

Tuesday, 17th July

Maps $\frac{1}{4}$ " Sheet 3
 1" Sheets 49, 55, 56.

Leaving Pitlochry we pass Faskally and turn down to the left over the Bridge of Garry. The River Garry here is very beautiful as it runs through a small gorge. The woods belong to Bonskeid House and on the right about 100 m. up the hill is a group of fine old Larix decidua which includes a 'plus' tree selected by the Geneticist. We pass through Allean Forest (Forestry Commission) which has an area of 1,192 ha., about a seventh of which is either agricultural land or land too high for economic planting. Pinus sylvestris, Larix leptolepis and Picea sitchensis are the main species used.

The broad expanse of Strath Tummel (Strath = a broad valley) stretches out in front of us and the view which first greets the eye was called the Queen's View after a visit by Queen Victoria. The view has changed since she saw it, as there is now a dam at the west end of the Tummel which has raised the level of Loch Tummel and greatly extended its area. The Hydro-Electric Power station at Tummel Bridge will be noticed, still in its wartime camouflage paint, across the River Tummel.

THE BLACK WOOD OF RANNOCH

The Forestry Commission. East Scotland Conservancy.

District Officer: Mr. D.A. Woodburn
Forester: Mr. P.J. Garrow

The Black Wood forms only a part of Rannoch Forest. It is this ancient remnant of the Caledonian Forest which we shall study this morning.

Geology and Soil. The rock formation is undifferentiated gneiss and schist of the Dalradian series and is overlain with a deep layer of glacial drift. Morainic knolls and ridges are a feature of this area. There is a layer of brown stony soil over the drift, 15-20 cm. deep, and where there is some depth of peat, the brown soil is replaced by a leached grey soil.

Past History. Formerly part of the lands of the Robertsons of Struan, the Black Wood is a remnant of the native Caledonian Forest. It probably owes its survival to the fact that even as late as 1791, when the First Statistical Account of Scotland was written, the district was considered uncivilised and barbarous, and the area had a sinister reputation as a refuge for outlaws.

The first grant of lands to the Robertsons was made in 1398 by Robert III. Although declared forfeited in 1690, the estate was not confiscated until after the 1745 Rising, when it was managed by the "Commissioners of Forfeited Estates and Barons of the Exchequer" from 1749 to 1784. After 1784 the estate was returned to the Robertsons. It was sold to the Wentworth family in 1857 from whom it was acquired by the Forestry Commission in 1947.

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Thus the Black Wood has returned to State control after a lapse of nearly 200 years. It was during the time of the State's first management that steps were taken to protect the woods from grazing cattle and to undertake some form of silviculture. In 1759 part of the woods were enclosed by a dyke, and two men were employed to maintain the fencing, to gather and sow pine seed, and to cut back young birch. The enlightened forestry carried out on the estate was largely due to the efforts of the factor at the time - Ensign James Small. As a result of this and further enclosures, when the cattle of the crofters at Carnghouran, which lies to the west of the Black Wood, were excluded, the survival of the wood was assured. A petition was sent to the Commissioners wherein it is stated that "the petitioners mean not to dispute that posterity may eventually be benefited by the proposed enclosure of the whole of the wood". The petitioners were right, for it is a result of these enclosures that there is this remnant of the Black Wood today.

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It is also, however, because of the failure of an effort to exploit the wood that it remains. At the beginning of the nineteenth century a public company from the south bought the Black Wood from the Robertsons, but this company, because of financial losses, had to abandon the project to fell it all. The company built a system of canals and collecting basins for extracting the timber which was sent down chutes to the loch and floated down the Tummel and Tay to the sea at Dundee.

After the Wentworth family bought the estate, the Black Wood was again enclosed in 1895, but it was with the object of sheltering deer, and it was not until the advent of the military in 1939 that the deer were driven out. The present enclosure, to keep out deer, was made in 1948, but it is easier to erect a deer fence than to keep deer out.

