

EAST (SCOTLAND) REGIONAL ADVISORY COMMITTEE

TOUR OF

TENTSMUIR AND BLAIRADAM FORESTS

ON

2nd JUNE 1970

Tuesday, 2nd June 1970

Visit to Tentsmuir Forest

Timetable and Itinerary

- 09 15 am Leave hotel at Dundee for the forest office at Fetterdale, Tentsmuir, arriving at 09 45.
- 09 45 am Introductory talk at office.
- 10 00 am Proceed south along perimeter road to the Kinshaldy right of way. Turn left, due east, follow this road to the beach. On the way down the perimeter road the party can see edge plantations of Scots Pine planted in 1922 with groups of beech in Compartments 3 and 4. The Working Plan provided for a permanent perimeter shelter of beech and Silver Firs. On the right of way on left is P 22 and P 23 in compartments 4 and 5, whilst on the right is P 30. The next compartments were acquired woods felled during the war and replanted in 1949. The fields are part of a farm which is now managed by the Department of Agriculture for Scotland. Continuing you will pass P 41, fields and P 33 on the left - on the right P 39, fields and P 39. The road now takes two right angled bends. Further on P 25 Scots Pine plantations are on both sides until just before the sawmill site the woods are P 28 with one compartment of Corsican Pine on the left.

10 15 am At the old sawmill site, assess potentiality for future car park site. Walk onto beach and dune areas. Look at Sea Buckthorn planted by the Commission in 1929 or 1930 as a wind protector to edge crops.

11 30 am Proceed north along the perimeter road passing Scots Pine and Corsican Pine (P 28 and 29) until the old Ice House area is reached. Here are the remains of a stone building where ice used to be kept for packing round the salmon when being transported in the summer months. The dunes from this point northwards were sold to the Nature Conservancy and in this area there has been the greatest accumulation of sand.

Proceed north passing plantations P 32-33 when the road turns westwards through P 35 and P 38 plantations.

12 00 noon From the gate in Compartment 84, proceed on the dune areas at foreshore which are owned by Forestry Commission. The area is used very frequently by the public who can bring cars along a high water road. At low tide they drive along the sands to points further east. Timing is important otherwise they can be caught by the tides.

The island is called Lucky Scoup and is usually covered with bird life as well as grey seals. The grassy area is a possibility for development as a car park site with entrance from the shore road.

Development would be the responsibility of the local council. The Commission could consider a long term lease of the ground.

12 45 pm

Proceed south along perimeter road. Passing P 27 Scots Pine and through the old acquired woods P 80 around Fetterdale before returning to the office.

Discussion and lunch. Inside or outside depending on weather.

Tentsmuir Forest

(Notes prepared April 1970)

1. Supervisory Staff

I. S. Watt - District Officer I
H. A. Kingham - Head Forester
D. Menzies - Forester

2. Situation and Climate

The forest is situated on the east coast of Fife, north of St. Andrews between the estuaries of the rivers Tay and Eden. Old writings describe Tentsmuir as an area of morass and sand inhabited by vagabonds and fugitives from justice. Some two centuries ago there is no doubt that the region was very wet, (the name Leuchars translated from the Gaelic means "a wet place") and isolated and the numerous hillocks of sand were in fact little islands during high tides. It is said that people (presumably fishermen) pitched tents on these dunes and the name Tentsmuir is derived from that practice.

In the last fifty years tides have caused large accretions of sand on the east and north east of Tentsmuir, with the result that the high water mark is now some one and a half miles further east than it was at the beginning of the century. From a scenic and amenity point of view, Tentsmuir now has several miles of beautiful sandy beaches which in the main are relatively undisturbed.

The rainfall is low, 20-25 inches (51-63 mm) per annum, falling mainly in the winter months. Snow is infrequent and does not lie long. Unseasonal frosts are relatively common and the forest is blasted by cold, dry, winter winds.

3. Area Statement

The forest is the result of seven separate acquisitions, the first was completed in 1922 and the last in 1961.

