
Stank	J.E.B. Bailie Hamilton	"	1935	1793
Ledcreich	G.D.H.F. Carnegie	Feu	1940	194
Farmston	Colonel Forman	Purchase	1949	287
Rusgachan	A. J. Blair	"	1949	83
			Total	11222
			Disposals	761
			Gross Acreage	10461

TABLE II

Statement of Areas as at end of F.Y.51

(a)	Plantations			
	Acquired	59		
	Formed by Commission	5249	5308	acres
(b)	In hand awaiting Planting		243	"
	Other Land		-	
(c)	Nurseries		4	"
(d)	Agriculture			
	No. of Tenancies 2		2048	"
(e)	F.W.H.			
	No. of Tenancies 11		59	"
(f)	Unplantable land in hand		2799	"
		Total	10461	acres

Before acquisition by the Forestry Commission, the present forest area was devoted mainly to sheep farming. The stock was usually black-faced sheep, and practically no cattle were raised.

Shooting was usually let for grouse, the bag being in the neighbourhood of 700 brace.

Physiography

The greater part of the forest lies on both sides of Loch Lubnaig on the slopes of the main Strathyre valley, with the outlying Tulloch Section covering two separate blocks on two valleys, Kirkton Glen and Glen Crotha, which run southwards to Loch Voil. All sections of the forest run north and south, following the directions of the main valleys. Recent acquisitions have been nearer the Pass of Leny, which is about two miles from Callander.

Loch Lubnaig is some four miles long with its head approximately one mile south of Strathyre, but the forest continues northwards on both sides of the valley for another two miles on the west side and three miles on the east.

On the west side, the forest rises to Ben Ledi (2873 ft.), runs north to Ben Vane (2685 ft.) and reaches Beinn an t'Sithein (1871 ft.) The surface of Loch Lubnaig is around 398 ft.

While the east of the forest is somewhat less impressive from the scenic point of view, nevertheless the boundary runs from Meall Mor to Meall nan Oighreag (1899 ft.).

The hills are more rounded and modest in the Tulloch Section, but Meall Reamhar (2010 ft.) is reached.

Generally, all the plantable land lies on moderate to steep slopes, with variable aspect and exposure. Most aspects occur to a varying degree over the forest, but the aspect is chiefly easterly and westerly in the main section; in the Tulloch blocks it is largely southerly.

Geology and Soil

Geology

The main formation of underlying rocks consists of metamorphic sedimentary quartzites, schists and schistose grits, with occasional bands of intrusive igneous rocks and one particular band of Dalriadan limestone.

The characteristics are typical of the area around the forest, lying as it does immediately north-west of the geological line of demarcation which runs across Scotland in a diagonal direction, dividing the country into two main sections, the Highland and the Lowlands. This is a geological as well as a geographical line, and separates the crystalline schists of the Highlands from the younger rocks of the midland valley. It is the appearance of the rock formation north of the "Highland Line" that gives the scenic grandeur that we associate with Strathyre Valley and the neighbouring Trossachs.

The different schists forming the Highlands of Perthshire traverse the country in parallel bands with a general north-east and south-west trend, and are roughly parallel to the great geological boundary fault.

North of Loch Voil, in the Tulloch section of the forest and in the north-east Kingshouse area, we have mainly mica schists; over the rest of the forest it is mainly quartzite, quartz schist and schistose grits (the Ben Ledi series of grits and schists). A band of "Green Beds" or epidotic and chloritic schists appears as the outcrop mass of Ardnandave Hill, while epidiorite and hornblende schists appear in the north-east of the forest. One dyke of dolerite runs across to the north of the Stank section.

Soil

Abundant evidence is found in the area of glacial action, and much of

the soil is a mixture of boulder clay and coarse gravel. Otherwise, where the soil has been derived from the parent crystalline schists, it is more of a sandy than a clay nature.

The main soils found in the forest are:-

(a) Deep free loams and sandy loams derived from the parent rock.

(b) Gritty or rocky loams and clays of glacial origin, often morainic drifts.

(c) Peats of varying depths, ranging from 3 in. - 4 in. up to 5 ft. overlying type (b).

General distribution of the soil types is:-

North-east - Kingshouse - Compacted glacial clay and gravel, often covered by peat.

North-east - Immervoulin - On the lower ground, deep peat overlying clay and gravel. On the higher ground, shallow peat overlying sandy loam or gravel.

North-east - Ruinacraig - Deep loam.

North-west - Bailefuill - Deep loam, interspersed with rocky outcrops.

North-west - Laggan - Deep loam

South-west - Stank - Deep loam

Vegetation

The better ground consisting of deep loam is typical of the characteristic upland grassland, with its mixture of fine grasses, usually sheep's fescue (Festuca ovina), bents (Agrostis tenuis and Agrostis alba) and silver hair grass (Deschampsia flexuosa), with the usual association of tormentil (Potentilla erecta) and heath bedstraw (Galium saxatile). This is usually found on the steeper and better drained slopes. Where the soil is deeper, there is usually an invasion by bracken (Pteridium aquilinum), particularly on the drier sites, with Aira caespitosa on the wetter areas. Oak and birch scrub occurred in the better places.

