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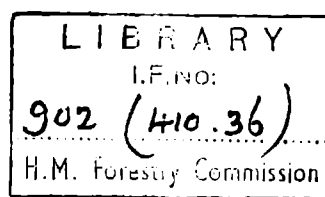
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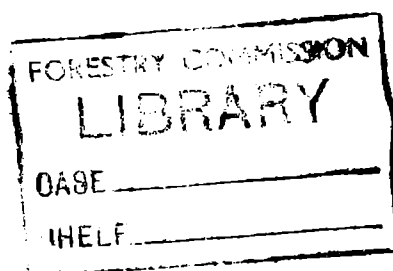
BENNAN SECTION

OF

CAIRN EDWARD FOREST

1921 - 1951

SOUTH (SCOTLAND) CONSERVANCY



HISTORY of the BENNAN SECTION

CAIRN EDWARD FOREST

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HISTORY OF BENNAN SECTION OF CAIRN EDWARD FOREST.

CHAIRMAN'S COMMENTS.

It was recognised from the beginning that the front slopes of Bennan facing the loch were relatively easy ground, that the Warren was a mixed bag and the back slopes of Bennan were very difficult with comparatively little safe ground and the remainder either doubtful or definitely unplantable.

The Warren was the first planted up and that according to the contemporary state of technique. The history describes the set-backs which followed and which were accentuated by attacks by black game and deer. Nevertheless a satisfactory if costly plantation has been secured in the long run. It is worth noting that the first plantation on a new area seems to attract all the neighbouring black game; that the result seems catastrophic at first; but that gradually the attacked trees get away and after the first or second thinning one has to look very hard to find evidence of the attack. The same thing happened at Screel Hill on a Japanese larch plantation which I noted specially at the time. Presumably recovery was made possible or hastened by severe handling of the black game.

The front face of Bennan seemed to present no particular problems. In my recollection the young Douglas fir began to swing and there was a good deal of staking; in due course the trees stiffened up and became windfirm. The use of European larch was in accordance with the state of contemporary knowledge; the superiority of Japanese larch on what might then have been described as a second-class European larch site was not known.

The planting of the back of Bennan was in essence a large-scale experiment, too large, no doubt, having regard to our then knowledge since it had to be followed up quite soon by the experimental plots referred to in the history. Even so I am

surprised that more intensive drainage, mound or turf planting were not applied sooner since J.M. Murray who had so much to do with Bennan was foremost in developing such methods in other forests. A possible explanation is that drainage was difficult and costly at a time when finance was difficult. I am interested to note that under these conditions Sitka spruce has not responded well in mixture with Scots pine but has done so in mixture with mountain pine. This is something worth remembering in connection with really bad sites. I gather that the back of Bennan (of which I have not had a good view for many years) is for the most part beginning to close up. Further improvement may be expected as the trees get mutual shelter and I think that a series of photographs (of a general and detailed character) should be taken and preserved for future reference.

I have no doubt that the early work at Bennan, leading both to success and failure or apparent failure, has been an invaluable guide to the much larger afforestation plans since initiated in the south-west of Scotland.

I am sorry that the Populus trichocarpa along the lochside have been so short-lived. Seen against a dark coniferous background their silvery foliage gave a most charming effect (as now to be seen for example in one view from the village of Ae). I think we should persevere with trichocarpa purely as an amenity tree, planting them wider apart than at Bennan and not pruning them since pruning seems to lead to canker.

R.
January 21st., 1952.

HISTORY OF BENNAN SECTION OF CAIRN EDWARD FOREST

GENERAL DESCRIPTION of the FOREST

The larger unit, Cairn Edward, of which Bennan Forest forms part, was, until quite recently, the largest State Forest area in South Scotland and one of the earliest to be created. It extends to 15,034 acres over the high ground between Loch Ken and the Black Water of Dee and lies immediately to the west and south-west of the Burgh of New Galloway. The forest was the forerunner of many to be formed in the relatively isolated but renowned province of Galloway and the Stewartry of Kirkcudbright.

Situation.

The name "Bennan" is derived from the hill rising 845 ft. above the western side of Loch Ken, which hill and flat land between it and the Loch being the first acquisition in 1921 to New Galloway Forest as it was then known. Cairn Edward Forest was created as a separate unit in 1937 and marched with Bennan to the west. After further additions in that direction the two forests were merged from 1st June 1939 though keeping their identities as Clatteringshaws and Bennan sections of Cairn Edward Forest. "Cairn Edward" is the name of the peak (1066 ft.) between Bennan Hill and the Black Craig or Cairnsmore of Dee, the highest hill within the area.

Acquisition and Area.

The first acquisition of 1280 acres formed the nucleus, in 1921, of the forest and consisted of Bennan Farm, a poor sheep farm, Bennan Hill and the Warren, both of sporting value only and all forming part of Airds Estate. In 1931 that part of Burnfoot Farm between Lowran Glen and Cairn Edward House was added from the Kenmure Estate. Burnfoot, Gairloch, Knocknarling and Laggan Farms, totalling 7925 acres, were acquired from the

same Estate in 1937 to constitute Cairn Edward Forest (see above). Cragnell, Clatteringshaws and Craigshinnie followed a year later, the last major addition being 790 acres of the Orchards Farm in 1940. As stated earlier the forest area was divided for working purposes in 1939 into Bennan and Clatteringshaws Forests. The boundary line was never clearly defined and following the relatively greater development of Bennan Forest the latter forest is taken to be the Knocknarling Farm and areas east of it. On this basis Bennan Forest extends to 8117 acres of which 3029 acres are now planted.