The history of the Black Wood is mainly one of exploitation. It was used by General Wade in 1733 for timber required when building his bridge at Aberfeldy. Over 1,000 trees were cut and used in the building of the West Highland Railway, and although spared during the 1914-18 war, it was cut over during the 1939-45 war by the Canadian Forestry Corps, who removed the best of the big trees. As a result of all this exploitation the area is by no means fully stocked, the trees remaining are, for the most part, either heavily branched or small, and natural regeneration is very limited and localised.

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Recent Management. Since its acquisition by the Forestry Commission in 1947, until 1955, the devastated Black Wood received no treatment except a little drainage and the control of vermin by fencing and shooting. During this time work at Rannoch Forest was concentrated in other parts of the forest, and it was hoped that reduction of vermin would result in the appearance of natural regeneration in the Black Wood.

This policy of "laissez faire" has not, however, been successful, and it is realised that more active measures are necessary to ensure the continuity of this Caledonian remnant.

Future Management. The direct approach to the problem of re-stocking the Black Wood has been taken by the staff of East Conservancy, whose policy is to clear-fell groups of the existing trees and to replant these groups with Pinus sylvestris grown from Rannoch seed. Trees due to be felled will be seen marked with white paint over the eastern two-thirds of the wood, and the necessary drainage operations are in progress.

While this policy offers a reasonable chance of reinstating the Black Wood as a productive forest of native Pinus sylvestris, it does not answer the question why, in this undoubtedly natural stand, conditions appear to be so unsuitable for healthy growth and regeneration.

It is true that the crop we now see is only a despoiled remnant of what must have been a flourishing wood, but nevertheless the stocking yearly becomes less and, while much of this is due to the death of over-mature trees, other apparently younger trees slow down in growth and die, or become moribund, to an extent greater than can be accounted for by insects, vermin and fungi.

Equally disturbing is the fact that the crop is not renewing itself, natural regeneration being sparse, sporadic and unpredictable.

Research work on natural regeneration. In order to investigate the causes of this unhappy condition the Research Branch of the Forestry Commission has taken over 97 ha., comprising the western end of the Black Wood, as an Experimental Reserve. The work here will be concentrated on observation of the agencies which operate; and on following the changes which are taking place in the tree growth, ground vegetation and natural regeneration. These observations will be assisted by experimental treatments when necessary, but any large scale alteration of site factors over the whole area will be avoided.

The need for such work was recognised at the time of acquisition, and in 1948 an ecological survey was made of the different vegetation types on seven plots of 0.8 ha. each. These will be re-surveyed in 1956, and more detailed study made of the types considered to be most important.

Other preliminary information is provided by experiments and observations started in 1949. These were:

- (1) The laying down of two experimental areas, one on Calluna/Vaccinium and the other on Molinia, where certain preparatory treatments were given, and the results of both seed sowing and natural regeneration could be observed.
- (2) Observations on square yard quadrats in areas where initial germination had been plentiful; Some of these plots were weeded and top-dressed with phosphate.

The results obtained were disappointing, but provisional conclusions reached were:

- (1) Killing the ground vegetation without working the soil is not sufficient to promote natural regeneration or to allow direct seed sowing to succeed.

(2) The risks are such that once the expense of soil preparation has been undertaken, it would be more economic to plant than to wait for natural regeneration.

(3) Natural regeneration may be possible after a long period, when the area has passed through a Betula/Sorbus aucuparia phase. Regeneration of these species is facilitated by the use of phosphate.

Although there are sporadic groups of Sorbus seedlings, Betula is very slow to regenerate, and the development of both species is severely retarded by Roe deer, (Capreolus sp.). It may therefore be a very long time before a Sorbus/Betula phase is reached.

While giving a good idea of the extent of the problem, these experiments were not observed sufficiently closely to indicate the precise causes of failure. Future work will attempt to do this by observing the effects of drought, frost, insects, birds and mammals on the young seedlings, and by sampling the amount and periodicity of the annual seed-fall.