On the gritty loams and clays, ling (Calluna vulgaris) appears on the hard, dry knolls, with purple bell heather (Erica cinerea) and the above fine grasses. Shallow peats usually carry mat-grass (Nardus stricta) and purple moor grass (Molinia caerulea) or ling (Calluna vulgaris) and bilberry (Vaccinium myrtillus). The richer peats have purple moor grass (Molinia caerulea) and jointed rush (Juncus articulatus), while the poorer peats are associated with deer sedge (Scirpus caespitosus), cotton sedge (Eriophorum vaginatum) and bilberry (Vaccinium myrtillus).

Meteorology

Strathyre has a climate approaching that typical of the West of Scotland. A small meteorological station is maintained in the nursery and the records show the annual rainfall to have been about 80 in. over the last few years. Another typical feature of the West is the relative freedom from heavy snowfalls, except on the higher ground.

The area is generally subject to the strong south-west gales, apart from the Laggan section, which is sheltered by Ardnandave Hill. As the valley lies roughly north and south, it is exposed to the cold north wind.

Both early and late spring frosts are experienced, the position being aggravated by the valley site.

South of Laggan on the west shore of Loch Lubnaig, there is no sunshine during the winter months and even in the nursery at Strathyre, there are only three hours possible on the shortest day.

Nearly every winter there is severe flooding round the River Balvaig, as Loch Voil, separated from Loch Lubnaig by about four miles has a water level, only 11 ft. above it. Similar flooding occurs regularly after the spring thaws.

Risks

Fire

In spite of the fact that the forest is traversed by the main Stirling-Oban railway line which follows the west shore of Loch Lubnaig, the main fire risk is from the heavy tourist traffic on the main Callander - Lochearnhead trunk road running along the east shore of the Loch.

As the popular "Gateway" to the Central and Western Highlands, tourists arrive in large numbers from Easter onwards, coincident with the fire danger period in the dry spring months. A rough census has been taken at the forest nursery in Strathyre, a popular halting place, and it has been estimated that up to 10,000 private cars and 30,000 bus passengers have been known to stop there in one season. Apart from vehicles, there are many cyclists and pedestrians, the latter making full use of the public footpath which runs up Kirkton Glen in the Tulloch section, before crossing the ridge that separates Balquhidder from Glen Dochart.

The east shore of Loch Lubnaig is also a very popular picnic ground and the public constitute by far the greatest risk to the forest, necessitating special fire precautionary measures.

Fire risk from the railway comes next in importance, but as the times of the trains are regular and known, this danger can be more or less systematically controlled.

Measures taken against fire are:-

(a) The establishment and maintenance of traces, both along the main roads and the railway. In the latter case, the plantations have been kept $2\frac{1}{2}$-3 chs. from the line, with a 9 ft. fire trace.

(b) Two look-out towers, one at Ruinacraig and the other at Bailefuill, are connected by telephone with each other and the forester's office, and command a view of the whole forest with the exception of the Stank section and the extreme south-west.

(c) The usual precautions are taken with the organisation of mobile patrols in hazard periods, a jeep drawn motor pump is available, and a system of depots of fire brooms, water dams and static tanks at strategic points is in operation.

Rabbits and Hares

When the estate was first acquired, the Stank section in the south-west had such a high rabbit population that the ground was practically bare of vegetation over large areas. To a lesser extent, this was also true of part of the Ruinacraig section. Rabbits have now been almost completely exterminated from the forest by means of intensive trapping and effective fencing.

Mountain hares were numerous at one time, but now only an odd one crosses the fence when the snow drifts are piled up.

Deer

Roe deer are still fairly common in the forest, but the deer fence is effective against the red deer so common in the neighbouring Glenartney. A few of the latter are occasionally seen in the forest during the winter, but any damage done is generally confined to roe deer, and that usually on Pinus contorta.

Sheep and Goats

The fencing is adequate protection against sheep, and only in the winter after snow damage is there an occasional one to be found.

It is interesting to record that there was a herd of some 10-12 feral goats on Ardnandave Hill when we took over in 1935-36, but they have long since disappeared from the neighbourhood.

Squirrels

No grey squirrels had been previously recorded in the district until early in 1952, when one was shot near Balquhidder. It was not thought that these animals had got so far north of the Strathyre Valley.

Voles

The intense plague of voles which had such disastrous effects in many areas in the west did not affect this forest. Only slight damage was recorded in the newly planted P.36 compartments.

Insects

In the second and third years after the F.Y.35 planting, Compartments 4 and 5 suffered extensive damage by an attack of a clay weevil. Destruction of the buds caused much bad shape and distortion in the larch, but the trees started to recover a year or so later, and the stand is now of excellent form.

