

LIBRARY
L.F. NO.
902 (410.7)
H.M. Forestry Commission

FORESTRY  COMMISSION

HISTORY

OF

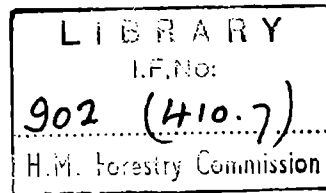
TEINDLAND

FOREST

E(S) CONSERVANCY

FOR
REFERENCE ONLY

Forestry Commission
ARCHIVE



FORESTRY COMMISSION

HISTORY

of

TEINDLAND FOREST

1923 - 1951

EAST (SCOTLAND) CONSERVANCY

HISTORY OF TEINDLAND FOREST

	<u>Contents</u>	<u>Page</u>
CHAIRMAN'S COMMENTS		1
DIRECTOR'S COMMENTS		2
FOREWORD by DISTRICT OFFICER		3
GENERAL DESCRIPTION OF THE FOREST		
Origin of the name		4
Area and Location		4
Physiography		4
Geology and Soils		4
Vegetation		4
Meteorology		5
Risks		5
Roads		5
SILVICULTURE		
Treatment of Scots pine scrub areas		5
Planting		6
Manuring		6
Ploughing		6
Cultural operations		7
Thinning		7
Heathland nursery		8
Research - Historical Account of Experiments at Teindland by Research Branch		9
Future Acquisition		15
Conclusions		15
Summary by State Forests Officer		16
APPENDICES:		
I	Notes from Inspection Reports	17
II	Record of Supervisory staff	23
III	Schedule of Height Growths	24
IV	Map of the Forest	

HISTORY OF TEINDLAND FOREST

CHAIRMAN'S COMMENTS

My first inspection of which I have a record was in October 1925, when underplanting of Scots pine with Tsuga and other species on an experimental scale was agreed.

It was apparent from the start that the upper parts of the forest presented a tough problem, towards the solution of which we could contribute little first-hand experience. In retrospect it appears that planting should have been on a smaller scale and experimental work more intensive. That lesson had to be learned, and should not be forgotten in its wider aspects.

The experimental work as it was developed at Teindland, Allerston and elsewhere, became more and more fruitful and interesting. The loss of so many Teindland plots in the fire of 1942 is greatly to be deplored.

We might perhaps have deduced from first principles that soil cultivation would have beneficial effects on tree growth, but the effects of slagging and above all the inter-action of pines and spruces were items of first class importance to our work.

The history would be improved if more information were recorded of the rate of growth of different species under typical conditions. Some of the crops no doubt have reached the thinning stage and something should be said about that.

I assume that the Tsuga underplanting has continued to thrive; butt rot may be expected in due course.

R.

23.5.51.

DIRECTOR'S COMMENTS

I can add nothing to Mr. Woolridge's excellent summary which deals mainly with silviculture. There is one feature not mentioned in the history, which is perhaps worthy of note. There is on the south march a classic example of the dangers of erosion on Old Red Sandstone. In the early days a small shallow drain was cut through the peat and into the drift, running vertically up and down the hill and joining the very top of the Carrie Burn. Erosion began and resulted, after a heavy thunder storm, in a deep, wide gully being washed out with consequent flooding and piling up of gravel on agricultural land below (not belonging to the Forestry Commission). Apart from damage and expense that was caused, an indirect result was the holding up of the acquisition of land from the adjoining Orton Estate for five years or more before the dispute about this erosion could be disposed of.

H. BERESFORD-PEIRSE

Edinburgh.

March, 1951.

HISTORY OF TEINDLAND FOREST

Foreword by District Officer.

Teindland lies in an area where the natural forest vegetation is pine, the land of the forest being old woodland with pockets of scrub.

It is a small forest where much Research work has been carried out. One third of the forest was destroyed by fire in 1942, at the time when the original planting was nearing completion. At this time, ploughing was developing. Hence we have on Teindland areas planted with and without ploughing. Time will show the value of ploughing here as it has done elsewhere. Where no ploughing was done, manual cultivation was used. In the better areas this has produced results but the poorer areas have reverted to type.

The development of the heathland nursery in more recent years has been a big feature in the history of the forest. Results have been more than satisfactory and have led to the planting of one year old seedlings, on a cautious scale.

Records and the past reports of visits of senior officers give a good picture of the forest in its various stages.

HISTORY OF TEINDLAND FOREST

GENERAL DESCRIPTION OF THE FOREST

Origin of name

The name of the forest is believed to be associated with the Church, but the belief is that the connection was limited.

Area and Location

From 1923 to 1925, 1287 acres were feued from the Duke of Richmond and Gordon. The forest is situated in the parishes of Speymouth and Rothes in the County of Moray. It lies about $6\frac{1}{2}$ miles south-east of Elgin and 4 miles south-west of Fochabers.

Physiography

The elevation varies from 150 ft. to 750 ft. above sea level. About three quarters of the land lies below the 500 ft. contour. The main area slopes gradually from the highest point in the south western corner in a north-easterly direction. The degree of slope varies from about 1 in 10 to 1 in 35 except on the western boundary at the Red Burn where it is, in some places, almost precipitous.

All aspects are represented but the greater part of the area has a north easterly to easterly aspect. The exposure is nowhere severe. Much of the ground is sheltered from the prevailing south-west winds.