It is possible that excessive surface moisture plays a very large part in the general ill-health of the pine and its failure to regenerate. This may be in part attributable to the disturbance of the natural drainage by the construction of the canals for the extraction of timber, and partly due to the reduced stock of trees and lesser water loss by transpiration.

Varities and forms of Pinus sylvestris. A study (as yet unpublished) of the native Scots pine in this wood and elsewhere has recently been made by Dr. A. Carlisle of the Department of Forestry, Aberdeen University. A number of habit variants have been distinguished:-

Var. horizontalis Don is easily recognised by its very straight stem, clean when mature, slender branches which are horizontal in the middle third of the crown, and rather open foliage. The crown shape of horizontalis tends to vary with age, but at about 120 years it is rather narrow and cylindric conic to cylindric. When over 140 years old this type has a straight clean stem with only slight taper and a dome-shaped crown at the top, still with more or less horizontal branches which, we believe, becomes the umbrella type when fully mature. As regards form, it is the best type we have, but as far as we can tell at present it is not very fast-growing.

Forma ascensa Carlisle is quite different. It has a definite main stem with rather coarse side branches reaching well down the stem and having an upward angle in the top two-thirds of the crown. The outline of the crown is irregular, but varies with age. Generally it is cylindric conic to broadly cylindric conic.

Both these types may be seen in all parts of the woods.

These two types in their true form are not particularly frequent, and the greater part of the forest consists of intermediates between them, which seems to be of rather faster growth than var. horizontalis.

Forma condensata Fries, which is common in Sweden, occurs scattered throughout the whole wood. It has a broad bushy crown with no definite main stem, the axis of the tree being formed of fused or applied stem-like branches growing upwards from the ground. When the trees grow older these branches fuse to give a much fluted stem-like axis.

Forma fastigiata Carrière is different and much rarer. It is a tall tree with a definite main stem, a long lobe-shaped or sub-columnar crown, and very numerous fastigiate branches reaching almost to ground level. It produces very few cones.

Var. Pyramidalis and var. pendula Caspary are also to be found.

Leaf Variants. Most of the trees in the wood have grey-green leaves, but there are a few scattered glaucous variants. The glaucous sheen is not very clear in the spring, being most obvious in late summer and autumn. It has no name, but resembles superficially var. argentea.

Cones. There are at least nine different cone types in the woods, based on differences in the prominence of the apophysis and in the shape of the cone. For general purposes however three broad types can be used to classify the cones, f. plana, f. gibba, and f. reflexa, these types being based on the prominence and curve of the apophysis; f. plana, Christ, has an almost flat or slightly raised apophysis at the base of the cone on its dorsal side; f. gibba, Christ, has a raised, dome-shaped to pyramidal apophysis; f. reflexa, Heer has a raised apophysis which is recurved.

Seeds. There are an enormous number of seed colour variants and variations in the micropylar tip. Generally speaking, there are black seeds, brown and pale brown to yellow, with some mottled. The seed wings vary from pale violet brown to deep chocolate brown, from short and deep to long and narrow; some of the wings are plain others striped.

Crossing back towards the main road the party will stop near Dall Sawmill where Pinus sylvestris, which survived the war-time fellings, can be seen.

A sandwich lunch will be taken in the forest.

The party will board the bus and going via Glen Errochty they will notice the hydro-electric power developments and the Forestry Commission's Glen Errochty forest on the right of the road. Coming into Glen Garry we cross the River Garry and arrive at Blair Atholl.

BLAIR ATHOLL

Owner: The Atholl Estates
Factor: Mr. T.P. Stewart
Head Forester: Mr. J.B. Hendry

Atholl Estates extend to an area of approximately 56,700 ha. situated to the north and east of the rivers Tay, Tummel and Garry, of this, 3,035 ha. consists of woodland.

The great afforestation projects carried through by the Duke of Atholl in the eighteenth century have already been described in the note on the visit to Dunkeld.

It is of interest that the bulk of the younger plantations, i.e. up to about fifty years of age, consist of the hybrid L. eurolepis.