Die-back of European larch

Several years ago, when die-back first appeared in the plantations, it was feared that a very considerable amount of damage could be anticipated, particularly in view of the relatively high percentage of European larch that had been planted in the earlier years.

Recovery, both in the Tulloch and main Strathyre sections, has been fairly complete, and these early fears now seem to have disappeared. It is worthy of notice that at Tulloch, in P.31 at Glen Crotha, the attack seemed to be much more severe on steep slopes than on the more gentle ones, and also more severe on south and east aspects than on west ones. This could indicate a relation between die-back, frost damage and lack of an adequate supply of moisture, particularly at the vulnerable flushing stage.

Roads

When the first unit was acquired, the only roads serving the forest were the main trunk road running along the east shore of Loch Lubnaig, the back road from Strathyre to Balquhidder via Ardoch and Stronslaney, the road to Laggan Farm on the west shore of the Loch (a county road as far as Keip Farm and a private road beyond), and in the Tulloch section, the Balquhidder-Tulloch road.

In 1947, the Laggan road was extended over 1½ miles, and two jeep roads were established, 1½ miles from the nursery to the fire tower at Ruinacraig and 1 mile from the gate at Bailefuill to the fire tower on the hill there. This was done entirely by P.O.W. labour under local forest supervision.

These jeep roads were at first merely skimmed of turf and bulldozed, but some rough bottoming has since been added when material has been cleared from the nursery. They have been extremely valuable during fire danger periods and in particular for the control of one fire just outside the forest east of the Ruinacraig fire tower. A jeep-drawn pump or water tank can be easily and quickly negotiated over the whole length of these roads.

Proposed roads in the main Strathyre section are:-

(a) One running from Laggan to Glen Buckie

(b) An additional mile in the Stank section, and

(c) contour roads through the centre of both sides of the forest running roughly north and south.

In the Kirkton Glen block of the Tulloch unit, three miles of road are urgently required to serve P.32-35.

The value of the roads already laid down cannot be over-estimated. Apart from their value in tapping P.35 and 36 at Laggan, they have greatly facilitated access, transport of labour to the actual work and fire protection.

Labour

The Tulloch section always had 8-9 men but in the Strathyre block at the commencement of operations, labour was fairly scarce, and the squad in that section consisted of 2 men. However, it quickly increased in size, many men cycling from the Callander direction. Labour was generally of a good country type, often ploughmen or shepherds.

In 1938, the establishment of a small bothy across the River Balvaig from Strathyre helped to form a good nucleus. By 1939, the labour force was 50-60.

Two new forest workers' poultry holdings were made at Tulloch about 1934 and five at Strathyre in 1935, three at Creagan and two at Stank. This did much to lay the foundations of a permanent squad. As agricultural tenancies became vacant on resumption of land for planting, they were

converted to small tenancies, and five were in existence by that time.

During the War, as in other forests, the labour force was much depleted, either by the Services or by the forest production department of the Ministry of Supply, but it was supplemented by conscientious objectors whose work was reasonably good.

The completion of twelve Swedish type timber houses in 1951 gave an impetus to the formation of a stable, regular labour force. Most of the tenants have been recruited from industrial areas and are only gradually becoming accustomed to forest work. The fact that an official house is occupied will keep many of the tenants from transferring to other employment, as so often happens in the case of the single men.

At present (1952) the labour force is:-

53	men	(10 at Tulloch section)
13	women	(1 " " ")
2	boys	

Of these, 14 men and 7 women are accommodated in two hostels, the women's hostel being a forest workers' holding.

The labour force is more or less adequate at the moment, but when the forest comes into serious production, a considerable increase will be necessary. Desirable numbers would be:-

1960	100 workers
1970	150 "

It is estimated that a total of 115 houses will be required by 1970.

Supervision

The Tulloch section is run as an independent unit in charge of a separate forester, but when additional labour is required there, it is made available when possible from the main Strathyre unit.

Present supervisory staff is:-

1 Head Forester

2 Grade II Foresters

2 Foremen

SILVICULTURE

Preparation of Ground

Most areas in the forest were relatively free from scrub and any removed consisted generally of alder on boggy land. Early in the operations for F.Y.35, a few old ash were removed; these were found to be very black in the heart after felling. A small area of alder in Laggan (P.35) was girdled.

By the time planting was started in this forest, the value of turfing was fully appreciated, and right from the start mounds were used where the ground was not suitable for flat planting. The best ground in the area was planted first, and naturally only a small percentage of the plants were on mounds. By P.37 and 38, extensive draining was necessary and probably up to 80% of the area was drained and mounded. About 20% of the drains were for turfing only.

On the harder knolls, the Scots pine were planted in a type of pit, which was made with a form of clay spade, known as a "Skelton". The hole was about 4 in. in diameter, and some of the top layer of the material removed was spread over the bottom.

Over the rest of the drier slopes which were usually covered with a heavy crop of bracken, very little screefing was necessary.