Former Utilisation.

The Warren was largely derelict agricultural land with some deep peat in the west. There were some good oak near the loch before 1920 and about 110 Scots pine of a great age but small volume. Original oak woods, mixed with Norway spruce (P.83) in Back and Birkgreen Woods still remain in the Knocknarling Glen as do patches of oak scrub around derelict crofts in the Dee Valley.

It is on record that Bennan Hill was at one time covered with very large Scots pine and European larch which provided the sleepers in 1870 for the construction of the nearby railway. The remaining timber was felled between 1918 and 1923 and consisted of mixed hardwoods, oak coppice and standards predominating and a few conifers scattered through it. The merchant who felled the trees states that oak coppice was 60-80 years old and that the whole wood gave around 100,000 cu.ft. of mill timber.

Topography.

The area is typical of the Galloway scene, formed on the large granite intrusions west of the Doon-Ken line. Bennan lies on the glaciated granite ridge extending west to east between the Knocknarling Burn and Black Water of Dee valleys

from the 1600 ft. peak of the Black Craig of Dee, through Cairn Edward (1066 ft.) and Bennan Hill (845 ft.) to the shore of Loch Ken at 150 ft. which largely forms the eastern boundary.

Geology and Soil.

For the most part granite is the underlying rock with metamorphic Ordovician along the northern boundary and Silurian along eastern boundary and in the south-east. The shales give a moderately good loam for the growth of trees but over the granite boss, boulder clay or a poor gritty soil are overlaid by peat, extensive and deep locally.

Climate.

Rainfall is moderately high varying from 55 to 75 in. per annum, being lowest in the south-east. Winds are generally south-westerly and gales from the south-west or north are not uncommon. Temperatures are fairly equable though frosts are frequently met with in late spring. Snow is variable and may persist for some time above 800 ft.

Vegetation.

The greater part of the area consists of Calluna/Molinia moorland with Scirpus, Myrica or Eriophorum locally, particularly on badly drained areas over granite. Bracken with grasses or Calluna occur locally, usually over the sedimentary formations. A feature of this forest is the morainic knolls covered with a tough peat supporting only Calluna occasionally mixed with bracken. In the three valleys forming approximately the north, east and south marches of the forest a better soil and vegetation occur supporting crofts or small farms. In these reaches tree growth is good.

Road Construction.

Early thinnings in the Warren had to lie where felled as extraction was difficult. Some material did, however, go by raft

to the loop. Road construction began in the Warren in 1944 and since that time good progress has been made towards serving all areas of thinnings with a metalled forest road. Road construction came under the direct supervision of the District Officer in July, 1950. In this connection areas are now compartmented with future road needs constantly in mind.

SILVICULTURE.

The First Decade (1922-1931).

During the last thirty years there has been witnessed a gradual change in the life of Galloway with each expansion of the State Forest area. What will, without doubt, develop into a major industry in this area, began with the creation of New Galloway Forest in 1921. An early and most significant comment was that this area was typical of many square miles in Galloway, afforestation of which could be regarded as experimental, giving lessons which could be used over a wide area.

Planting began in 1922 in the Warren with 212 acres. Flat planting with spade or mattock at a "screef" was employed, though Douglas fir was planted with the circular spade. No drainage was done except for "recutting the existing drains which are largely filled up and not functioning" (viz. Plan of Work F.Y.22). According to that plan forty chains per acre overall were envisaged but the average must have been between five and ten chains per acre. The selection of species suggested by the Acquisition Report was followed to a large extent, viz. "Larch where luxuriance in the bracken shows a better patch of soil; Douglas on sheltered slopes by loch; Spruce (Sitka and Norway) on wet ground". A further 46 acres were planted in F.Y.23, thus completing the Warren. Establishment was very slow and was largely attributed to frost, black game and deer. Plant espacement was generally $4\frac{1}{2}$ ft. to 5 ft. and beating up was high for several years - between 50% and 70%.

A further set-back occurred in 1926 when a fire destroyed 87 acres of the P.22-23 area. This area was replanted in F.Y.27 except for about 12 acres which were wisely reconsidered as unplantable.

The introduction of new species at each beating up resulted in the final establishment of numerous mixtures, e.g. European larch/Scots pine, European larch/Norway spruce, Douglas fir/Norway spruce, Sitka spruce/Norway spruce, Sitka spruce/Scots pine and Sitka spruce/Pinus contorta.

F.Y.24 is noteworthy for the first planting of Japanese larch in Compartments 10 and 12 on Bennan Hill, this species not being used again until F.Y.31. European larch was planted more extensively. Whilst this latter species form untidy, open plantations after a heavy attack of die-back the remaining trees are now coming away more vigorously and should, in time, form a satisfactory crop.

Douglas fir was planted during F.Y.24 and F.Y.25 on the lower slopes of Bennan Hill, with European larch above. Sitka spruce was planted in wetter ground though still with inadequate drainage and always flat planted. A small area of Picea omorika was planted (Compartment 14) during this period and now forms an interesting crop.

