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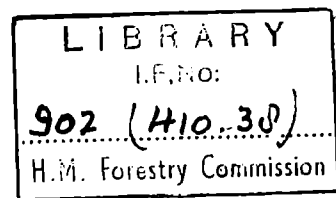
HARWOOD

FOREST

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FORESTRY COMMISSION

HISTORY

of

HARWOOD FOREST

1929 - 1952

NORTH EAST (ENGLAND) CONSERVANCY

History of Harwood Forest

	<u>Contents</u>	<u>Page</u>
GENERAL DESCRIPTION OF THE FOREST	1
General historical note	1
Area and Utilisation	3
Physiography	7
Geology and Soils	7
Vegetation	8
Meteorology	9
Risks	11
Roads	13
Labour	14
SILVICULTURE	15
Preparation of ground	15
Choice of species	15
Planting - Methods, Spacing, Type of plants used, Annual rate of planting, manuring, Success of establishment	17 - 20
Mixtures	20
Ploughing	21
Beating up and subsequent operations	21
Rates of Growth	22
Treatment of established plantations	26
Nurseries	27
Research	27
Conclusions	27
APPENDICES - I Notes from Inspection Reports	29
II Record of Supervisory Staff	33
III Maps of the Forest Areas		

HISTORY OF HARWOOD FOREST

GENERAL DESCRIPTION OF THE FOREST

General historical note.

Harwood Forest comprises 5,265 acres of land in the parishes of Harwood, Hartington, Hepple, Tosson, Newton, and Hollinghill, in the Rural District of Rothbury, and lies on the extensive moorland to the south of Rothbury which stretches from the Simonside Hills in the north to the Morpeth - Elsdon road in the south. This forest is in two parts, Harwood section being the southern portion, and Chartners and Simonside sections the northern.

In mediaeval times Harwood formed an outlier of Rothbury Forest, as did Ottercops. The parish of Harwood was held in capite by the Barons of Bolam around 1279, along with other land on Greenleighton. The name Harwood is supposed to be derived from its lying on the "har" or boundary between Wallington and Redesdale.

Chartners appears to have formed part of Barony of Hepple in 1369, and was later owned by the Tayleboys family. It is probable that Chartners formed part of the land which came into the possession of John Hall of Otterburn around 1530, and which was sold to Sir William Blackett of Wallington in 1702.

Simonside was originally within the common land of Rothbury Forest. Newtown was granted to Robert Fitz-Roger as part of the lordship of Rothbury in 1205. The commons were gradually encroached upon, and this area was in the possession of the Duke of Northumberland in the 17th century. In 1884 the Duke sold this area to Sir W. G. Armstrong and it was incorporated in Cragside estate.

The area is one of antiquarian interests. On a hill at the north-west corner of Harwood section is a strong camp, in the form of a trapezium, defended by double ditches. It had a boundary cross, Manside cross, on the north-east angle. This camp overlooks the country far up into Redesdale, and to a great extent every other way. It is presumably of Roman origin. Another smaller, and less well-defined camp lies in the centre of Harwood section, near the Old Plantation.

Harwood Farm was sold to the Forestry Commission in 1929 by Sir Charles Trevelyan, of Wallington, who was anxious to have a forest created on his estate, and who was willing to assist the establishment of the Forestry Commission in the district. The farm was sold at £4 per acre, and it was then estimated that this price was about £2000 less than the probable market value of the property. Sir Charles intended to plant on a fairly extensive scale himself on other parts of the estate, and it is recorded that he promised to offer the adjacent farms of Harwood Head and Raff Shiel to the Department at a later date.

It was proposed in 1929 to lease 30 acres of land at Harwood Gate, also on Wallington Estate, as Forest Workers' Holdings, two of 10 acres and two of 5 acres each being proposed, the lease to be for 999 years at £1 per acre. Difficulties arose over water supplies, and finally it was decided not to proceed with acquisition, as Sir Charles Trevelyan was a Member of Parliament and the transaction was not permissible under the House of Commons Disqualification Acts. The Forest Workers' Holdings were built at Harwood Farm instead. In 1933 Sir Charles offered Harwood Plantation, 56 acres of old woodland on our eastern boundary, at £4 per acre. The proposal was turned down by the Forestry Commission on the grounds that the strip was too narrow to justify the cost of moving the fence.

Dunshiel Farm, near Elsdon, was bought by the Forestry Commission in 1937 from Sir H. Haggerston and others. This farm, 515 acres in extent, was tenanted until May, 1949, when it was transferred to the Ministry of Agriculture.