The nature of the greater part of the forest makes it generally too steep for mechanical ploughing, but in P.48 at the top of Immervoulin, a small area was ploughed with a Cuthbertson single furrow plough drawn by a Crawler tractor. Some 9-10 in. of peat overlies the gravel in this section and the considerable improvement in aeration is reflected in the excellent growth of the Sitka spruce planted there.

Choice of Species

The general principles followed have been:-

European larch on all the deeper free soils on the slopes, which were usually covered with bracken.

Scots pine on all the hard knolls and dry Calluna type of soil.

Norway spruce on the lower flushes and richer peats. A notable exception to this can be seen in Compartment 146, where about four acres have been planted at an altitude of 1000 ft. This was following the older practice when the Norway spruce was usually planted on the high ground

while the Sitka spruce was planted on the lower, more sheltered sites, a complete reversal of our present practice.

Sitka spruce on the poorer soils at both high and low elevations and also in exposed sites where Norway spruce was not thought likely to succeed.

Japanese larch generally on Calluna/bracken ground which was considered too poor for European larch and too good for Scots pine.

Hybrid larch in a small percentage in P.38 on soil considered too poor for European larch and too good for Japanese larch.

Other species were used in extremely small proportions. These were:-

Abies nobilis planted in pure blocks in P.36 and 37 at high altitudes in exposed places.

Douglas fir planted in heather knolls in P.45 in mixture with Scots pine, four rows of Douglas fir alternating with two rows of Scots pine. The Douglas fir went into check and many died. Better results might have been obtained if they had been planted in pits instead of being merely notched in, and if the mixture had been a 50/50 one. Nevertheless the surviving Douglas fir now show signs of coming out of check.

Pinus contorta planted in mixture with Sitka spruce in P.38 and 39. The mixture was an intimate one of alternating plants in the rows, with occasionally complete alternating rows of each species. In all cases, the plants were on mounds. The pine has generally outgrown the Sitka spruce.

Amenity Planting

Groups of Red oak, lime, beech, maples, Thuya plicata and Lawson cypress have been planted along the roadside for amenity purposes. An occasional laburnum and a small block of Stronvesia davidiana have also been planted on the edge of the forest near the Strathyre section of the main trunk road.

Planting

The normal spacing used over the forest has been:-

Scots pine	4½ ft.
European larch	5 ft.
Japanese larch	5½ ft.
Hybrid larch	5½ ft.
Norway spruce	5 ft.
Sitka spruce	5½ ft.

Type of Plant

A 2+1 transplant was the normal type used, except in the case of the spruces, when 2+2 plants were more common. As usual, the larger plants were used for flat planting, while the smaller were kept for the mounds. The source of supply was usually Strathyre or Tulliallan nursery.

Seedlings were only used in Compartment 150 at Laggan, where 2+0 Japanese larch were planted.

Methods of Planting

For notching, the Schlich spade was commonly used, with an "L" notch as the usual form of cut, but in the case of all the larch, a deep vertical notch was made with a Skelton spade.

Worn down nursery spades were latterly used for the mound planting.

Annual rate of Planting

As in many other forests, the early annual rate of planting was considerable. Planting started in Kirkton Glen at Tulloch in 1931, but operations only started in 1935 in the main Strathyre block.

F.Y. 31	122 acres	F.Y. 42	289 acres
32	107 "	43	240 "
33	100 "	44	262 "
34	216 "	45	157 "
35	422 "	46	131 "
36	420 "	47	352 "
37	303 "	48	239 "
38	313 "	49	117 "
39	406 "	50	111 "
40	339 "	51	158 "
41	445 "		
		Total	5249 acres

Manuring

No phosphatic fertiliser was ever used on the plants in this forest as soil conditions were never bad enough to warrant it.

Establishment

There can be no doubt of the success of the establishment of this forest. The careful selection of species for each variation of soil type

has resulted in the utilisation of all the plantable ground and there are no obvious gaps.

European larch has been very successful and has been relatively free from die-back. Almost the only outbreak in the Strathyre section was concentrated in the south-west of the forest, particularly in P.35. After its first appearance in 1948-49, the affected crop was given a heavy thinning, the worst trees being removed in the process; the remainder of the crop has now completely recovered. In the Tulloch section die-back appeared in the P.32 area of Glen Grotha and Kirkton Glen, but recovery in both cases has been fairly complete.

Spruces have also been extremely successful, Norway spruce in particular which was always planted on the best soil. Sitka spruce is developing well, as seen at high altitudes in Compartment 40, P.36. Had more of this species been planted on the better sites, a considerably increased yield could have been expected from the forest. The P.36-37 Sitka spruce looks remarkably uniform and healthy.

Where Pinus contorta has been planted in mixture with Sitka spruce it is usually outgrowing the latter. When the crop is thinned, the spruce will be favoured.

Scots pine is remarkably healthy, planted as it has been only on the most suitable dry sites.