	Acres	Hectares
Planted	3664	1483
To plant	3	1
Other land, agricultural and seashore	274	111
Total	<u>3941</u>	<u>1595</u>

The forest consists of one large block 3564 acres (1443 hectares) and three detached sections of 28, 65 and 284 acres (11, 26 and 115 hectares). This latter block adjoins a large RAF Aerodrome and has been largely cut away in recent years to allow extensions to the runways. As the future of the remainder of the woods is uncertain this block was excluded from the Working Plan.

4. Geology

The greater part of the area is on blown sand of recent formation. The underlying rock is Old Red Sandstone, covered by alluvial deposits of fairly recent origin, mainly from the River Tay.

5. Soils

The soil was formed originally from littoral sand. There has been little shifting of sand as on the Moray coast. Moreover the sands are of quite a high fertility, due probably to the alluvial deposits being derived from mica schists washed down from the hills of Perthshire.

6. Site Classification

The individual site factors: sea fogs, low rainfall, unseasonable frosts, and salt laden air, together place the site as one suitable for a restricted type of forestry, a limited choice of species and special protective precautions particularly against fire. It is entirely a coastal site. Pines will probably remain the principal species, although Sitka Spruce does very well where the water tables are high. Frosts tend to retard growth in the early years.

7. Planting

Most of the planting was done in large annual programmes between 1922 and 1933. Scots Pine was used exclusively up to 1924 after which

Corsican Pine was introduced. Even in these early years Corsican Pine was found to be very difficult to establish and most of the P 25 Corsican Pine died. It was persevered with in later plantings and where it has been established it has proved to be a fast growing species.

8. Species Distribution

	Acres	Hectares	%
Scots Pine	2422	980	67
Corsican Pine	878	355	24
Lodgepole Pine	91	37	2
Norway Spruce	58	23	1
Sitka Spruce	115	47	3
Larches	74	30	2
Other	26	11	1
Total	3664	1483	100

The gale of January 1968 blew down the most of the Sitka plantations. They were about 70 feet high and, standing above the surrounding pine areas, were exposed to the wind.

9. Age Distribution

	Acres	Hectares	%
1-10 years	340	138	9
11-20 "	432	175	12
21-30 "	516	209	14
31-40 "	1398	565	38
Over 40 "	978	396	27
Total	3664	1483	100

10. Production

Thinning: This is arranged by area and is the principal silvicultural operations. The present thinning cycle is six years.

The Working Plan of 1955 prescribed the conversion of the forest into a normal forest by 1995 ie a forest which would have an even distribution of age classes. To achieve this object of management 40 acres (16 hectares) were being clear felled annually prior to the January 1968 windblow. Difficulties associated with the establishment of Corsican Pine on clear felled areas have made it advisable to reconsider the principles upon which this course of action was based, to see if they still apply today.

The outturn from the forest is approximately 250 000 hoppus feet (9000 cu m) per annum and the work is shared between a resident timber merchant, who buys approximately 100 000 hoppus feet (3600 cu m) per annum standing and the Forestry Commission who work 150 000 hoppus feet (5400 cu m) and sell it at roadside.

11. Houses

There are nine houses, two of which are occupied by the Forester and Forester Assistant. One house is part of a forest worker's holding. Three other houses are occupied by forest workers. One small house is unoccupied

meantime and three other houses have been let to outsiders.

12. Labour

At present there is a squad of eight Forestry Commission workers and on average a minimum of twelve timber merchant's employees in the forest and the associated sawmill.

13. Amenity and Recreation

The beach at Kinshaldy has been known to a few people for a long number of years, and as there is a right of way leading through the forest to this area the public cannot be kept out even in times of extreme fire danger.

In the past and increasingly today the forest and coastal dunes have been much frequented by enthusiasts of the biological sciences. The area is very interesting botanically and the forest and the shore are invaluable to the ornithologist especially at migration times. The archaeologist still finds Tentsmuir and its surrounds yielding more evidence of its past history. Small groups and societies visit the forest quite frequently, but cause no trouble and their interest is generally welcomed.