After F.Y.26 when the planting of the Bennan Hill face was largely completed with Norway spruce and European larch, generally poorer land remained - soils were more peaty and vegetation, apart from a few bracken areas, was largely Molinia/Calluna, pure Calluna or mixed with Erica, Myrica, Scirpus or Eriophorum. In the following year more attention was paid to drainage though still confined purely to very wet areas and at a low density of twenty chains per acre. Corsican pine, Norway spruce and Sitka spruce were used, all but Sitka spruce being flat planted in "screefs".

A further important step forward was made in F.Y.27 - Sitka spruce was planted in a turf and a manure in the form of "Semsol" was applied to the plant. The method of planting was to cut a turf 12 in. to 15 in. square, overturn it by the side of the space it formerly occupied and plant the Sitka spruce in a notch cut into the turf. This advance was taken further in the following year when though drainage intensity did not increase, plants were notched into turfs cut from the drains. This improved technique was not generally practised over the whole of the planting area but was confined to the better wet and peaty ground - usually small in area.

About this time the slow establishment of Sitka spruce on heather sites was clearly evident and in F.Y.27 when the first ^{planting} turf/was employed at Bennan the first planting of Sitka spruce with a pine took place. This was a series of experiments of varying mixtures with mountain pine - always at 3 ft. x 3 ft. spacing - in dense heather. This experiment has been more successful than other Sitka spruce/pine mixtures. The Sitka spruce is now above the mountain pine by four feet to five feet. The mixtures appear to have been tried in the following proportions:-

1. Alternate lines of mountain pine and Sitka spruce.
2. Two lines Sitka spruce and one line mountain pine.
3. Three lines Sitka spruce and one line mountain pine.
4. Four lines Sitka spruce and one line mountain pine.

Plots 2 to 4 have been planted so that the pines are in diagonal lines across the plot, thus:-

P.	S.	S.	P.	S.	S.	
S.	P.	S.	S.	P.	S.	
S.	S.	P.	S.	S.	P.	etc.

A fairly high proportion of Sitka spruce have been successful, growth being generally better where the mountain pine

intensity is less, i.e. mixtures 3 and 4. The mountain pine is generally from 10 ft. to 15 ft. in height and the Sitka spruce where it has survived is from 15 ft. to 25 ft. with some even 30 ft. where the proportion of pine appears to have been less in the original mixture. The Sitka spruce where it is growing is very healthy and vigorous and there appears to be an average current height of 15 in.

Comparing the Sitka/mountain pine mixture with the experimental plots of Sitka/Scots pine and Sitka/Pinus contorta mixtures also at Bennan, it is interesting to note that the Sitka planted with mountain pine appears to have forged ahead much more successfully than when mixed with Scots pine and Pinus contorta. Sitka spruce mixed with the latter species are now some 15 ft. below the pines.

F.Y.29 found all the best land overlying the Silurian shales and conglomerates planted and there followed four years to 1932 when small annual plantings were confined to the best ground available on the west of Bennan Hill. Sitka spruce and Scots pine were the only species used, generally pure, on bracken, heather, Vaccinium areas. There was no drainage of these planted areas and flat planting was the rule. So far as is known no drains were cut around the areas though any existing drains through the intervening deep peat bog areas were cleaned out.

Before leaving this decade mention must be made of the introduction of beech as a fire break along a ride on the face of Bennan Hill (P.25). The break extended from the road to the top of Bennan and it is perhaps unfortunate that the higher portions were lifted and replanted in F.Y.29 along the roadside near Lowran Glen, as their performance at all elevations could have been noted. However, those remaining, wherever they are situated, have grown exceedingly well and approach in height the adjacent conifers.

The Second Decade (1932-1941).

The acquisition of Burnfoot Warren placed more readily plantable land at our disposal and after clearance of scrub birch and when the planting of this area began in 1933. Sitka spruce with Scots pine or Pinus contorta in groups on heathery places were flat planted on Molinia/heather or bracken/heather ground at the highest elevations, whilst Norway spruce was mainly flat planted below about 400 ft. above sea level. Drainage was not extensively done but basic slag treatment of Sitka spruce, which appears to have been done continuously since 1928, was again carried out.

It is not recorded that group planting of Pinus contorta or Scots pine was specifically used to nurse the spruces - in any event there is not evidence now that adjacent spruces benefited from the pines which are growing quite well. It is noteworthy, however, that both Sitka spruce and Norway spruce at similar elevations and on similar soils are generally out of check but Norway spruce appear to have done this more readily.

Whilst afforestation of this section proceeded during the following four to five years, attention was largely focussed on the establishment of a forest crop on the type of ground exemplified by that in the Bennan Moss area. Here are morainic knolls covered with tough peat, supporting Calluna or Calluna/bracken, scattered about an area of deep peat bog covered by Molinia, Calluna, Erica and Myrica. The results of these experiments are discussed in the Research Branch Report but it can be said that the immediate objective has been reached, namely, these knolls can be planted successfully if some cultivation and manuring is employed. The striking success of Douglas fir, Scots pine and Pinus contorta is well worth noting. Piecemeal planting of Bennan Moss and northward to Lowran Burn continued during this decade until only the very worst ground was left. During this time there was a general trend towards

the intensity of drainage now known to be necessary on this type of land (thirty to forty chains per acre). Siting of drains changed from the dip slope to the contour but areas can be found where planting was still not being done on turf, i.e. those places where turf planting was most necessary. Intense drainage tended to be too localised and often not of sufficient depth.