Japanese larch is growing well, and where small blocks have been planted on the better sites among Scots pine, its thinning may constitute a management problem.

Ploughing

The only ploughing done to date was at 5 ft. to 6 ft. spacing in a few acres in P.48 at the top of Immervoulin, when a Cuthbertson single furrow plough was utilised. 2+2 Sitka spruce were planted and subsequent growth has been excellent.

Beating Up

Careful planting and good supervision resulted in very little beating up being necessary up to 1940. In P.35, 36 and 38, there was no beating up at all.

During the War years, with the deterioration in the quality of the available labour, more beating up was necessary, but it was never excessive.

Weeding

Intensity of weeding varied with the vegetational type. For example, P.35, 36 and 37 had to be very intensely weeded owing to the extremely heavy bracken growth, which was often 6 ft. to 7 ft. high. Following prevailing practice, the pines and larches have been kept fairly clear of vegetation, while the spruces, particularly early in the season have needed much less weeding.

Mixtures

The only mixtures have been Pinus contorta/Sitka spruce and Scots pine/Sitka spruce, apart from the small area of Douglas fir/Scots pine. The mixtures were established more through a prevailing shortage of Sitka spruce than for purely silvicultural reasons. The Pinus contorta has largely outgrown the Sitka spruce, but the Sitka in its turn has outstripped the Scots pine.

Rates of Growth

There is a variation in growth rate over the forest, but the following table gives some examples of typical rates on free loose soil over quartzites and schists.

Compartment	Species	P.year	Age	(a) Altitude (b) Aspect (c) Slope (d) Exposure	Mean height of dominants	Mean height of crop	Mean B.H.Q.G. of dominants	Mean B.H.Q.G. of crop	Current Annual height increment during last four years.	Quality Class
					ft.	ft.	in.	in.	in.	
4	E.L.	35	17	(a) 500 ft. (b) W. (c) Steep (d) Sheltered	39	32	5	3¾	26	I/II
9	E.L.	31	21	(a) 1000 ft. (b) S.W. (c) Gentle to Steep. (d) Mod. exposed	35	30	6	5	20	II
4	S.P.	35	17	(a) 550 ft. (b) W. (c) Steep (d) Sheltered	25	20	4½	3¼	21½	II
4	N.S.	35	17	(a) 500 ft. (b) W. (c) Steep (d) Sheltered	30	24	5	3	18½	I/II
4	S.S.	35	17	(a) 540 ft. (b) W. (c) Steep (d) Sheltered	27	22	4¾	3½	22	III
8	S.S.	31	21	(a) 930 ft. (b) S.W. (c) Mod. slope (d) Exposed	30	26	5½	4	26	IV

The Quality Class of the Sitka spruce seems low, but it must be remembered that in the early years, the best spruce ground was reserved for Norway spruce.

Past Treatment of Established Plantations

The main operations carried out since the establishment of the plantations have been brashing, cleaning, thinning and drain repairs.

As in so many other forests, repairs to drains were neglected during the period of intense labour shortage during the War, and as a result, many of the areas closed canopy before this work could be undertaken. With the partial easing of the labour problem, much of this neglected work has now been brought up to date.

One hundred per cent brashing has been the custom in the European larch areas, partly due to the ease with which this operation can be carried out in this species, but mainly to the need for adequate ventilation and inspection of these stands. In the case of Scots pine, up to date approximately only 25% of the crop has been brashed in each stand, covering the elite trees. Racking only has been carried out so far in the other species.

Cleaning of the larch started in 1949 at Strathyre, and was completed by 1952. A beginning was made in 1951 with light thinning to the P.35 European and Japanese larch; some 30 acres have been treated, the average volume of the thinnings being .9 H.ft. per stem. The intensity is being increased and an average thinning yield of about 250 H.ft. per acre is being removed. At the Tulloch section, 43 acres of larch have been thinned, also with an average yield of 250 H.ft. per acre.

There has been little or no wind damage in the forest, and not much danger is to be anticipated on such a well drained area with fairly free soil. As so much of the Sitka spruce has been planted on the poorer sites, a relatively low quality class can be expected on many areas and the greatest yield of timber will probably be given after reasonably heavy grades of thinning are applied.

Research

One of the sets of Japanese larch provenance experiments planted by J.M. Murray in 1934 is situated in Strathyre Forest, Compartments 56A, 57A and 41. This experiment came under the control of the Research Branch in 1948.

There are nine plots of larch originating from different parts of Nagano Province, Japan. There are no clearly marked differences between any of them and it must be concluded that differences, if any, are too small to be brought out by an unreplicated experiment.

Experiments on the effect of lime on Scots pine, Sitka spruce and European larch were carried out in Strathyre nursery in 1936 and succeeding years. In 1940 it was concluded that "while effects of dressings up to five tons per acre may be negligible one or two years after application, the ill-effects of heavy lime dressings are serious to crops laid down three or more years after the initial lime dressing." Even much lighter dressings were found to be harmful, except to some extent with European larch

Conclusions

The establishment of Strathyre forest commenced at a time when many of the early mistakes of silvicultural technique had been overcome, and as a result of improved knowledge and careful supervision, the establishment has generally been extremely successful.