For general recreation the stage has now been reached where the public with cars and children are coming to the Kinshaldy beach area for picnicking and bathing. To a certain extent this is

also true of the north eastern part of the forest which lies near to Tayport. Up to 400 cars have been counted at the Kinshaldy old sawmill site at a weekend. Now that the Tay Bridge has been completed Dundee with a population of 190 000 becomes a very near neighbour. It has also been found that people who used to go to St. Andrews are now coming to the quieter beaches at Kinshaldy.

The future development, or otherwise, of the beach area is a matter for the appropriate Planning Authority although what will emerge is not clear at present. The Fire Planning Authority in their overall Planning Scheme for Fire scheduled Tentsmuir as a non-development area. The Wheatley Report has recommended that the Tayside Development Area would include North East Fife and Tentsmuir. Ultimately the Countryside Commission might become involved.

The actual situation today is

1. The existing right of way allows people with their cars to come to the beach area.
2. The Fife Council some years ago decided on no development as the Beach was considered dangerous. The Forestry Commission had a plan prepared whereby they would develop a car park and repair the right of way road. In return the County Council were to install toilet facilities. Ultimately the Council got an estimate of £14 000 for the

bringing in of water for the toilets. Whether it was this high figure which governed their decision that there should be no development is difficult to say.

3. So the Commission cannot prevent access and yet cannot provide any facilities such as picnic seats without incurring either disapproval or a request from the Council that the Commission provide the toilets.