Geology and Soils

The underlying rock is the Lower Old Red Sandstone except in the south west corner where it is metamorphic schists and gneisses. The soil is principally glacial drift and varies from clayey loam to gravel and sand. The three general soil types are:-

- (1) Normal podsoles on fluvio-glacial sands and gravels.
- (2) Peaty gley podsoles with hard pan on boulder till.
- (3) Peaty gley soils on boulder till.

Vegetation

At the time of acquisition the existing crop of Scots pine and European larch was in the process of being felled. When the merchant had completed his felling, some Scots pine scrub was left. Heather predominated over the

remainder of the area. There was also a strong growth of whins in places, cotton grass, Erica tetralix and lichens occurred on the poorer parts. Repeated heather burning on the poorer ground had seriously impoverished the soil.

Meteorology

The average annual rainfall is about 36 in. and the snowfall can be fairly heavy at times.

Risks

Pests have not caused much trouble. There were rabbits on the area but their numbers were not excessive. Slight damage was caused by hares, roe-deer, capercaillie, black game, sawfly and pine weevil. In 1942 a fire which started up some 5 miles away, invaded the forest and destroyed 499.5 acres which included about two-thirds of the Research Branch Experiments.

Roads

The first $2\frac{1}{2}$ miles were built to the original road specification laid down and a large amount of hand labour was used with resultant heavy costs.

On closer investigation, it appeared that the soil was good enough for the construction of earth roads which were considered adequate for present requirements. Metalled roads were therefore abandoned, at least until a reasonable quantity of timber is ready for extraction.

If and when surfacing is required, adequate quantities of gravel are available west of Spey to ensure cheap surfacing.

SILVICULTURE

Treatment of the Scots pine scrub areas.

One of the operations which received early attention was the inter-planting of the Scots pine scrub. It was realised at the time that the scrub would have been costly to clear and clearing would have encouraged the breeding of weevils. In 1926 the scrub was interplanted with Tsuga and Thuja. In 1929 the Tsuga were reported to have transplanted well, were very healthy and making vigorous growth but there was a fair percentage of failures among the Thuja. At the time of writing (1951) the Tsuga are

still growing satisfactorily. The appended summary of reports of visits by senior officers (Appendix I) shows that this work of interplanting has been closely watched since it started. Other species used for interplanting were Norway spruce, Sitka spruce, and beech. Although there are still live specimens of these species, the only one which appears to be at all promising, is Norway spruce. In 1932 Mr. Sangar reported that the success of Tsuga used for underplanting, even on poor soil types, was most marked. In extremely poor soil conditions, Pinus contorta has proved its value.

Planting

The early planting was done with 6 in. semi circular spades. A plug of soil was taken out and the soil underneath stirred up to a depth of 8 in. to 10 in. The plant was inserted and the plug of soil was broken up before being returned to the hole from which it was taken. This method of planting was noted as being nearly as cheap as notching and was considered more efficient. Good growth a year or two after planting confirmed the success of this method of planting.

Weeding was heavy in the heather and whin areas and plants used for beating up were to be good 2 x 1s and these were to be pit planted.

Manuring

There are no records to indicate that basic slag was used prior to 1937. In that year, however, 1.5 acres of P.26 Pinus contorta were treated at the rate of 2 ozs. per plant. Records also show that some plantations were slagged two or more years after the year of planting and that slagging the current year's planting was first done in 1939. The change to ground mineral phosphate was effected during the 1939-45 war. It was alleged that there were harmful impurities in the basic slag.

Before the fire of 1942, the main species used for planting was Scots pine. From 1942 a mixture of Scots pine and Sitka spruce was generally used. Wet hollows were turf planted.

Ploughing

55.5 acres of the area burned in 1942 were ploughed in 1945 for the following year's planting with R.L.R. and Solotrac ploughs drawn by tractors. The ploughing was too shallow with the result that not enough pan was broken. In 1947, 125 acres were ploughed with a Solotrac plough

for P.48 planting. The planting position was on the slice. By this time, heathland nursery technique had developed and larger one year seedlings were being produced. These were given a trial on the ploughed ground.

All spruces planted on ploughed ground have been given an application of ground mineral phosphate at the rate of 1½ ozs. to 2 ozs. per plant. In many cases it appears that the Scots pine would have benefited had they been given a similar dressing . In some cases the Sitka spruce are not out-stripping the pine. By 1939 the forest had been planted. In 1942 a fire started on the neighbouring Orton Estate spread into the Commissions plantations and destroyed 499.5 acres. It was in this area that the above ploughing took place.

. Cultural operations

Much of the original planting at this forest has now reached the cleaning and thinning stages, or is about to reach them. The Scots pine is in general slow grown. Growth varies from 2 ft. to 5 ft. in the first six years, according to the site, the best recorded growth being 6 ft. in the first 7 years. The clearing and thinning stages have been generally reached when the plantations are about 25 years old. Trees of good type and quality are abundant throughout the crop. The thinning to date has been confined to the compartments near the Elgin-Orton road with the exception of plots of Sitka spruce up the valley of the Redburn. Some thinning was done in the old scrub pine areas during the war years (1939-45). The following table shows areas and species thinned and the yield from these thinnings.