From F.Y.34 in particular, great care was taken to plant the species according to the indications of even small vegetational changes, which has resulted in the practice of sound silviculture and first class amenity planting. Dr. F. Fraser Darling, in his book "Natural History in the Highlands and Islands" says "Such is the country either side of Loch Lubnaig where the Forestry Commission is changing the face of the hillsides. The varied scheme of plantings here can serve as a model to confound those who hold that forestry spoils scenery."

The whole area of the Strathyre section was surveyed before planting was started, resulting in a system of rides and compartment boundaries well laid out.

Draining has been fully adequate for the area, and the small amount of beating up necessary demonstrates that the planting was well done.

Generally speaking, no modern technique would have greatly helped the establishment of the forest, as mechanical ploughing would not have been possible in the area on account of the nature of the terrain. The only exception might have been the P.47 section, Compartments 41-47 inclusive.

The only minor criticisms that might be levelled are:-

(a) In the early years at Tulloch, Norway spruce was still being planted on the high ground and Sitka spruce on the lower areas. This practice ceased by 1934.

(b) More pine might have been usefully planted at Tulloch, as some Sitka spruce has been planted on Calluna ground.

(c) The planting line has been just too high in places at Tulloch, where it rises to as much as 1800 ft. above sea level.

(d) Occasionally, minute variations in soil type have been followed too closely, with the result that small isolated blocks of Japanese larch in a matrix of Scots pine will require thinning long before the latter species, and extraction may not be economic.

The forest is now at a very interesting stage, when the primary task of establishment has been largely completed, and the production era approaches.

W. P. Thomson

27th June, 1952.

APPENDIX I

Notes from Inspection Reports

Forestry Commissioners' Tour - June 1935

"At Balquhidder, the cars were stopped at the Forest Workers' Holdings and a short walk taken into Kirkton Glen. Entering P.34 from the south, the Chairman drew attention to the deep free soil below the shallow, unfavourable surface layer, and it was suggested that Japanese larch might be better than Scots pine for use on such knolls. The Assistant Commissioner was doubtful as to the future market value of Japanese larch, but its value as a pioneer species was agreed."

From Chairman's Visit - July 1943

"The Chairman decided to inspect those parts of the oldest Strathyre plantations in the Laggan block (P.35 and 36) along the west shore of Loch Lubnaig.

European larch was seen to be suffering from Chermes attack and in many cases this was accompanied by the blackening of the stem due to last year's infestation by an earlier stage. A discussion on the future of European larch as a forest crop then took place. The Chairman stated that it was disturbing in view of the quantity of European larch which had been planted in the past to have doubts about the health of this species. The general opinion was that too much European larch was being planted, though the Acting Assistant Commissioner believed that the proportion in Scotland as a whole was not too high. The aim should be to have only a few larch in the final crop, rather than risk pure crops of European larch.

It was observed that Norway spruce at Strathyre Forest was growing well, one of the reasons being that it had been grown on the good sheltered ground along the lochside; Sitka spruce had been confined to spruce ground at higher, exposed levels where Norway spruce would not have thrived.

The Chairman ... said that we must not any longer, at Strathyre or elsewhere, allow so much of the best spruce ground to be planted with Norway spruce, which, after all, produced so much less timber than Sitka spruce."

Chairman's Visit - September 1947

"The party motored to Laggan. Here the road being constructed by Forest and P.O.W. labour was walked for a mile. The Forester estimated the cost at 15/- per yard, i.e. £1,300 per mile.

Looking across Loch Lubnaig to the P.35 and 36 plantations on the other side, the Chairman remarked that the intricate admixture of species had resulted in a pleasing mosaic. The groups of Japanese larch isolated in blocks of slower growing species would, however, be difficult to manage. Thinnings of this larch must not be delayed, but such small quantities of produce could not be economically extracted and would have to be left lying.'

Tulloch

"The Chairman considered the growth of all species in P.40 satisfactory, and commented on the healthiness of the seedling European larch along the roadside.

Of P.37, the Chairman said that the Scots pine and Sitka spruce appeared promising but had the same criticism to make of the groups of Japanese larch as at Strathyre. Both Scots pine and Norway spruce have been planted too high up the slope."

Chairman's remarks

"To me, the most interesting point was the improvement in the appearance of the European larch, which, I was informed, was in contrast to the Aberfoyle district. One can hope that the improvement will be maintained because there is far too much European larch in this forest."