to Tayport

Office

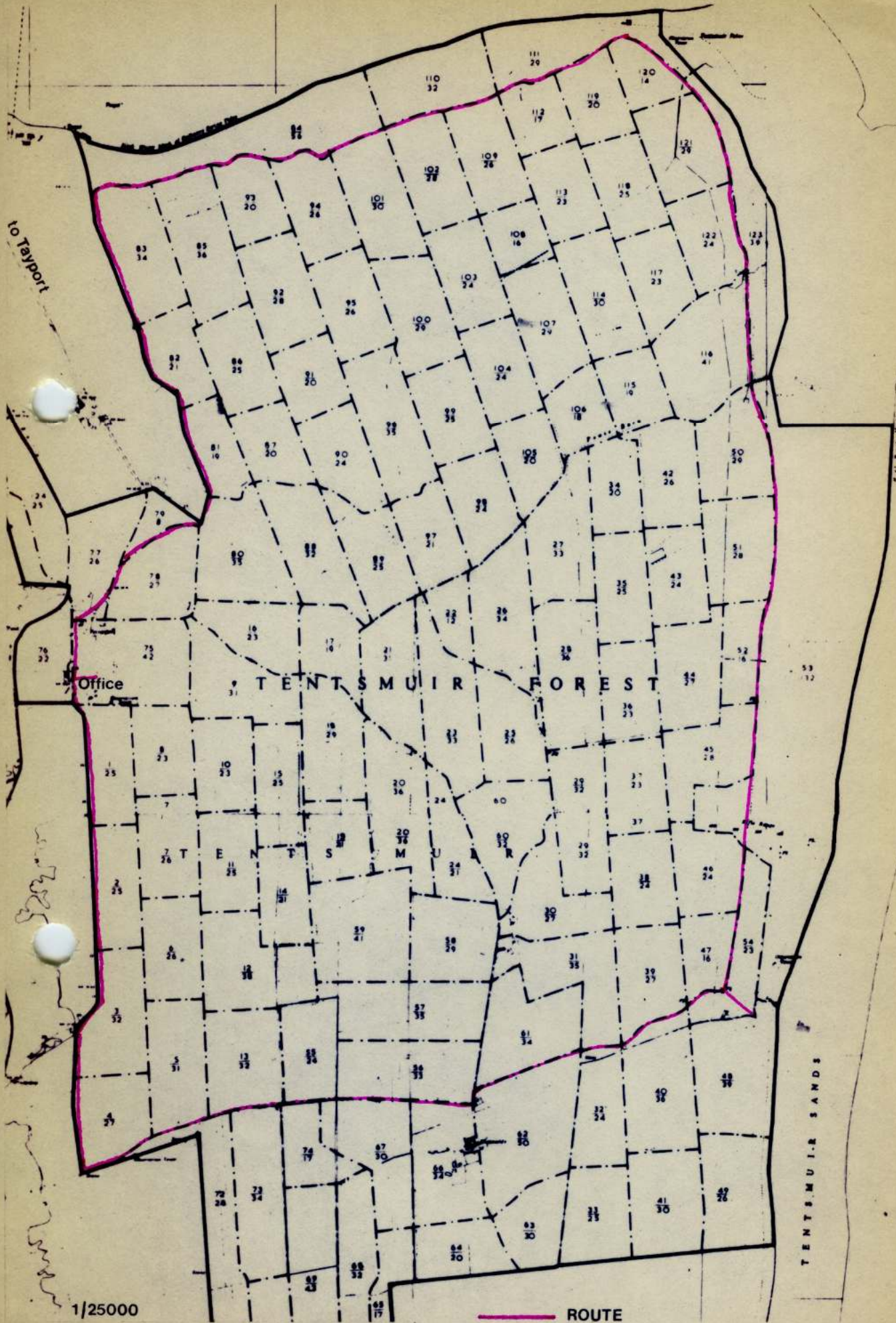
TENTSMUIR FOREST

TENTSMUIR

TENTSMUIR SANDS

1/25000

ROUTE



Tuesday, 2nd June 1970

Visit to Blairadam Forest

Timetable and Itinerary

Arrive Blairadam 14 45.

Meet at Forest Office - short talk.

15 15 pm

Cars will proceed north passing compartment 50 and then on the right compartment 49. Parts of this compartment were windblown in 1963 and replanted in 1964. The original crop was Sitka Spruce and Norway Spruce planted in 1931. Its growth had fallen off badly since about 1950 and the Yield Class prior to the windblow of January 1968 was 100 to 120.

The soil type is surface water gley.

In compartment 49 just before the old railway the soil on the right is brown gley.

After passing the old railway, compartment 32 is on the left and compartment 31 on the right. The crops were planted in 1931 and 1932. The Yield Class of Sitka Spruce in both was 160 and Norway Spruce was 140. The soils are very varied ranging from brown earth to peaty gley.

Cross the tarmacadam road and pass beech of poor form, planted in 1930,

into what was mainly 1933 Sitka Spruce in compartment 30. The soil type is a surface water gley. Sitka Spruce was Yield Class 180 and Norway Spruce was Yield Class 140.

Now into P 49 Norway Spruce and Sitka Spruce. The Sitka Spruce has a Yield Class of 220 and the Norway Spruce a Yield Class of 140.

Beyond the standing crops there are further windblown areas. Compartments 20 and 21 are on the left and compartment 15 on the right.

Compartments 20 and 21 were P 28 and had a Yield Class of 180 Sitka Spruce top height 66 feet and a Yield Class of 160 Norway Spruce top height 56 feet.

Compartment 15 was P 27 and had a Yield Class of 140 Norway Spruce top height 55 feet, Yield Class 120 Sitka Spruce top height 52 feet and a Yield Class of 80 Scots Pine top height 35 feet.

Soil type - some brown earth beside the road.

Turn right and compartment 14 is on the left, compartment 15 still on your right. Compartment 14 has had a history of windblow since the early 1950's. Before that it was a fine stand.

Compartment 14 was P 27 and had a Yield Class of 100 top height 49 feet.

Soil type is peaty gley. In compartment 15 on right it is surface water gley, becoming peaty gley in the hollow.

The soil type is now all peaty gley, as you go up the hill.