F.Y.	Compt.	P.Yr.	Age	Area Thinned (acres)	Species	Vol. Removed (cu. ft.)	
44	5	24	20	4	D. F.	300	1st Thinning
51	"	"	27	"	"	428	2nd Thinning
49	39b	30	19	1	S. S.	200	1st Thinning
48	5	25	23	13	S. P.	2080	-do-
51	7	25	26	12	S. P.	3410	2nd Thinning
50	40	29	21	3½	P. C.	300	1st Thinning
51	5	25	26	1	E. L.	221	-do-

Heathland Nursery

After a few trials by the Research Branch at this forest, a heathland nursery was opened in a ride in 1944. The area was 380 sq. yds. The nursery was a success and additions were made as follows :-

In F.Y.	45	...	...	...	...	300 sq. yds
" "	46	...	...	...	...	840 " "
" "	47	...	...	...	...	2850 " "
" "	48	...	...	...	...	1380 " "
" "	49	...	...	...	...	1320 " "
" "	50	...	...	...	...	1320 " "
" "	51	...	...	...	...	12100 " "

giving a total to date of 20,490 sq. yds.

To make these extensions possible it has been necessary to fell part of the plantation and completely remove stumps, roots, and the bigger stones. The cleaned ground is then cultivated by rotohoe. Heather is removed.

In selecting the site the area is examined to find a place where the ground is almost level and aspect is not south or east. There should be no excessive surface moisture, no signs of frosting and peat should not exceed 3 in. in depth.

Weeding in the heathland nursery has been very limited. The dominant weeds have been Rumex and Calluna. Spraying has been done regularly with Bordeaux mixture against Botrytis and incidence of attack appears to have been much reduced.

Grading of seedlings has been simple and normally two or three grades have sufficed. Experimental sheughing for long and short periods has been tried with reasonable results but its full possibilities remain unexplored.

One year seedlings have been produced up to 12 in. in height. These were considered fit for planting on ploughed ground and trials were laid down in the area burned in 1942. These trials are satisfactory. Originally the seedlings were spaced at 3 ft. on furrow slices 5 ft. apart but success has been great enough to indicate that there was no need for this reduced spacing.

After being lined out for one year heathland seedlings have produced excellent 1+1 transplants. These also have been used for planting on the furrow slice but the indication is that the seedling may well replace the

transplant on the better ploughed sites.

RESEARCH - Historical Account of the Experiments at Teindland by
Research Branch

In 1925 some thirty acres of poor Calluna/Scirpus/Cladonia moorland at Findlay's Seat, the highest point in Teindland Forest was fenced in as an experimental reserve in connection with the possible afforestation of large tracts of high lying Calluna moorlands which extend across the counties of Nairn, Moray, and Banff. The previous crop on Findlay's Seat was Scots pine only a few feet high at eighty years. It is not without significance that the first two registered experiments laid down in the following year concerned ploughed and hand prepared fire-belts, which unfortunately proved more or less ineffective in the exceptionally dry spring of 1942 when a fire which started up some five miles away swept across the moors and destroyed two-thirds of the experiments.

1926

Experiments in this year concerned direct sowing, age and type, and methods of planting Scots pine, beech, Pinus contorta, and mountain pine. There was also one manuring experiment employing both Kainit and basic slag. As all these experiments dealt with direct planting or sowing on the natural, often wet, and always anaerobic surface, which conditions they did nothing to ameliorate they all passed out sooner or later, mainly as complete failures.

There were, however, two draining experiments, (12 and 13), in both of which an ordinary agricultural plough was used in comparison with hand-dug drains. In Experiment 12, before it was destroyed by fire in 1942, Scots pine had grown twice as high where shallow drain furrows were six feet apart as the species had grown where the furrows were twelve feet apart. Experiment 13 fortunately was not destroyed and still provides a striking demonstration of the primary need for removing surface water from high heathlands of this type. After twenty-two years Scots pine had a mean height of 13.5 ft. on shallow drains 16 ft. apart as against only 3.5 ft. in the undrained controls.

1927/28

So far, it must be made clear, this plough had been used solely as a draining tool, the ridge turned out of the furrow not being intended primarily for planting upon.

The real value of the Findlay's Seat experimental enclosure dates from the following year 1927 when Experiment 16 was laid down to compare the growth of various species, pure and in mixture, on the poor heather ground after partial or complete ploughing, with and without phosphate. The plough, which weighed about four hundredweights, or double the weight of an ordinary farm plough, required three horses. It had been specially built at the Standfast Works, Craigellachie, at the instigation of Dr. M.L. Anderson who was then Research Officer, Scotland. In the following year, a repetition of the first year plough trial was added alongside (Experiment 23).

The ploughing methods involved in the experiments were (a) complete, (b) double furrow and (c) double furrow with subsoiling, but seldom was the ploughing deeper than six inches on account of the hard packed nature of the Old Red Sandstone till.

Scots pine, mountain pine, Pinus contorta, Sitka spruce, Norway spruce, Thuja and Tsuga were the species planted. The two spruces besides being planted pure were also planted in mixture with mountain pine and Pinus contorta. On strips amounting to half of the area basic slag was applied broadcast at the rate of ten hundredweights per acre, intervening strips being unmanured.

The more complete forms of ploughing gave slightly better results than simple double furrow ploughing. The effect of basic slag is most striking particularly on the spruces, and on Thuja and Tsuga; without slag, the majority failed or are still in check. Pinus contorta and Scots pine have grown best, twenty years after planting both species averaging $16\frac{1}{2}$ ft. on complete ploughing with slag, and $11\frac{1}{2}$ ft. for Scots pine and $15\frac{1}{2}$ ft. for Pinus contorta without slag. The largest spruces are found in intimate alternate plant mixtures with pines. Where Sitka spruce is in mixture with Pinus contorta on complete ploughing with slag the height at twenty years was 13 ft. as compared with 7 ft. where planted pure even although the pure Sitka area was recultivated in 1935. Norway spruce grew $6\frac{1}{2}$ ft. in mixture but only 2 ft. where pure; Tsuga was 10 ft. with slag but only $2\frac{1}{2}$ ft. without slag. Unfortunately Experiment 16 was destroyed by fire in 1942, but the part of Experiment 23 which still remains provides much interest to visitors and shows that cultivation in the form of ploughing and manuring with phosphate are essential to good growth on this type of land.