Director's Visit - September 1948

"My general impression was of a promising forest, well planned from the beginning, and credit for this is due to Cameron, who has been at Strathyre since the beginning (except for the war years). Careful choice of species (except to some extent in the war years) has resulted in a varied and generally flourishing appearance. So far, the bulk of the European larch (and there is a lot of it) looks healthy, but I rather anticipate an increase in the amount of die-back. Early and heavy thinning of the European larch is important as the only possible measure that might help to ward off an attack. Extraction is being tackled in a sensible and economical way."

Chairman's Visit - August 1951

In P.45 certain of the better (pan-free) morainic knolls at the lower elevations which carried almost pure Calluna were planted with a mixture of Scots pine and Douglas fir.

Three lines of Scots pine alternating with three lines of Douglas fir were planted, thus giving a 50/50 mixture. The Chairman admired the healthy and sturdy growth of the Douglas fir very few of which still show signs of the yellow discolouration they assumed shortly after planting. He thought that such sites would eventually yield some of our best stands of Douglas fir but that in any case, it was important to introduce a more highly productive species than Scots pine wherever there was a reasonable chance of success. There was a considerable area of this type of land in the Strathyre-Loch Ard district which had previously been planted with Scots pine pure, and he asked that the matter be given very careful consideration in future planting programmes. The Chairman thought that on such sites where the Douglas fir came speedily out of check, a mixture of two lines of Scots pine alternating with two lines of Douglas fir would have given just as good initial results and considerably greater volume, since the crop would have become pure Douglas fir far more rapidly.

Whilst driving along the Laggan road, the Chairman remarked upon the healthy growth of European larch in P.41 Compartment 120, P.39 Compartment 143 and P.35 Compartment 145, all of which areas had been brashed and cleaned. He asked the Forester if there were any areas of die-back in Strathyre Forest. Mr. Cameron said that there were a few patches at the far end of the road in P.35 Compartment 151, but that elsewhere all the European larch were healthy. Incipient die-back which had been noted in 1945 and 1946 had disappeared with brashing and cleaning.

The Chairman said that little was known about the causes of die-back but that it appeared certain that if a crop were brashed and opened out early, i.e. immediately after the canopy had closed, the risk of a bad attack was greatly reduced. He asked the Forester to watch the European larch closely as there was still some danger of die-back developing. After the second and third thinning it was likely that this danger would be past."

Chairman's remarks

"The chief doubt as to the success of the plantations has been the

behaviour of the large areas of European larch. Apparently early brashing and cleaning has so far prevented die-back so that there are only a few small patches which exhibit extreme die-back. This is promising, but we are not yet "out of the wood"."

APPENDIX II

Supervision

Conservators

1946 - 1948	A. Watt
1948 - to date	J. E. James

Divisional Officers

1930 - 1934	J. M. Murray
1934 - 1938	O. J. Sangar
1938 - 1939	A. H. Gosling
1939 - 1945	J.A.B. Macdonald
1945 - 1946	A. Watt

State Forest Officers

1947 - 1948	J. E. James
1948 - to date	H. V. S. Dier

District Officers

1930 - 1933	W. Whelans
1933 - 1935	L. A. Newton
1935 - 1943	J. E. James
1943 - 1945	T. E. Edwardson
1945 - 1949	H. V. S. Dier
1949 - 1951	J. G. Chrystall
1951 - 1952	I. Gillespie
1952 - to date	W. P. Thomson

Foresters Strathyre Section

1934 - 1941	A. Cameron
1941 - 1946	H. MacKinnon
1946 - to date	A. Cameron

APPENDIX II (Continued)

Foresters	Tulloch Section
1930 - 1934	J. Scott
1934 - 1937	A. Cameron
1937 - 1944	W. Fairbairn
1944 - 1946	W. Stoddart
1946 - 1947	W. D. Rattray
1947 - 1949	R. Linder
1949 - to date	A. Polwart

APPENDIX III

NURSERY

The nursery attached to the forest was first established in 1935 and extended in 1936 to its present area of approximately 3½ acres.

In F.Y.52 the utilization of ground was as follows:-

Seed Beds

	Square Yards	
1 year	2193	
2 year	2006	4199
Transplant Lines		
1 year	6464	
2 year	171	6635
Greencrop	3797	3797
Not Cultivated	200	200
Roads, Paths and Waste	1729	1729
Grand Total		16,560 square yards

Soil Analysis

Soil conditions are fairly good, the last analysis report in 1951 gave the following details:-

pH.	% Readily Soluble Lime	Phosphate Content	Potash Content
5-5.5	.04 - .07	Slightly low	Slightly low

It will be seen that the reactions approximate to those most favourable to the growth of conifers, namely pH 5.0 - 5.6 and .12% readily soluble lime (CaO).

Maintenance of Fertility

Fertility is maintained by the practice of greencropping on a four year rotation, followed by one year under transplant lines and two years under seedbeds. This is the normal procedure but there are occasional deviations from the regular treatment.

Green-crops

Before sowing the greencrop in late March or early April, the following dressing of fertilizers is applied:-

Farmyard manure	20 tons per acre
Sulphate of ammonia	2½ cwts. per acre
Superphosphate	3 cwts. per acre
Muriate of potash	2 cwts. per acre

Rates vary with the results of the soil analysis but the above are average.