Flatt Fell, 57 acres of land adjacent to Dunshiel, was bought from the Trustees of the late Miss H. J. Gow in 1948. It was tenanted as part of Dunshiel, and was also transferred to the Ministry of Agriculture in May 1949.

In 1950 Simonside section, 525 acres, was leased to the Department by Lord Armstrong. This land formed part of Cragside Estate, and was followed in 1951 by a further lease of 867 acres to the south of Simonside Hill from the same estate.

Meanwhile, the County Borough of Tynemouth leased the 1765 acre farm of Chartners to the Department in 1951. This area formed the catchment area of the main streams feeding the Font reservoir, owned by Tynemouth Corporation.

The latter wished to have the catchment area under forest, and after considering planting the area themselves under the Dedication Scheme, they decided to lease the area to the Forestry Commission. It is stipulated in the lease that the Department will not do or permit any pollution of streams or water courses within the demised area.

Negotiations are proceeding for the acquisition of land on Redpath farm, owned by Sir Charles Trevelyan. This will form a link between Harwood section and the northern Chartners-Simonside block.

Area and Utilisation

Only 121 acres of this forest were woodland previously. The farms of Harwood, Chartners and Great Tosson had all been under sheep at the time of acquisition.

Harwood farm was tenanted by Mr. Telfer, of Ottercops Farm at the time of acquisition, and he continued in occupation until 1932. Later, in 1936, Mr. T. Carruthers, of Whiskershiel, tenanted 382 acres of the unplanted ground, on a 364-day tenancy. Both Mr. Telfer and Mr. Carruthers grazed cattle as well as sheep on this ground.

The sheep stock on Chartners was valued at £3275 on 12.5.50, and comprised 485 ewes, hogs and rams with followers. This is a density of 1 to 3.6 acres. A loss of acclimatisation value on immediate resale of £400 could be expected, but none was incurred as the stock was taken over immediately by the Agricultural Land Service, to be managed pending planting of the ground.

Simonside section, which once formed part of Great Tosson farms, is in hand, and has been so since it was acquired. Sporting rights on Harwood farm were reserved by Sir Charles Trevelyan when the land was sold. A further lease of 21 years was taken out by Sir Charles on 14th May, 1950. On Chartners and Simonside, the sporting is reserved by the lessors, subject to the rights of the Forestry Commission under the Forestry Acts and Ground Game Acts, and the right to keep down black game, deer, and wood pigeons.

The Forestry Commission has been asked by the Nature Conservancy to preserve the bog around Chartners Lough in its present condition. This area is of special botanical interest; a variety of the lesser yellow water lily, Nuphar intermedium grows in the lough, a sub-species not known elsewhere in

Britain. In the surrounding marshes Andromeda polifolia is found. Also of scientific interest is the moor to the west of Chartners; on the unplatable land of this section the dunlin is reported to breed.

Selby's Cove, a well-defined glacial overflow channel is of geological importance. It lies on the south-east boundary of Simonside, and the Forestry Commission is asked to leave the land immediately surrounding it, unplanted.

Amenity will be preserved at Simonside which is much visited by holiday-makers. A vista will be left unplanted up the Coe burn, so that the top of Simonside Crag can be seen from the Council road.

TABLE I

Utilization of Land

Areas in acres at 1.1.52

	From (1)	By (2)	Date (3)	Plantations acquired (4)	Plantable Excl. Col. 4. (5)	Nurseries (6)	Agricul- tural (7)	F. W. H. (8)	Unplantable Excl. Col. 4. (9)	Other Land			Total (14)
										Land permanently transferred Description (10)	Acres (11)	Land temporarily transferred Description (12)	
Wallington Estate (Sir Charles Trevelyan)	Purchase	14.5.29	-	1452	-	24	55	-	Houses, etc.	5	-	-	1536
Dunshiel Farm (Sir H. Haggerston & others)	Purchase	9.6.37	-	-	-	-	-	-	-	-	-	Transferred to M. A. F.	515
Platt Fell (The Public Trustees)	Purchase	27.1.48	-	-	-	-	-	-	-	-	-	Transferred to M. A. F.	57
Cragside Estate (Lord Armstrong)	Lease	25.10.50	-	391	-	-	-	-	134	-	-	-	525
County Borough of Tynemouth	Lease	3.7.51	-	-	-	-	-	-	-	-	-	Temporarily transferred to M. A. F.	1765
Cragside Estate (Lord Armstrong)	Lease	25.9.51	-	627	-	-	-	-	240	-	-	-	867
Totals				-	2470	-	24	55	374	-	5	-	2337
													5265