1927/28 saw also a number of new trials of species and methods of planting, mainly by direct methods, but in one or two experiments planting on turfs and mounds was also undertaken. Mounds made by heaping the spoil from small pits, gave results almost as good as ploughing, but owing to the high cost of such hand preparation and the success of ploughing, the method was abandoned by 1931.

1929/30

Eleven experiments were laid down in these years, the most interesting among them being the first trials of Andersonion group planting with and without special soil preparation. Unfortunately the majority of these were lost in the 1942 fire, before anything approaching final results could be obtained. A major advantage of group planting on this poor land lay in the fact that the very beneficial but costly cultivation by hand and manuring could be concentrated on small patches instead of over the whole area. Hand cultivation was of course inevitably superseded when the early ploughing trials proved satisfactory.

The first really large scale ploughing experiment 41.P.29, was laid down during this period, the object being to test methods of preparation with and without the heavy three-horse plough. Pinus contorta was chosen as the indicator species presumably because it appeared already from the earlier experiments to be the species most likely to do well. Two methods of ploughing were tried out, viz. 10 ft. wide completely ploughed bands leaving 10 ft. unploughed between, and three furrow strips spaced at 5 ft. The normal method of mound planting at the time, and referred to above, was used as a control, and basic slag at the rate of two ounces per plant was applied over half of the experiment. The contorta grew well from the start and there is now a well established plantation of several acres where originally the poorest of Scots pine scrub had grown. At nineteen years after planting, the top height of Pinus contorta was 20 ft. with slag and 16 ft. without slag. Height growth on the mounds is almost as good as that on ploughing, but of course the difference in cost of preparation rules out such hard preparation.

1931/33

Experiments in the next two years mainly concerned provenance. Two compared various races of Pinus contorta and one races of European larch. There are, however, also trials of species on ploughed Calluna ground some

of which contained single furrow ploughing, more complete ploughing and complete cultivation by cultivator and harrow. These experiments unfortunately, as well as many of the others which have been mentioned, were destroyed by fire in 1942. Perhaps the most interesting result observed in these species and cultivation experiments was the good growth of Japanese and hybrid larch, particularly the latter. In Experiment 47, inside the Findlay's Seat enclosure and 48 in Compartment 17, near the middle of the Forest, hybrid larch was growing at the rate of 15 in. to 18 in. per annum, remarkable growth for this very poor class of heath.

1934/35

The first 1934 Experiment, (50), was an interesting and rather spectacular one in which planting was carried out into each of the well defined soil horizons of this podsol area. A trial of species on ploughed and on turfed Calluna ground, a block of hybrid larch, two beating up experiments and some manuring experiments, including the first trial of "Semsol" on Teindland were established during these years. It is interesting to record that the first results from the use of "Semsol" gave a very high death rate when this phosphate manure had been applied at the roots of the plants. In other manuring experiments it was found that applications of basic slag or ground mineral phosphate were just as effective when applied on the surface as at the roots at time of planting.

Luckily the two most important experiments laid down in 1934/5 escaped the fire. They were a Pinus contorta provenance experiment and a draining intensity experiment, both are on the hillside just below the Findlay's Seat enclosure. In this draining experiment, deep and shallow drains at various spacings showed that all species responded to increased drainage, and while most increased steadily in the order of cost, be this on account of depth or closeness, Japanese larch shows a striking difference in that it responds to closeness much more than to depth.

1937/39

Some minor experiments on manuring and an attempt to grow a plantation on tractor ploughed ground after a preliminary sowing of birch had a short life as they perished in the 1942 fire. A $3\frac{1}{2}$ acre trial plantation, Experiment 63, in which groups of the most promising species for poor moorlands were planted on ploughed ground, was laid down in 1938, but perhaps the most interesting item of these years was the introduction of

some rather more exacting species into the ten year old Pinus contorta plantation experiment 41.P.29. The 10 ft. unploughed strips between the bands of Pinus contorta in this experiment, referred to earlier, were tractor ploughed and planted with double lines of Douglas fir, beech, Tsuga, alder and Sitka spruce, generally in mixture. The growth of Douglas fir, Tsuga, and alder has been most gratifying and because of these results further large scale trials of introductions into pine plantations have been laid down in various Scottish Forests.

Various hardwoods were also introduced into small gaps among the Pinus contorta in the three furrow strips of the same experiment (41) as a possible means of improving the soil fertility of this poor moorland type, but after ten years the only worth while species were the two alders, Alnus incana and Alnus oregona, which reached heights of 9 ft. and 15 ft. respectively. From the heavy leaf fall of these two species it appears likely that the raw humus layer is already changing to a better type. Neither at Teindland nor elsewhere, it is worth noting, has there been any success with the alders in straight forward first plantings.

No new experiments of any importance were established between 1939 and the year of the fire. To some extent this was because the Findlay's Seat enclosure had become very well filled up and it became the habit to lay down new experiments in extension areas on the Black Isle and at Clashindarroch.