At the bend you will see compartment 11 on left and compartment 10 on right.

	Cpt.	P.	Yield Class	Top Ht.
Sitka Spruce	10	34	160	51'
Sitka Spruce	11	34	160	52'
Norway Spruce	11	27	120	49'

At the cross roads compartment 2 across road and to left with compartment 3 across road to the right.

	Cpt.	P.	Yield Class	Top Ht.
Sitka Spruce	2	39	140	41'
Norway Spruce	2	39	80	28'
Sitka Spruce	3	39	140	38'
Corsican Pine	3	38	60	26'

15 30 pm

Cars will turn at the junction of compartments 2, 3, 9 and 11 and return to the junction of compartments 14, 15, 20 and 21 and the

party can disembark to discuss and survey the scene.

15 45 pm

Re-embark, proceed on same route - past the office again and on to the main county road, passing compartments 50, 51 and 57, compartment 50 and 51 are on surface water gley soil type, while compartment 57 is all peaty gley.

	Cpt.	P.	Yield Class	Top Ht.
Sitka Spruce	50	31	120	49'
Sitka Spruce	51	32	140	50'
Sitka Spruce	57	30	120	49'

Turn right at Lodge Gate proceed along the tarmacadam road and turn left into the Thornton section.

16 00 pm

On the left compartments 60 and 63, Norway Spruce and Sitka Spruce P 47. On the right compartment 61, Norway Spruce and Sitka Spruce P 42. At stopping place, windblown P 43 Sitka Spruce.

16 30 pm

Disperse.

Blairadam Forest

(Notes prepared April 1970)

Supervisory Staff

I. S. Watt - District Officer I
W. F. French - District Officer II
R. M. Ellen - Head Forester
A. H. Weir - Forester

Local History

The establishment of forestry in this area dates back to 1733. The Adam family, famous in history as lawyers and architects, were also intensely interested in forestry and this work was recorded in detail. Five volumes on the history of Blairadam were written by William Adam, a Lord Chief Commissioner of the Jury Court in 1834, and according to these there were 1140 acres (462 hectares) of plantations on the estate when he succeeded to it in 1792.

The plantations were in five categories:

1. Woods of Succession
2. Woods of Selection
3. Woods of Ornament
4. Clumps
5. Woods open to pasture

and full descriptions and instructions for the working of these woods were written.

Area Statement

The forest is built up from fourteen separate acquisitions. The first in 1927 and the last in 1967.

	Acres	Hectares
Acquired Plantations	287	116
Planted by Forestry Commission	2984	1208
Plantable land in hand	252	102
Agricultural	86	35
Unplantable	77	31
	<u>3686</u>	<u>1492</u>

The new motorway (M 90) crosses part of the forest and some 32 acres (13 hectares) have been sold for this purpose.

Situation

Blairadam Forest is made up of ten separate blocks ranging from the agricultural districts near Kirkcaldy and Aberdour to the higher land on the main block and at Cleish near the Crook of Devon. In general the elevations are lowest at the east and gradually rise to the west until at Cleish they are on the foothills of the Ochil Hills. The configuration is that of gentle to moderate slopes except in parts where intrusive volcanic outcrops have produced very steep slopes.

The elevations range from 350 feet (107 metres) to nearly 1100 feet (336 metres).

Climate

The average annual rainfall taken at an elevation of 670 feet (205 metres) was 34 inches (860 mm) per annum (for the years 1931-1959) of which about 14 inches (360 mm) fell in the five growing seasons May to September.

The prevailing winds are from the west and southwest and these can be severe as there is no barrier along the plains from Stirling. In recent years cold drying winds from the east and southeast have been frequent in the spring and these often bring snow.

Site Classification

The geological formations are limestone of the Carboniferous Series and intrusive volcanic quartz dolomite. These determine the site classifications to a large degree in spite of glacial deposits. The sites on the Carboniferous Series have heavy impermeable clay gley soils which are basically fertile, but because of the shallow rooting medium which they provide, they are difficult forestry subjects. The volcanic formations comprising the Binn, Benarty, Harran Hill and Cleish Hills have clay-loam soils of moderate depth and are well drained naturally.