TABLE II

(a) Plantations: acquired Formed by Commission	1452 acres	1452 acres
(b) In hand, awaiting planting Blanks after felling Burnt areas Other land	97 " - <u>921</u>	1018 acres
(c) Nurseries		-
(d) Agriculture; a tenancy, area:		24 "
(e) F.W.H. 4 in number, area:		55 "
(f) Unplantable land in hand		374 "
(g) Other land: buildings transferred to Ministry of Agriculture		5 " 2337 " <u>5265</u> "

Physiography

The southern part of the area slopes gently and evenly, with an east to south-east aspect. Elevation is 700 ft. at the south-east of Harwood section, rising to 1000 ft. over most of Chartners. Chartners forms a wide basin, with an easterly aspect, the highest ground being on the north-west boundary, where the elevation is 1330 ft. Drainage over this southern part is eastward, by way of the Newbiggin, Fallowlees and Harwood burns.

The ground on the south of Simonside rises gradually to the rocky ridge of the Simonside Hills, (1409 ft.), with a south-easterly aspect. This ridge forms the watershed between the Wansbeck streams to the south and the Coquet tributaries to the north.

Northwards from Simonside, the ground falls away steeply in a series of crags, forming two sheltered bowls, Chesterhope and the Coe Burn valley. Aspect on this area is north-west to north-east.

Over the forest as a whole, exposure is not severe except on the western boundaries and on the high ridges. The lower ground is sheltered for the most part.

Geology and Soils

Harwood lies on rocks of the English Carboniferous Limestone series, and the dominant feature of the area is the Chartners-Cragend fault, running west to east across the middle of Chartners, which separates the Bernician limestones in the south from the Tuedian fell sandstones in the north. Another fault runs west to east along the base of Simonside crags, and divides the fell sandstones from the cementstones to the North.

The Bernician limestones on Harwood and south Chartners are covered by a layer of boulder clay, two to four feet deep.

The Fell sandstones forms the north part of Chartners outcropping to form the great series of crags on Simonside. They are massive, coarse, false-bedded, and highly weathered, and as a result of faulting, have numerous sink-holes. On the more level portions there are patches of boulder clay and one or two small areas of bog peat.

There are traces of old coal workings in the south of Chartners, where rocks of the Scremerston coal group occur, though only in limited extent. These are exposed by the Chartners - Cragend fault.

Over the greater part of the area lies a thin layer of peat, up to 6 in. deep. Basin bogs occur on the west boundary of Harwood section, and on Chartners. The largest of these covers 220 acres, and others are 80, 45, and 25 acres. Occasional small patches of heavy clay are also found.

Along the burn sides the soil is a good alluvial loam. The Fallowlees Burn valley lying between Harwood section and Chartners, is the richest of these areas, and surpassed only by the improved land of the Harwood Forest Workers' Holdings and the in-bye of Chartners.

Soils on the crags of Simonside are thin and infertile sands, with or without a thin peat covering. The Coe Burn rises in a small basin bog immediately below the Stell Crags, and this formation is repeated in a smaller bog below Dove Crag. The lower, more gentle slopes of this area have a moderately good sandy loam.

Vegetation

Four well-defined vegetational types can be recognised, and their occurrence is determined by the underlying soil and the degree of drainage.

A. Molinia type

Over the southern part of the forest, on the boulder clays, vegetation is predominantly Molinia. This occurs almost pure over the shallow peats, interspersed with flush areas of Juncus sp. with Agrostis and fescues. In the eastern part of Harwood section the Molinia is mixed with Calluna to a greater or lesser degree. This type of vegetation covers all of Harwood section, and northwards to the Fallowlees burn. The Calluna element is masked where grazing occurs, but reappears on enclosures.

B. Grass-heath type

On the good loams of the alluvial burn valleys, vegetation is grasses mainly Agrostis and fescues, with rush flushes.

C. Calluna-heath type

The greater part of the Fell sandstone areas of Chartners and Simonside have an almost pure Calluna vegetation, wherever drainage is unimpeded, and peat shallow. Vaccinium occurs on the crests of dry ridges on Simonside, mixed with Calluna, and under the thin cover of the scrub on the old woodland areas of this section. On this Calluna type of

vegetation are occasionally found small patches of bracken which usually indicate better soil aeration and slight flush effect. Bracken is common on the more fertile lower slopes of Simonside.

D. Calluna-bog type

The basin bogs of all sections form a distinctive vegetational type. Calluna is dominant, along with Eriophorum vaginatum, and Erica tetralix. Mosses which are almost absent in the Molinia type and present to some extent in the pure Calluna type, are of importance here. The principal mosses are Sphagnum species, with Hylocomium also present. Scirpus caespitosus occurs when drainage is exceptionally bad or when the area has been recently burned over. When this occurs, Molinia may appear extensive for a time, but gives way later to Calluna.