In F.Y.34 turf nurseries on the Corrou system were tried in Compartments 34 and 37 for some patches of old drained ground. The areas treated in this manner are not recorded and in two cases planted turfs were not spread at all, possibly because the system of drain turfing followed so quickly on these experiments.

It will be seen that the rapid establishment of crops on the Bennan type of land was a major problem at that time - indeed it would be unwise to be over-confident even with present methods (F.Y. 51). In the middle thirties more attention was also being directed towards maintenance of existing plantations and afforestation was switched in part at first (1939) and later wholly to the Clatteringshaws Section of the Forest.

Brashing of Douglas fir in Warren began in F.Y.38 and some was done to Japanese larch, Compartment 10, in later years, but the general practice seemed to be to cut or brash racks through the Compartments at two to three chain intervals a year or so in advance of cleaning/thinning operations. Cleaning was essential in the Douglas fir stands particularly those planted on the old coppice sites in F.Y.24 and F.Y.25.

Thinning began in F.Y.41 in the Japanese larch in Compartment 10, whilst most stands of Douglas fir were thinned in the following year. Thinnings in these crops were usually very light, e.g. 250 cu.ft. per acre were taken from the Douglas fir in three thinnings over five years. Suppressed and "wolf" trees were often left in the crop - the latter caused trouble several years later when they were removed with difficulty and not a

little anxiety.

Drainage upkeep was practised only to a limited extent and is not recorded before 1948 except for small areas in Compartments 27 and 28.

The Third Decade (1942-1951).

No planting was done at Bennan from F.Y.42 to F.Y.45. During these years afforestation proceeded at the Clattering-shaws Section using Bennan labour. A small labour force was left which carried out a thinning programme in Douglas fir and Japanese larch. In F.Y.46 planting began at the northern end of Burnfoot Farm with 66 acres. The rate of planting has increased gradually to the present programme (F.Y.51) of 600 acres per year.

Preparation of Ground.

Hand draining and turfing is the principal method, drains being 22" wide by 18" deep and cut to give the greatest drainage effect as far as possible at a narrow angle to the contour and leading to main drains which take a steeper course downhill. Up to F.Y.49 turfs were spread at a 5 ft. spacing between and across drains. In F.Y.50 the 5 ft. spacing was retained between the drains but 7 ft. spacing was introduced across the drains, particularly in the wetter areas. This follows investigation into causes of windblow elsewhere. With the narrower spacing roots of drainside trees easily enter the drains and these roots have to be cut when drains are cleaned, thus reducing the stability of the crop. The 7 ft. spacing reduces this tendency and will give more room for deepening and widening drains later on.

Cut-off drains are made above or below areas of pure heather or bracken or at the bottom of steep slopes draining into flatter, boggy ground. All areas are drained where wetness is indicated by the vegetation, e.g. Molinia among heather or bracken; rushes; Myrica, etc. Drainage is generally of an overall intensity of thirty to forty-five chains per acre.

Ploughing using a single furrow Cuthbertson plough was first done in F.Y.48 and has been used each year to an extent limited by the terrain and the frequent outcropping of granite. For this reason hand preparation is the main technique. In F.Y.48 ploughing was at 27 ft. espacement, the furrow giving turfs to spread in between drains. In subsequent years spacing of plough drains has varied with the type of ground from 5 ft. to 11 ft., 17th ft. or 22 ft. The narrower spacing was used for poor peat and for areas of bracken/heather having shallow peat above a moderate mineral soil - in the latter case the preparation being for the planting of Japanese larch.

Choice of Species.

Sitka spruce is the principal species being turf planted pure on Molinia or Molinia/Calluna ground. A two and two (in rows) mixture with Scots pine (or Pinus contorta on higher and/or poorer ground) is used where Calluna predominates in mixture with Molinia, Erica and Scirpus. Scots pine is notched or matted in screefs on areas of pure heather whilst Norway spruce is favoured on good heather-free, sheltered sites. Mountain pine has been used at the upper planting limit for shelter and ground cover. The use of Japanese larch is seen on good bracken/heather sites, preferably with a northerly aspect and is carefully notched or pitted or is notched into plough furrows as explained above.

Post-planting Treatment.

Immediately after planting a manurial treatment has been given to Sitka spruce and Norway spruce. The treatment consists of placing 1 oz. basic slag in the notch of the turf. In F.Y. 49 and subsequently the same quantity of ground North African phosphate has been used. Over most areas in F.Y.49 and F.Y.50 slag was placed below the turf before planting. A fault with this method was the uncertainty that the tree roots when

placed below the turf at the time of planting would be in contact with the manured surfaces. Scots pine and Pinus contorta when planted in mixture with Sitka spruce are similarly treated.

Beating up of earlier plantations has always been the normal practice. Earliest records of beating up indicate that heavy losses were sustained in young plantations. The trend to be noted in this decade is that the operation is not tackled so rigidly, as earlier plantations at Bennan and elsewhere showed the folly of beating up each dead plant. Generally losses below 15% spread regularly over an area are discounted. Heavier losses are not beaten up fully; fewer plants are replaced than actually died and only when the deaths occurred in groups.