By 1947, however, the burnt ground at Teindland was again being used for experiments to compare the new well grown one year seedlings from heathland and sterilized established nurseries with the more conventional transplants. In 1948/49 also a portion of the burned land within the Findlay's Seat enclosure was employed again for a methods-of-ploughing and species experiment. There were more nursery extensions, some further age and type trials and a position of planting experiment designed to find out the best place for planting on single furrow ploughing.

An interesting feature of the Findlay's Seat area has been the gradual change in the vegetation over the past twenty-five years from the poor, Calluna/Scirpus/Cladonia of the untouched moor to luxuriant Calluna and the disappearance of Scirpus where ploughing or at least surface draining had been carried out.

Of the seventy-eight experiments and preliminary trials laid down

before the fire, forty-four were destroyed.

Summary:

In 1925 the Findlay's Seat area was selected for experimental work.

The first years experiments dealt mainly with direct sowing and methods of planting with only very local surface preparation, within a few inches of the seed or plant. These methods were soon found to be futile. Two experiments designed to investigate the effects of different degrees of surface draining have proved to be exceptionally interesting.

Ploughing proper, employing at first a heavy three-horse plough began in 1927. Single and double furrow, ten feet ploughed strips and complete ploughing were all tried out. The difference between complete and single furrow ploughing is marked, but not between double furrow and complete ploughing. Of the various methods, complete ploughing gave the best results. Although draining, especially where closely spaced, gave marked results in some of the early experiments it was found to be unnecessary in combination with ploughing.

Next to ploughing, phosphate manuring gave the greatest increase of growth although its effect was small on unploughed land. No artificial manure other than phosphate has been successful on the Findlay's Seat area, but manuring has not been so exhaustively studied there as at the Lon Mor or Allerston.

Pinus contorta, hybrid larch and Japanese larch have so far proved themselves the best species when planted pure on ploughed ground with phosphate. Sitka and Norway spruce have made satisfactory growth only when in mixture with Pinus contorta, Scots or mountain pine where the ground was ploughed and phosphate applied. Sitka spruce/Pinus contorta is the best mixture. Scots pine has done almost as well as Pinus contorta under optimum conditions of soil preparation and phosphate manuring.

Among species employed for inter or under planting Oregon alder has been most successful - it was useless in the open here. Douglas fir and Tsuga have done well as an interplant between bands of Pinus contorta and the method of late introduction opens up promising prospects. Tsuga has also grown remarkably well in full exposure where the ground was ploughed and phosphate applied.

J.A.B. Macdonald

23rd December 1950

Future Acquisition

In the near future, the forest area will be doubled by the acquisition of adjoining ground from the Orton Estate. On this new area, the soil on the lower slopes is excellent, the higher slopes adjacent to Findlay's Seat are similar to the poorer sites of Teindland. Other additions are smaller blocks feued from Gordon Castle Estate.

Conclusions

The main difficulty at Teindland has been the establishment of plantations on the poorer soil or the higher slopes. After improving this by ploughing, a crop can be raised. On the poorest sites, the use of Pinus contorta, hybrid larch if available, and Japanese larch have been found to be the most suitable species, even after ploughing. Unploughable sites at Teindland are confined to the valleys of the burns where crops can be raised without ploughing.

(Signed) W. F. French,

District Officer.

SUMMARY

This history of Teindland Forest shows clearly that ploughing is the key to the successful afforestation of hard Calluna/Scirpus moor. It also shows that where conditions are easier as indicated by absence of Scirpus and the presence of occasional whin and broom, plantations may be established by traditional methods if the choice of species is restricted to the pines and the larches. By these methods, however, establishment is slow, and there is no doubt that at Teindland ploughing will bring advantages wherever it can be done.

The growth of Tsuga under scrub Scots pine gives the lesson that if species other than pine and larch are to be successful there must first of all be some suppression of heather. The best trees for this purpose seem to be Scots pine, Japanese and hybrid larch. This nursing appears to be necessary also on ploughing.

The choice of species at Teindland has been unimaginative and perhaps wisely so. From a study of Findlay's Seat, however, it does seem that by the use of plough, phosphate and careful selection of nurses, the introduction of a wider range of species particularly hardwoods, could be made with the aim of maintaining or improving soil fertility.

From the ample evidence of this history the use of phosphate should be normal practice on all poor Calluna ground.

There is an aspect of Teindland worth mentioning here. The quality of the pines and larches on this poor soil is very high and is maintained through what must be a good variety of different origins. The same persistence in quality was noted recently by Mr. Gosling at Culbin.

(Signed) T. H. WOOLRIDGE,

State Forest Officer.

Reports of Past Visits

The following summary of the reports of past visits of senior officers mentions only the salient points in the reports and is of interest as it mentions the state of the crops in the early years and the difficulties experienced in establishing them.

Mention is made of the advent of ploughing in so far as it affects this forest and of the fire which took place destroying the crop on the area which was ploughed.

Reports of Visits

1. The earliest report on a visit which can be traced is that of :- Sir Roy Robinson, Technical Commissioner, Mr. Annand, Mr. Cowell-Smith and Mr. Warren, which took place on Wednesday 19th September, 1929.

P.24 and P.26 were visited. The Scots pine were believed to be established and out of reach of black game damage. The spruce in P.25 looked miserable and it was suggested that a small group be treated with basic slag. Damage by black game to Scots pine was noted in P.25 and P.27. The inter-planting of scrub pine was reported to be successful; various species were used and Tsuga albertiana was reported to be particularly good. In the future interplanting was to be done in groups.