The Estates have dedicated 2,932 ha. of woodland consisting of approximately;

	<u>Hectares</u>	
(a) Hardwoods	174	Mainly <u>Quercus</u> (includes scrub coppice)
(b) Conifers 45 years and over	324	Mixed conifers
(c) Conifers under 45 years	1,295	<u>Larix</u> spp. and other conifers
(d) Felled and other Woodland	1,139	Mainly <u>Pinus sylvestris</u>
	2,932	
(e)	103	
Total	<u>3,035</u>	

Item (c) includes approximately 930 ha. of Larix, eighty per cent of which consists of L. eurolepis and L. leptolepis.

During the next ten years it is proposed to plant at the rate of 80 ha. per annum and to proceed with thinning, mainly undertaken by timber merchants, at the rate of approximately 300 ha. per annum producing about 12,600 cu.m. annually.

The staff consists of: one woods manager, 5 district foremen, one office assistant, one carpenter, 38 forest workmen (including permanent sawmill staff, horsemen, truck and tractor drivers). Total 46. Plus seasonal labour as available.

(1) The bus enters by the West Gate and passes through pure blocks of L. eurolepis, P. sylvestris and P. abies planted in 1926. The trees with a white paint ring indicate selected stems for retention. Next on the right there is a stand of P. sylvestris planted in 1909 and by the ride two fine old pines 160 years old.

The party leaves the bus at this point and walks up to:

(2) Lagrennich Plantation. Elevation 200-250 m. This wood contains 3 ha. of L. leptolepis planted in 1895, (one of the oldest plantations of this species in Scotland) on the lower slopes. Higher up the hill there is nearly a hectare of first generation L. eurolepis planted at a later date which is not known exactly. Both species have been thinned four times, starting in 1936, and another is now marked. The total yield per hectare (including the thinning marked) has been: L. leptolepis 401 cu.m. and L. eurolepis 410 cu.m. The standing crops are 272 trees per hectare comprising 321 cu.m. and 346 trees per hectare comprising 303 cu.m. approximately.

(3) Old Blair. At Old Blair near the ancient St. Bride's Church are a collection of exotic conifers including the following:- Abies grandis 39.3 m. high, Abies lowiana 32.0 m., Abies magnifica 29.9 m., Abies procera 35.5 m., Chamaecyparis nootkatensis 18.3 m., Libocedrus decurrens 24.1 m., Sequoia gigantea 35.3 m., Thuja plicata 28.0 m., Tsuga heterophylla 33.0 m.

Leaving the churchyard the party moves towards Old Blair Bridge where there are nine of the original Larix decidua brought by Colonel Menzies in 1738. These trees are from the same lot as the "Parent Larch" at Dunkeld Cathedral. The tallest of these is now 41 m. and it has a diameter of 128 cm.

(4) Diana's Grove. Diana's Grove is a unique mixture of North West American conifers and other exotics. It is 3 ha. in extent, elevation is 170 m. The soil is a loam on top of gravel, and it was planted in 1880. Volume has been estimated at 1,079 cu.m. per ha. The wood was examined in 1955 when it was found that there were 18 different species present. Of the 75 trees which were measured, 62 are 30 m. or over, 21 are 40 m. or over and 3 are 43 m. or over. Four trees are probably the tallest of their species known in Britain:-

Tree No. 20.	<u>Larix leptolepis</u>	32.0 m. x 78 cms. diam.
" " 56	<u>Abies magnifica</u>	35.4 m. x 99 cms. diam.
" " 66	<u>Abies lowiana</u>	40.8 m. x 86 cms. diam.
" " 71	<u>Abies concolor</u>	38.7 m. x 94 cms. diam.

There are also 10 Abies grandis 40 m. high or over.

After looking at this the party moves on to Blair Castle. Near the lawn are two of the original Larix eurolepis from 1900 seed. They are now 24.4 m. and 23.8 m. tall.

The party will have tea at the Castle.

On the return journey to Pitlochry we pass the site of the Battle of Killiecrankie (1689).