Very heavy arrears of beating up, often necessitating almost complete draining and turfing, have been undertaken at Bennan in the post-war years in extensive gaps in plantations made in the early thirties. This work is progressing in the Gairloch area in F.Y.51 and it is hoped that it will be completed; new plants are being kept at least 8 ft. from the P.38-41 plants, some of which are small and now coming out of check.

Reference has already been made to the extraordinary additional drainage being done in old wood still in check. Normally drains are looked at within two or three years after planting in order to rectify any obstructions to water flow or deepen where necessary.

Maintenance of Woods.

The post-war period found considerable arrears of maintenance at Bennan. A reasonable labour force was built up in spite of persistent difficulties in this direction and by 1951 most of the arrears have been cleared.

Brashing.

By the end of this year all crops fit for brashing and over 19 years old will be brashed. Until recently brashing was generally 100%. The present practice is to brash to 70%-80% intensity on a selection basis. With good female labour this is being done quite cheaply.

Thinning.

Rapid strides have been made recently towards making up arrears and putting the woods on a fairly firm thinning cycle. Though labour was in short supply an average area of thinnings of about 190 acres per year over the last 4 years has been obtained as a result of an arrangement for the sale of thinnings standing, to a local merchant. The general grade of thinning is C or C-D and is made on a three to five years cycle according to species and situation.

Drainage Maintenance.

Fairly large arrears of this work still remain in plantations of all ages, some of which have been mentioned above. Generally all thinned areas have been attended to as the first priority. As yet drain repairs at Bennan have not been so urgent or difficult a problem as in the Border type of forests, though lessons learned there are being put into effect. In the early close-planted, almost undrained plantations it is difficult to impose a drainage system in the wood without cutting tree roots or isolating some trees on unstable sites. This problem is being solved at thinning by removing drainside trees where necessary and possible. All damp hollows are being drained and particular care taken to drain all areas where windblow may possibly start. In the Plan of Work drainage generally is made to conform to the following pattern:-

1. Intense drainage as may be necessary before planting.
2. One or two years after planting, drainage systems checked and repaired where needed.
3. Cleaning and repair of main drains at immediate pre-thicket stage.

4. Repair of drains after brashing the crop; where brashing precedes thinning by a year or so.
5. Repair of drains after each thinning.

Utilisation of Produce.

As mentioned earlier, many thinnings are sold standing to a timber merchant who also takes a large quantity of poles felled by our own labour. The principal markets are the Ayrshire coal mines for pitwood, Commission requirements for fencing material and local farmers for fencing stobs.

Portable powered saws are used for conversion. Recently this saw has been kept to a proper milling site, timber being drawn to it as necessary. Handling is eased considerably by selling all poles over 5 in. diameter butt to the merchant.

Amenity.

The planting of Populus trichocarpa at the Warren alongside Loch Ken in F.Y.22 was the earliest example of planting with amenity in view. This is certainly appreciated by travellers along the eastern shores of the Loch. Beech and Poplars were planted along the roadside. The poplars are now heavily infested with canker and many of the trees have died and are being cut out. The average height of the living trees is about 50 ft. and the average volume is around $7\frac{1}{2}$ hoppus feet over bark. The poplars were initially planted too close to the Douglas fir and this will probably have contributed towards the severe attack of canker. As recent plantings have been away from public view little was done towards amenity planting but the construction of a road to Loch Stroan, which will eventually go through to the High Bridge of Dee at Clatteringshaws has focussed attention on this aspect again. Red oak and Oregon alder have been planted by Loch Stroan.

In 1947 the Glentool National Forest Park was constituted and Cairn Edward Forest forms part not only of a National Park area which will increasingly attract visitors, but of the province of Galloway which is becoming better known for its

scenic beauty. Further extensions to the road system will bring amenity questions to the forefront.

Present Day Methods of Establishment.

Problems connected with the afforestation of Bennan Forest differed on either side of the line marking the metamorphic aureole of the granite intrusion which underlies most of the forest area. Early problems of establishment in the Warren were, other than frost, deer and black game, largely a problem of technique. The choice of species there was reasonably good except for European larch though even this tree is now improving whether pure or in mixture with other species, the mixture possibly being preferable.

The front of the Bennan Hill carries altogether very good crops. Douglas fir is perhaps the most outstanding. The maximum height is about 75 ft. and thinnings have yielded over 500 cu.ft. per acre.

It is regrettable that Japanese larch was not used more frequently instead of European larch. The latter crop has suffered heavily from die-back and canker and though the crop was not treated for some years is now progressing more satisfactorily. Japanese larch, however, outshines by comparison. Maximum height is about 70 ft. in Compartment 10 and whilst normal thinning yielded 400 cu.ft. per acre a Sample Plot in this Compartment gave 597 cu.ft. per acre.

Sitka spruce and Norway spruce form good stands on this site and whilst the yield from Sitka spruce may be high Norway spruce may yet prove to be the outstanding crop even to the west of Bennan Hill.

A small area of Picea omorika (Compartment 14) is an interesting example of this species which could well be planted more frequently and at lower elevations. Thinning in F.Y.50 yielded about 300 cu.ft. per acre.