2. Visit of Mr. O.J. Sangar in October 1932

The forest area was described as an old woodland area with a soil which had been ruined by repeated burning of heather and with boggy patches. On both of these Scots pine and spruce had checked badly. Much weevil and deer damage was observed. From P.27 onwards weevil damage had decreased and more intensive soil preparation and drainage had been done. This, with Pinus contorta, Sitka spruce slag and improved planting methods have given better results in repair of earlier plantations (P.24-26) and improved results in later plantations.

The success of 30 acres of P.26 on poor burned ground was still doubted. By that time repair of P.26 on Badentinan Wood had not been completed. P.24-26 were believed to be otherwise established.

Scrub pine areas were to have the soil drained and prepared and the plants were to be slagged. Comment is made on the success of Tsuga in interplanting even on the worst soil types.

P.24-25 had been planted mainly with Scots pine with some European and Japanese larch and Douglas fir. On the main road Scots pine were averaging 6 ft. in height, European larch more and Japanese larch 12 ft. Fomes was becoming troublesome in the 12 acres P.25 Scots pine along the burn (presumably the burn near Altonside but this is not stated).

P.24 Scots pine ranged from 6 ft. high on the lower, better slopes. In P.25 Scots pine had reached 12-18 in. on the higher, hard, burnt flats. In P.25 the stocking was reported to exceed 90%. 15 acres screef planted (P.25) on sparse Calluna with Scirpus and Gladonia with Norway spruce had checked completely and was drained and replanted with Pinus contorta.

A few acres of Scots pine (P.24) on wet ground were drained and interplanted with Sitka spruce now 18 in. - 12 ft. in height and forming complete (mixed) stocking. Few plants resulted from direct sowing of Corsican pine, Scots pine and Sitka spruce and the area was replanted. The Corsican pine did best and up to 200 seedlings per acre survived and had reached 2 ft. in height or the same height as the 2+ 1 Scots pine used in 1930 replanting.

P.26 includes 50 acres of Scots pine on good ground along the main road adjoining P.25. There was much weevil damage and beating up. Stocking was then complete and height from 2-5 ft. Useful groups of natural European larch up to 8 ft. high occurred. In the wet pockets Sitka spruce had reached 6 ft. and Norway spruce 4 ft. The 30 acres of Badentinan had been heavily burned over before planting. The plantation here was badly drained and attacked by weevil. First planting had failed completely except on the drain sides where plants were then 5 ft. tall. After draining and beating up a satisfactory stocking of Scots pine, Pinus contorta, and beech resulted.

The remainder of P.26 was scrub Scots pine interplanted with Norway spruce. The European larch and other species on the banks of the Burn were satisfactory. There were uneven patches of Scots pine then fully stocked after weevil damage and beating up (height 1 ft. - 4 ft.) and promising Norway spruce and Sitka spruce on the heavily drained bog.

In P.27 one small block of Scots pine (11 acres) near Badentinan was badly damaged by weevil and heavily beaten up in 1930. The survivors of

P.27 were then 4 ft. high. Most of P.27 included much poor ground and underplanting of old Scots pine with Tsuga, Thuja and Sitka spruce. All Scots pine, Norway spruce and Sitka spruce on hard ground have been replanted with Pinus contorta after draining.

On bogs the vegetation was Calluna, Cladonia (Lichen), Erica etc. Juncus squarrosus with Sphagnum and Polytricum, Sitka spruce vary from just out of check to 7 ft. in height.

Tsuga were the best of the underplanted species, many being 6 ft. or more in height. Sitka spruce were satisfactory and Thuja less promising.

P.28-29. On the better land, Scots is the main species with Tsuga and Pinus contorta, and Norway and Sitka spruce on the peaty sites. Growth and stocking were satisfactory. The Scots pine and the Sitka spruce on the better sites were then 2-3 ft. tall. All spruces were turf planted. The underplanting near Badentinan Wood was successful but bad patches had been drained and planted with Pinus contorta or Sitka spruce. The old Scots pine were recovering and forming leaders.

P.30-31. The bad Badentinan flats were planted with Scots pine and Pinus contorta with Sitka spruce in the wet hollows. The remainder was old Scots pine underplanted with Sitka and Norway spruce. 14 acres of Japanese larch had reached 3 ft. in height and some European larch 2 ft. Stocking was satisfactory. The 2+0 Scots pine used on 10.15 acres suffered vole damage but were 95% stocked and had 3-6 in. leaders.

In Badentinan, Pinus contorta was planted where Scots pine had failed and Sitka spruce was used in the wetter areas. After intensive draining all species were mounded in the wetter areas.

P.32. Scots and Pinus contorta had been planted with Sitka spruce in the wetter areas.

3. Visit of 20.9.37 of :-

Sir Roy Robinson, Chairman.

J. M. Murray, Assistant Commissioner.

Dr. H.M. Steven, Divisional Officer

A. Warren, District Officer.

J.A.B. MacDonald, District Officer (Research)

J. Farquhar, Forester (Research)

The old scrub Scots pine which had been underplanted with Tsuga, were being thinned. The P.27 Sitka spruce on Calluna/cotton grass and the Pinus contorta were seen. Growth was slow but the plants were believed to be otherwise established.

4. Visit on 8.10.41 of:-

Sir Roy Robinson, Chairman.

Mr. A.H. Gosling, Assistant Commissioner

Mr. L.A. Newton, Acting Divisional Officer

Mr. I.J. Stewart, District Officer

Mr. J. Farquhar, Forester (Research)

Mr. A. Hepburn, Foreman.