A soil survey was carried out in 1969 and twelve soil types were differentiated. These which are problems to forestry are:-

		Acres	Hectares	%
1.	Surface Water Gleys	1537	622	42
2.	Peaty Gleys	682	276	19
3.	Raised Bog	262	106	7
4.	Brown Gley	303	123	8
		<u>2784</u>	<u>1127</u>	<u>76</u>

Planting

The main block which had carried a large acreage of broadleaved woodland was acquired in 1927.

In the first plantings in 1927 it was thought that frost and cold winds would have a harmful effect on the planting of pure Sitka Spruce. So Scots Pine was planted with Sitka in a 3 : 1 mixture. By the end of 1928 it was considered that the sheltering effect of Scots Pine was not necessary and Sitka Spruce was planted pure thereafter. Sheltered juncus flush hollows were reserved for Norway Spruce. Most of the earlier Forestry Commission plantings were made at the rate of just under 100 acres (40 hectares) per annum.

Ploughing with an agricultural plough commenced in 1942 and planting was done on the ridge with roots so placed as to be on the sandwich layer between the ridge and the surface vegetation.

The growth of Sitka Spruce up to the age of twenty years is satisfactory, averaging Yield Class 180. After this age, growth falls off rapidly and by thirty-five years is down to Yield Class 120. Norway Spruce at the same age is 100.

Species and Age Class Distribution
(At January 1968)

Species	Acres	Hectares
Scots Pine	420	170
Other Pines	202	82
Sitka Spruce	1166	472
Norway Spruce	603	244
Larch	386	156
Other Conifers	29	12
Conifer Mixtures	288	116
Hardwoods	177	72
	3271	1324

Age Classes	Acres	Hectares
1-10	805	326
11-20	439	178
21-30	601	243
31-40	944	382
41-50	438	177
Older	44	18
	3271	1324

Production

Prior to the windblow of January 1968 production was in the form of thinnings by area. Sitka Spruce and Japanese and Hybrid

Larch were on three year thinning cycles and Scots Pine and Norway Spruce were on a five year cycle. The original timber production programme was as follows:-

Year	Forecast Annual Volume Production	
	Cu ft (Hoppus)	Cu m
1970	76 000	2740
1975	87 000	3100
1980	98 000	3500
1985	102 000	3700

Windblow

The area blown at Blairadam by the gale of January 1968 was the most extensive in the Conservancy, and spruce and pine plantations of various age classes, both thinned and unthinned collapsed in the storm. The heavy soil which in places required additional drainage was in the grip of frost at the time and it is assumed that this was responsible for some of the stem snapping as distinct from uprooting.

At that time, the estimated area and volume of timber blown was:-

	Acres	Hectares	Cubic Feet	Cubic Metres
Pines	130	53	223 000	8 050
Spruces	617	250	1 059 000	38 159
	747	303	1 282 000	46 209

The volume of timber cleared by March 1970 was 770 000 cubic feet (27 484 cu m). A revised assessment of actual volume windblown made the total about 1 000 000 cubic feet (36 101 cu m). It thus means that about 223 000 cubic feet (9025 cu m) have yet to be cleared. About 90 000 cubic feet (3249 cu m) of this total consists of very small (1 to 1½ cubic feet average) spruce which is unattractive to timber merchants.

Roads

Sixteen miles of estate roads were acquired and there are now 29 miles of completed roads ie about five miles per square mile.

Housing

The Head Forester occupies a Commission house and the Under Forester is in a local authority house at Cowdenbeath. In addition, there are two Forest Workers' holdings and three Forest Workers' houses.

Labour

There are fourteen employees many of whom have been employed at Blairadam for many years. They are experienced and links with the early work at the forest have been maintained.