Scots pine does not give a good crop here and its main use will be as a nurse and pioneer species for the spruces. Sitka

spruce/Scots pine mixtures first occurred by accident as a result of beating up in the Warren. The mountain pine/Sitka spruce plantings have already been mentioned, as have the experiments on the planting of tough peat knolls, but apart from some success with the former mixture Sitka spruce does not appear to have responded favourably to mixture with the pines whether the mixtures were accidental or intentional. This result is also seen in Compartment 18 where Sitka spruce was beat-up with Scots pine. The Sitka spruce are still in check after 23 years whilst the Scots pine though not good in form or volume are ready for thinning.

Contorta pine is quite successful on the tough peat knolls and occurs fairly widely over the whole area but in small amounts. Deer damage is high but good growth has been obtained on poor sites whether in mixture with Sitka spruce or pure in small groups. This species is being increasingly used as a pioneer species on the poorer ground.

Only one reasonable area of Corsican pine is to be found, Compartment 20, though here site is exposed, soil is loose and crop is not very happy. On other sites, however, locality factors appear to be more adverse and it is possible that the whole stand will be lost by Brunchorstia and Fomes annosus.

Abies nobilis is frequently recommended at the present day the small area on Bennan Hill serves as a useful indicator that this species could be profitably used at high elevations.

The areas at the back of Bennan Hill and in the Gairloch area are now coming away quite well, there having been a marked improvement since 1949 when a fence was erected along the Dee. There can be no doubt that grazing by sheep and cattle was the major contributory cause of severe check for many of the trees. Completion of the Clatteringshaws and Glenlee Electricity Schemes about 1935 marked the reduction in flow of the Dee and the loss of a barrier to invasion by grazing animals.

The experiments in Bennan Moss have been important in improving techniques for afforesting country of which Bennan is typical of many square miles in Galloway. It has been pointed out that with proper cultivation and manuring afforestation of morainic knolls is possible. The development of the tine plough may be considered a result of these experiments. In the same way the successful use of Japanese larch planted in ploughed furrows was first indicated by them. Joining these techniques to the co-incident ones for drainage of wet peat areas there can be now more confidence that the afforestation of variable ground as at Bennan can proceed simultaneously. This is particularly desirable now that higher values on grazing land must reduce the areas of resumption to those necessary for the immediate planting programme.

Unavoidable arrears of maintenance accumulated during the war years but with the increase in the labour force arrears are being made up and the forest is now in a healthier condition. The provision of a housing scheme to serve this forest in the near future will ensure the successful management of the forest based on a prescribed Plan of Operations.

(Sgd.) K.W. Wilson.

March, 1951.

Research - Note by the Research Branch

Five experiments and six sample plots of the Research Branch are located at Bennan. Four of the experiments, dating from 1932-36, deal with a problem of widespread interest in the north and west of Scotland; the best method of planting the heather clad, peat covered, morainic knolls which are a common feature of the land available for afforestation.

The first experiment (1.P.32) is a simple trial of species planted on shallow turfs with an application of basic slag in

half the plots. Mountain, Scots and contorta pines have grown steadily with a 20% improvement with slag. Sitka spruce, both pure and in mixture with contorta pine, is poor with many deaths in the controls, while Japanese larch failed almost entirely, due probably to game damage and frost, though the few survivors in the slagged section have grown well. In the next experiment application of "Semsol" was tested on directly notched checked Scots pine and Sitka spruce (2.P.35). The phosphate has reduced losses slightly, but made little difference to the growth of the survivors.

The last two trials in this series were of four species planted with seven methods of ground preparation (3.P.35 and 4.P.36). After fifteen years, Pinus contorta at seventeen feet high is the fastest species but Scots pine, Douglas fir and Japanese larch are only a foot or so behind in the best treatments, though Japanese larch in both experiments and Douglas fir in one suffered very heavy losses. The best methods of ground preparation used were the Wareham pit and complete mock ploughing. These experiments have demonstrated that with a adequate ground preparation and addition of phosphate these tough peat knolls can be afforested.

In 1939 a new project was started with a costing experiment on brashing and pruning in Douglas fir (5.P.39). The first results indicated that brashing greatly facilitated subsequent thinning, and this has led to a series of trials elsewhere which have however not entirely borne out this result. The next important result, only recently obtained, is that high pruning has not reduced the time required for the peeling of thinnings.

Five sample plots were established in 1947 (S.160-164). They are:- one of Japanese larch thinned to D-grade, one of Douglas fir to C grade and a series of three Norway spruce plots thinned to B, D and L.C. grades. A Sitka spruce plot thinned to C-D grade has recently been added to this series.

(Sgd.) J.W.L. Zehetmayr

Edinburgh,
February, 1951.

APPENDIX I.

Notes from Inspection Reports

A list of the most interesting and important inspections which have been carried out at Bennan in previous years is given below, along with some extracts and brief notes. Naturally the bulk of the history has been obtained from many of these inspection reports.

2nd June, 1925: Technical Commissioner, R.L. Robinson.

The damage by frost, black game and deer is noted, especially in Japanese larch, and remedial measures are suggested.

14th September, 1929: Forestry Commissioners.

Mr. Robinson gave instructions that no birch or coppice was to be cut on the eastern slope of Bennan Hill. With regard to the future treatment of the Warren, it was decided to let the existing crop come up, as it is now fairly complete on most of the area.

July, 1932. Mr. O.J. Sangar.