The normal prescription used for the green-crop is:-

Castleton Potato Oats	2½ bushels per acre
Tares	1½ bushels per acre

This crop is ploughed down in July and where the area is to be lined out the following season it is re-sown with the following mixture:-

Perennial rye grass	20 lbs. per acre
Italian rye grass	5 lbs. per acre
Broadleaf clover	2½ lbs. per acre
Late flowering red clover	2½ lbs. per acre

Application of fertilizers is then at the rate of:-

Sulphate of ammonia	1½ cwts. per acre
Muriate of potash	1 cwt. per acre
Nitro chalk (as a top dressing a week after seeding).	1½ cwts. per acre

This crop is ploughed under in the process of lining out and renders this operation possible at times when bare ground would be unworkable.

Sterilization

Excellent results were obtained in F.Y.51 through the sterilization with formaline of the seed beds some two weeks before sowing coniferous seed. Spent hops, fortified with a balanced artificial fertilizer dressing gave large 1 + 0 seedlings of which a high percentage were fit for lining out.

A similar trial was carried out in F.Y.52.

History of Strathyre Forest

APPENDIX IV

Percentage of Species Planted

F.Y.	S.P.	E.L.	J.L.	D.F.	N.S.	S.S.	P.C.	H.L.	Other Cfs.	Hwds.
1935	16.3	20.2	.7	.4	51.8	10.2	-	-	-	-
1936	15.3	6.7	5.3	-	24.3	45.9	-	-	1.8	.4
1937*	43.0	5.0	7.1	-	17.8	18.1	7.1	-	-	.7
1938	14.3	18.5	1.6	.5	16.9	37.6	2.0	5.8	2.8	1.9
1939	16.8	10.6	1.6	-	23.4	45.7	1.9	-	-	-
1940	5.6	4.4	10.5	-	15.6	61.8	.5	-	1.6	-
1941	3.7	9.4	10.1	.2	9.7	64.6	.3	-	1.4	.6
1942	23.7	11.7	20.1	-	3.2	40.6	.7	-	-	-
1943	7.4	-	10.8	-	25.1	54.7	-	2.0	-	-
1944	-	-	-	2.5	2.0	95.0	-	-	-	-
1945	3.0	1.8	1.2	1.8	4.2	86.6	1.2	-	-	.5
1946	7.1	-	-	1.5	-	91.4	-	-	-	1.2
1947	13.8	2.1	4.5	.3	13.6	65.7	-	-	-	-
1948	3.5	-	-	-	-	96.5	-	-	-	-
1949	-	-	-	-	-	96.0	4.0	-	-	-
1950	3.2	-	-	-	-	96.7	-	-	-	-
1951	19.4	5.1	34.9	-	4.5	33.5	1.3	1.3	-	-
Aver-age	13.4	7.6	6.3	.5	16.7	52.7	1.1	.6	.6	.4

* The high percentage of Scots pine planted in 1937 was due to a shortage of Sitka spruce in that year.

STRATHYRE FOREST
TULLOCH SECTION

COUNTY OF PERTH
PARISH OF BALQUHIDDER

AREA STATEMENT Nov. 1936

P. No	Acres		
	Established	Not Estab^d	Total
31	112·5	10·0	122·5
32	58·0	49·5	107·5
33	5·0	95·0	100·0
34		216·5	216·5
35		138·0	138·0
36		111·5	111·5

Key to Experiments

A. S.S 30/29 2 yr Seedlings P. 32 C. 43. 44
B. J.L Races; P. 34, C's 56A · 57A Dr SW Fk No. 68.

Scale _ Six Inches to One Statute Mile or 880 Feet to One Inch – 10560

10 Chains 5	0	10	20	30	40	50	60	70		80 Chains	1 Mile
40 Perches 20	0	40	80	120	160	200	240	280		320 Perches	
1000 Feet 500	0		1000	2000	3000	4000		5000	5280 Feet		1 Mile
1 Furlong	0		¼	½	¾						

Photoprinted from Second Edition 6" O.S. Map
Perthshire Sheets XCI.SE XCII.SW CIII.NE CIV.NW
with addition of plantations to Nov 1936 and compartments

John White Nov 1936

LIBRARY
I.F.No:
902 (410.12)
H.M. Forestry Commission

AREA STATEMENT Nov 1936

P. Nº	Acres		
	Established	Not Estab.d	Total
35		283·5	283·5
36		3400	3400

STRATHYRE FOREST

COUNTY OF PERTH

PARISHES OF BALQUHIDDER AND CALLANDER

Photoprinted from Second Edition 6" O.S. Map
Perthshire Sheets CIV (all) CXIV (all) XCIII S.W.
with addition of plantations to Nov 1936 and compartments

Scale – Six Inches to One Statute Mile or 880 Feet to One Inch