Since the windblow, timber merchants and contractors have been working in the forest and in the summer of 1968 up to forty men were engaged in windblow clearance. Since that time the numbers have dwindled and in January 1970 about twenty contractors were working in the woods.

Futuro Management

The principle factor affecting forest management at Blairadam is the extent (approximately 76%) of shallow-rooting sites where tree crops are liable to windthrow before reaching the age of optimum financial return.

The gale of January 1968 was in the category where extensive windblow on sites exposed to it, was inevitable, and the extent of damage depended only upon the duration of the storm.

Gale of 14th January 1968

	Time	Mean Direction	Speed (Knots per Hour)	Highest Gust (Knots per Hour)
Glasgow Airport	03 00	250°	53	89
Leuchars Airport	04 00-05 00	230°	56	92
Turnhouse Airport	04 00-05 00	260°	62	90

The problem of management is to improve the stability of tree crops to make them less susceptible to windthrow by the 'normal' gale force winds and gusts which occur throughout the year.

A gale force wind has a mean speed exceeding 39 mph at 33 feet above ground level for more than ten minutes. Blairadam lies in a zone having an average of 7.5 days of gale per year with gusts over 55 mph on 19 days per year.

Mean wind speeds of 40 mph can throw Sitka Spruce on (peaty) gley soils, with gusts at 50% to 80% above mean wind speeds, possibly causing most damage.

Topography is important in determining the location of windblow and relative topographic exposure was assessed by taking angle measurements to the horizon at the eight cardinal points of the compass, and adding these to give "topex" values, unweighted for westerly exposure. The measurements were taken at 120 sites throughout Blairadam main block.

Soil	Topex			Remarks
	Purple 0-10	Red 11-30	Yellow 31-100	
Deeply rootable 24"	Moderate	Low	Low	Moderate - damage likely at 60 feet top height
Well drained to rock or induration 24"	Moderate to high	Moderate	Low	High - damage likely at 45 feet top height
Poorly drained (gleys)	Extreme	High	Moderate	Extreme - damage likely at 30 feet top height
Deep peats	High	High	Moderate	

Possible Action to Improve Stability

Deep (30 inches) drains at an intensity of 6 to 8 chains per acre improve drainage on gley sites and consequently increase root production/penetration, stability and growth. Drainage experiments in the Borders indicate that spruce may grow an extra 10 feet in height before windthrow becomes a serious danger. The question of costs and timing of input are of course critical.

1. Deep Draining - Pre-afforestation

Initial drain formation costs about £2 per acre to which must be added £16 for maintenance of drains. The increase in final crop height necessary to match the cost varies with Yield Class. In Sitka Spruce Yield Class 120 an increase of about 10 feet in final height would justify the drainage. In higher Yield Classes smaller increases would suffice.

2. Deep Draining in pre Thicket Stage

The economic relationships are very similar to 1 above. The increased cost of deep draining (about £5 against £2 for drainage at time of planting) is offset by the delay from the start of the rotation and by a reduced period of drain maintenance. An increase in final top height of about 10 feet in Sitka Spruce Yield Class 120 less in higher Yield Classes would justify the expenditure.