P's 22 and 23 have given a great deal of trouble as the result of the original choice of species and type of plant; the damage sustained from black game and roe, insufficient drainage and the method of planting. The next three P. years were on more favourable ground; apart from black game damage, they were successful almost from the start. Subsequent P. years (P.27 onwards) have been on more difficult sites, but care in selecting the actual ground for planting, together with the choice of species and more intensive drainage and turf planting, has resulted in satisfactory plantations.

2nd September, 1935: Forestry Commissioner, Sir Alexander Rodger.

The encouraging growth of Douglas fir and Japanese larch was commented upon.

28th April, 1941: The Chairman, Sir Roy Robinson, A/Assistant Commissioner, Mr. A.H. Gosling.

The question of the planting of some of the poorer type of land behind the Bennan Hill was discussed and it was suggested that a pine/spruce mixture might be used. The question of limiting planting work in order that essential maintenance could go ahead was also brought up.

4th/5th June, 1943: The Chairman, Sir Roy Robinson; A/Assistant Commissioner, Mr. A.H. Gosling.

The P.24 Douglas fir on the Bennan face was visited and the intensity of thinning favourably commented upon. The question of extraction in the Warren in the P.22-P.27 areas was discussed as was also the thinning of some of the rough Douglas fir areas which had not come away as well as those on the Bennan face.

5th September, 1946: The Chairman, Sir Roy Robinson; The Lord Chancellor, Lord Jowitt.

The possibility of more extensive use of Douglas fir planted in mixture on some of the harder morainic knolls was mentioned. The advantages of high pruning on certain selected sites of Douglas fir were mentioned in connection with the experimental plots on the Bennan face.

6th December, 1948: The Director, Mr. H.C. Beresford-Peirse.

A discussion on the degree of heavy thinning required in the Douglas fir crops took place but it was considered that this regular crop was now benefiting from the heavy thinnings applied. The possibility of using more Pinus contorta in mixture, rather than Scots pine, was also discussed.

14th June, 1950; Director-General, Mr. A.H. Gosling.

The delay in the removal of heavy Douglas fir "wolves" in the Warren was commented upon. Progress with regard to road construction was noted. The excessive damage done by grazing in the early years of the forest was noticed in the P.38 areas at the back of the Bennan Hill.

In addition to the above sources of information the following documents have been consulted:-

Acquisition Reports
Plan of Work 1921/1922
Plan of Work 1949/1952
Forest Records.

In addition Forester Parley and Foreman Murray, who has been at Bennan since 1929, have given much information as to the early planting years.

APPENDIX II.

SUPERVISION

Conservators

1946 - 1947	J.R. Thom
1947 (March to May)	F.W.A. Oliver
1947 to date	J.R. Thom

Divisional Officers

1920 - 1922	A.D. Hopkinson
1922 - 1934	J.M. Murray
1934 - 1938	O.J. Sangar
1938 - 1939	F.W.A. Oliver
1939 - 1942	A Watt
1942 - 1945	J.R. Thom
1948 to date	R.E. Fossey

District Officers

1921 - 1927	J. Hunter Blair
1928 - 1931	A.H. Gosling
1931 - 1938	J.M. McDonald
1938 - 1939	A. Watt
1939 - 1946	No District Officer
1946 - 1948	W.S. Fergusson
1949 - 1950	R.R. Donald
1950 to date	K.W. Wilson

Foresters

1921 - 1925	S.H.A. Paterson
1926 - 1929	J.A.M. Kennedy
1929 - 1932	J. Watson (Foreman in charge to 1930)
1932 - 1934	G.J. Thomson (Foreman in charge to 1932)
1934 - 1936	A.D. MacRae
1936 - 1937	J.M. Ferguson
1937 - 1947	A.S. Peddie
1947 to date	C.W. Parley

Up till 1938 the forest was a unit within the South-West Division of Scotland with control exercised by the Divisional Officer. In 1938 it came under the newly constituted South Division and from 1st January, 1946, this Division became the South (Scotland) Conservancy.

APPENDIX III.

I. ACQUISITIONS

Bennan Farm, Hill and Warren, Whitsunday, 1921; 1280 acres from Sir Arthur Henniker-Hughan, Airds.

Part of Airds Estate, Whitsunday, 1926; 18 acres from Miss Beryl Henniker-Hughan, Airds.

Burnfoot Warren, Martinmas, 1931; 310 acres from J.S.M. Gordon, Kenmure.

Burnfoot, Gairloch, Knocknarling and Laggan Farms, Martinmas, 1937: 7925 acres from Kenmure Estate.

Craignell and Clatteringshaws Farms, Whitsunday, 1938; 3326 acres from Galloway Water Power Co.

Craigshinnie Farm, Martinmas, 1938; 1433 acres from J. Gardiner, Upper Rusko, Gatehouse.

Orchars Farm, Whitsunday, 1940; 790 acres from Mrs. Murray Usher.

Housing Site, New Galloway; Whitsunday, 1948; 2.75 acres.

Excambion; 2.2 acres at Loop obtained from Galloway Water Power Co. for 10.75 acres at Clatteringshaws Dam; 28/6/43.

Excambion; Todstone Wood area for certain areas round Cairn Edward House; 29/10/34.

II. DISPOSALS

To Galloway Water Power Co.