In P.26 the Douglas fir was considered good. Of the Scots pine and European larch in P.24, the larch was considered good. The Chairman stated that patience would be necessary with the backward patches and that nothing could be done to hasten growth. In P.27 Sir Roy stated that the Sitka spruce growth on peat was good. The cleaning of the Scots pine scrub from the Scots pine plantations had been too complete. Shelter had been lost. There was weevil damage in the planted Scots pine.

In the underplanting Tsuga were better than Thuja of which few survived. Sir Roy commented that the recent thinning in the overcrop had been well done. It was believed that Scots pine stems should be kept on till the final crop even if some of the undercrop were sacrificed. In P.36 Pinus contorta had been used extensively. In P.35 Pinus contorta and Japanese larch were on poor ground which had been ploughed by horse plough (Compartment 26) and were agreed to be growing well. In P.28 growth of Scots pine was reported to be good.

In P.26, Compartments 9 and 10, where the old Scots pine had been underplanted, it was agreed that the pine only should be removed gradually when required. Where Sitka spruce had been used for underplanting, it was just coming out of check, and it was stated that the pine scrub had been removed rather soon. The shelter value of the scrub was stressed.

5. Visit on 6.8.42 of:-

Sir Roy Robinson, Chairman

Mr. A.H. Gosling, Assistant Commissioner

Mr. I. Gillespie, District Officer

Mr. I. J. Stewart, District Officer

Mr. N. R. Hepburn, Forester

In P.25, 26, 28 and 30 the growth was stated to be satisfactory. Compartment 15 (P.26) was destroyed by the fire on 6.5.42 as was P.27, Compartment 29 (Scots pine underplanted with Tsuga).

6. Visit on 6.12.44 of:-

Mr. A.H. Gosling, Assistant Commissioner

Mr. L. A. Newton, Acting Divisional Officer

Mr. I. J. Stewart, District Officer

Mr. N. R. Hepburn, Forester.

In Compartments 9 and 10 a thinning was being carried out in the Scots pine which was underplanted with Tsuga and Sitka spruce. The Tsuga was good and was expected to react to the increased light following the thinning by more rapid growth.

In P.24 the Scots pine were reported to be improving. Mr. Gosling advised ploughing in the burned area, especially on the higher ground. Much whin and broom was noticed on the burned area. This was to be given early attention.

7. Visit on 1.9.45 of:-

Sir Roy Robinson, Chairman

Mr. L.A. Newton, Divisional Officer

Mr. Flentje, R.A.A.F.

Mr. N. R. Hepburn, Forester.

The RLR plough and TD 9 tractor were inspected and Sir Roy Robinson was surprised to hear of breakages and bendings on the plough.

In Compartments 1 and 12 the slow growth of Scots pine was noticed.

The D.4. tractor and the Solotractor ploughing in Compartment 15 was, the Chairman' stated, too shallow and not enough pan had been broken. Similar comment was made on the RLR ploughing in Compartment 26. In Compartment 18 the RLR ploughing was believed to be deeper and better.

The P.33 underplanting of the old Scots pine with Tsuga were stated to be nice and frequent light thinnings of the pine were approved, leaving plenty of light for the Tsuga and a fairly open permanent crop of pine.

Sir Roy Robinson stated that the prolific whin growth had to be planted soon.

Ploughing and Replanting of Failed Areas

No recent report of the visit of a senior officer covers the ploughing and replanting of the difficult, failed areas which was done during F.Y.50. 20 acres in Compartments 39a and 39b (P.30); 43 (P.30) and 42 (P.31) were ploughed up and replanted with Scots pine, Pinus contorta, Japanese larch and Sitka spruce during F.Y.50.

APPENDIX II

STAFF RECORD

Divisional Officers and Conservators-in-Charge

Mr. J.F. Annand, Divisional Officer	...	...	1924
" R.G. Forbes,	"	"	25.7.32 - 26.9.33.
Dr. H. M. Steven,	"	"	30.9.33 - April '38
Mr. F. Scott,	"	"	April '38 - Sep. '39
" L. A. Newton,	"	"	Sept. '39 - April '46
" H.C. Beresford Peirse, Conservator	...	...	April '46 - May '47
" F. Oliver,	"	...	May '47 continuing

District Officers

Mr. R. Cowell Smith	...	...	...	Mar. '32 - Nov. '34
" A. Warren,	...	...	...	Sep. '34 - 1939
" I.J. Stewart,	...	...	...	Oct. '39 - Oct. '47
" R. Waterman,	...	...	...	May '47 - Sep. '47
" B.R. Feaver,	...	...	...	Oct. '47 - Sep. '49
" W.F. French,	...	...	...	Oct. '49 continuing