3. Deep Drainage before Replanting

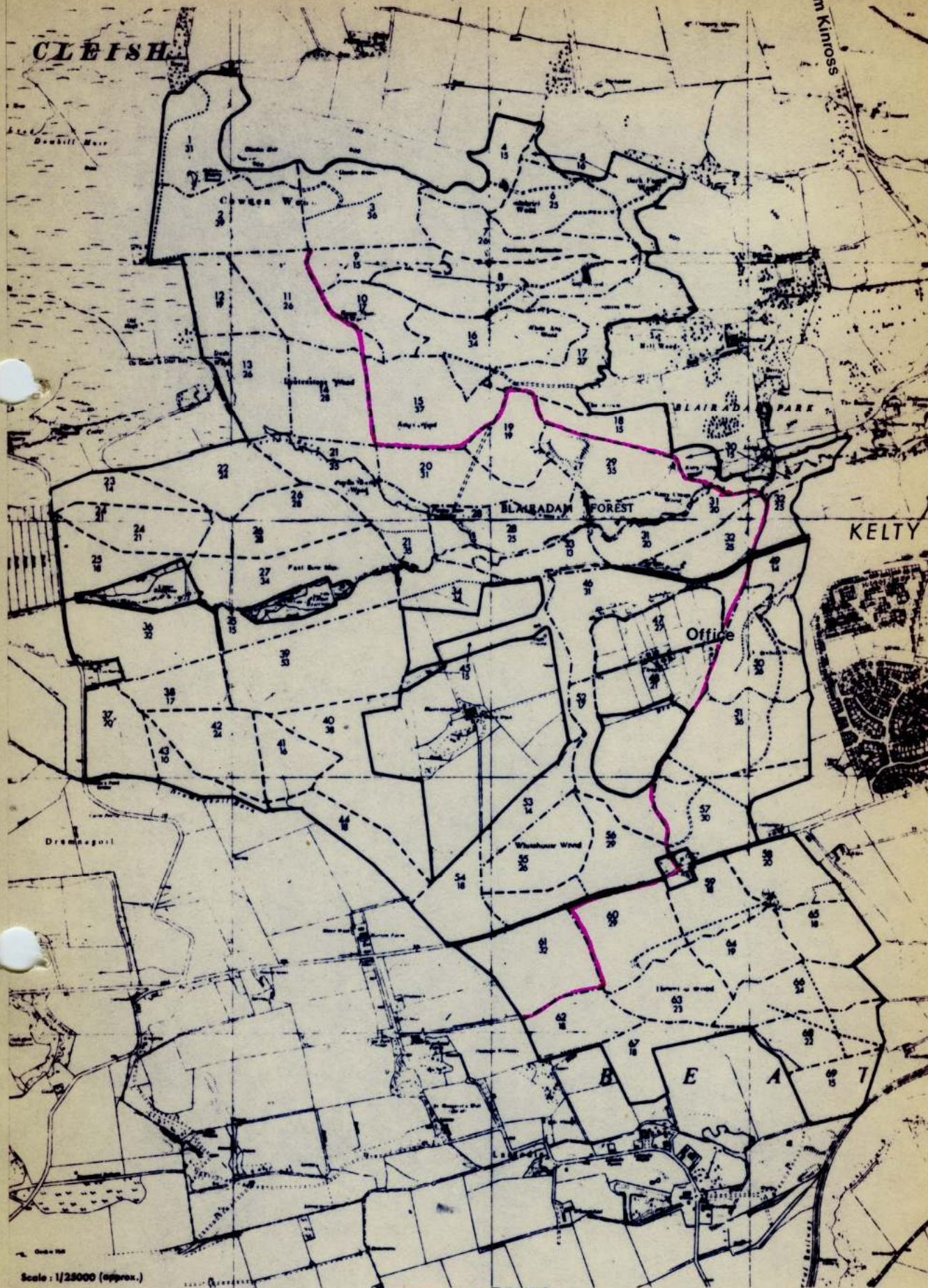
This costs up to £25 per acre plus up to £16 capitalised drain maintenance costs ie, a total discounted expenditure on deep drains of up to £40 per acre. An increase in final crops height of 15 feet to 20 feet in Sitka Spruce 140 Yield Class would be needed to repay this expenditure. In lower Yield Classes the expenditure cannot be justified whatever the increase on final crop height.

If, however, deep draining can be delayed without increasing its cost, then it is more likely to be economically justified. A delay of six years before incurring the cost of deep draining results in its being justified by a 10 feet increase in final crop height in Sitka Spruce Yield Class 140.

Techniques are also being improved to cheapen draining costs eg by heavy ploughing equipment and specially prepared back-acting equipment.

CLEISH

from Kinross



Scale: 1/25000 (approx.)

ROUTE