1/9/32 - 8 pieces of land (mostly between road and Loch Ken) 15.75 acres.

January, 1935 - Lochside, 6.751 acres.

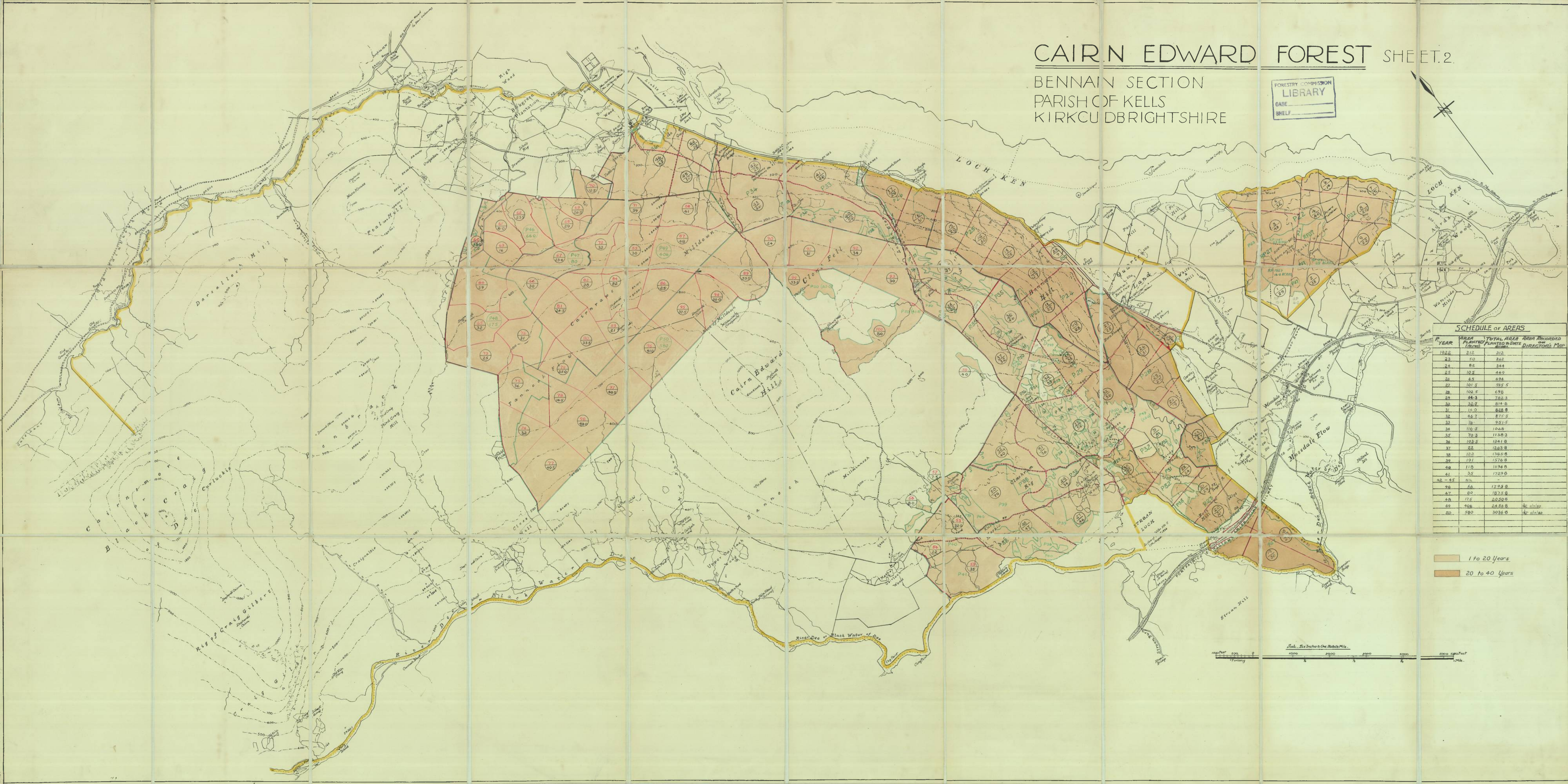
Cairn Edward-Bennan



CAIRN EDWARD FOREST SHEET 2.

BENNAM SECTION
PARISH OF KELS
KIRKCUDBRIGHTSHIRE

FORESTRY COMMISSION
LIBRARY
CASE
SHELF



SCHEDULE OF AREAS

YEAR	AREA PLANTED (Acres)	TOTAL AREA PLANTED (Acres)	AREA RECORDED ON DIRECTOR'S MAP
1922	212	212	
23	50	262	
24	82	344	
25	105	449	
26	45	494	
27	101.5	595.5	
28	102.5	698	
29	84.3	782.3	
30	32.3	814.6	
31	14.0	828.6	
32	46.1	874.7	
33	78	952.7	
34	116.5	1069.2	
35	73.3	1142.5	
36	103.5	1246.0	
37	22	1268.0	
38	12.2	1280.2	
39	19.1	1309.3	
40	11.8	1321.1	
41	3.5	1324.6	
42-45	NIL		
46	4.6	1329.2	
47	8.0	1337.2	
48	17.2	1354.4	
49	42.8	1397.2	42.8/100
50	59.0	1456.2	42.8/100

1 to 20 Years
20 to 40 Years