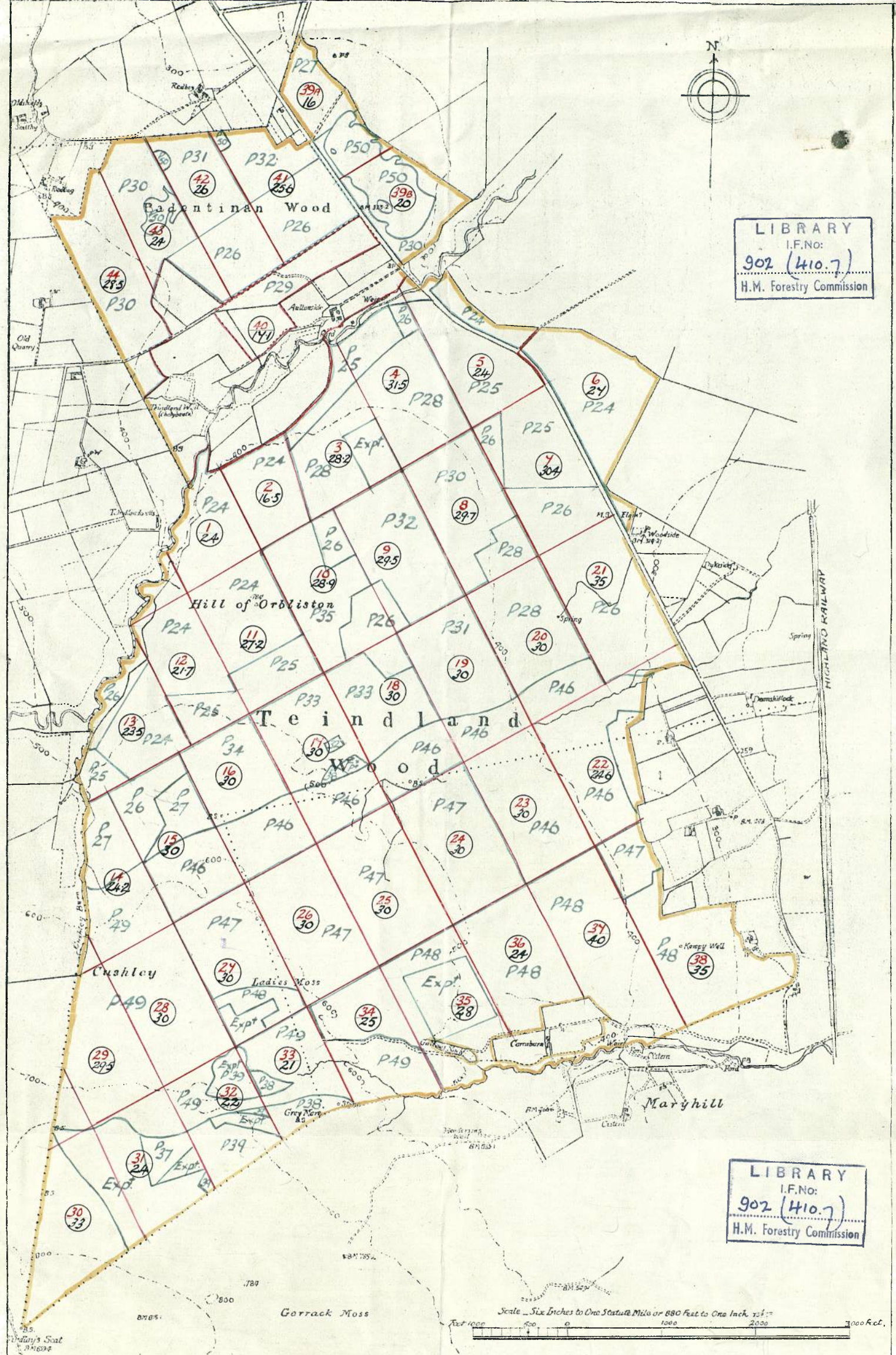
Foresters and Foremen in charge

Mr. J. McEwan, Grade I	...	...	...	1923 - Feb. 1926
" " " Head	...	...	...	Mar. '26 - Aug. '28
" A. Warren, Grade I	...	...	...	Sept. '28 - Oct. '29
" " " Head	...	...	...	Oct. '29 - Sept. '34
" D. J. Urquhart, Foreman	...	...	...	Jan. '35 - Sept. '35
" " " Grade II	...	...	...	Oct. 1935 - Mar. '46
" " " Grade I	...	...	...	April '46 - June '49
" N.R. Hepburn, Foreman	...	...	...	Nov. '39 - Sept. '41
" " " Grade II	...	...	...	1941-42 Dec. 1945 - June '46
" J.G.M. Reid, Grade II	...	...	...	1949 continuing.

APPENDIX III
GROWTH RATE

Compt.	Species	P. Yr.	Age	Geology and Soil	(a) Altitude (b) Aspect (c) Slope (d) Exposure	Mean Ht. of Dominants	Mean Annual Ht. Increment	Current Ht. Increment of last 5 years.
7	S.P.	25	26	O.R.S. Conglomerate Podsolized thin Skin of Peat	(a) 300' (b) E. (c) V. Slight (d) Nil	35'	1' 4"	1' 7"
11	S.P.	24	27	" as above	(a) 450' (b) N. (c) V. Slight to N. (d) Nil	30'	1' 1"	1' 8"
5	E.L.	25	26	" "	(a) 300' (b) E. (c) Flat (d) Nil	40'	1' 6"	1' 6"
5	D.F.	24	27	" "	(a) 300' (b) E. (c) Flat (d) Nil	46'	1' 8"	2' 1"
39b	J.L.	30	21	" "	as for C.7	45'	2' 1½"	1' 7"
12	S.S.	24	26	" "	(a) 400' (b) Hollow (c) Flat (d) Slight to E.	55'	3' 1½"	1' 10"
40	P.C.	29	22	" " (Gravel)	(a) 350' (b) E. (c) Flat (d) Nil	28'	1' 3½"	1' 8"

Teindland.



LIBRARY
I.F.No:
902 (410.7)
H.M. Forestry Commission

LIBRARY
I.F.No:
902 (410.7)
H.M. Forestry Commission

TEINDLAND FOREST
COUNTY OF ELGIN
PARISHES OF ROTHES & SPEYMOOUTH

REE
R.30 / No.28
Intd.B.....