Some areas exist which show characteristics of the Calluna bog type of vegetation, but to a lesser degree. Here the Calluna is the predominant species, with Molinia and Juncus squarrosus. They may be regarded as being intermediate between types C and D, and can be improved by drainage. Type D is considered to be unplantable, for the present at any rate.

The following is the description of the vegetation of Harwood section, as given in the acquisition report of 1929.

"The principal species are Molinia and fine grasses with abundant Juncus articulatus, some Juncus communis and in places Scirpus and Juncus squarrosus. There is very little heather but here and there both Calluna and Erica tetralix. On the relatively higher ground, Nardus occurs with Juncus spp. Polytrichum, Sphagnum and other mosses occur almost throughout the area".

There have been no major changes in vegetation since this report was submitted other than those normally met with on enclosure.* Juncus species have disappeared over nearly all the area, as a result of drainage, and there has been a slight increase in Calluna as a result of cessation of grazing.

Meteorology

a) Rainfall. Average annual rainfall over the forest is 35 in. - 40 in. distributed fairly evenly throughout the year. At Bellingham, which

has 30 in. - 35 in. per annum, March, April and May were the driest months and October to January the wettest during the period 1920 - 1939. As elsewhere in Northumberland, it is noticeable that the open moorland may have 5 in. - 10 in. more rain per annum than the more sheltered valleys.

b) Snowfall. The number of days on which snow falls and the duration of snow-cover varies a great deal with topography. Figures for Bellingham, 12 miles distant and at an elevation of 849 ft. are as follows, for the period 1920 - 1939.

Greatest number of days with snow	64
Greatest number of days with snow lying	74
Smallest number of days with snow	26
Smallest number of days with snow lying	12

Most of the snow falls between December and March, with January, February and March having the highest frequency.

The snow fall at Harwood is undoubtedly greater than at Bellingham, on account of the greater elevation, exposure, and rainfall. This is borne out by the personal observation of the forest staff over the years.

c) Temperature and Frost. July and August are the warmest months, January and February the coldest. The highest frost frequency is in January and February, but severe frosts may occur in March and into April. At Bellingham, the temperatures between 1909 and 1923 were as follows:

January	Maximum	41°f
"	Minimum	32°f
July	Maximum	65°f
"	Minimum	58°f

Late spring frosts occasionally occur, on clear nights with slight cooling breeze. The conditions for frost formation vary with topography a great deal. Early autumn frosts are rare.

d) Wind. The prevailing winds are westerly and are followed in frequency by south-westerlies, north-westerlies, and southerlies. These blow on most days in autumn and winter, while in spring and early summer northerly, north-easterly and south-easterly winds are common.

Topographical influences are marked, and sea-breezes occur in summer and autumn, and are felt occasionally 20 miles inland, though their penetration is normally only a mile or so. They may reduce or reinforce the existing wind.

Gales are less frequent on the north-east coast than on the west. Westerly gales predominate, the highest frequency being in January and December, followed by October. Compared with the rest of the country, the north-east coast has a high percentage of northerly and north-easterly gales. The number of gales averages about five a year, but may vary from one or two to eight or ten.

The lie of the land on Harwood forest gives a slight measure of protection against west and south-west wind, except for the exposed ridges and on the western boundary.

A weather station has been established at the Forester's house, as one of a series of stations laid down in the Border area to provide meteorological data for fire protection purposes.

Risks

Fire

There have been few fires on this forest. Moor-burning is the principal source of danger, and there is also some danger from passers-by and picnickers along the Morpeth-Elsdon road side, particularly at the western corner of the forest and close by Willie Winter's Gibbet, a well-known landmark. Simonside hill is also a beauty spot, much frequented by holiday makers from Rothbury. Occasionally walkers enter the plantations of Harwood section at the north-east, on their way to and from the Youth Hostel at Rothley Shiel.

The first fire of which records exist occurred on March 14th, 1943, when .5 acres in P.33 Sitka spruce Compartment 61, were destroyed. This fire was reported at once, and extinguished in half an hour. It is thought to have been started by the children from the Forest Workers' Holdings.

On February 24th, 1946, a moor fire crossed the western boundary at Compartment 13, but was extinguished without damage being done. Three days later another moor fire crossed the west boundary and destroyed 30 acres of Sitka spruce in P.38 and P.43. It entered the forest at 2.0 p.m. and was reported at 2.55. It was extinguished at 5.45 p.m. only with considerable difficulty. An action was brought against Mr. A. Ford, of East Todholes, Elsdon, who was responsible for allowing the moor fire to get out of control. This resulted in a conviction. Mr. Ford then assaulted Mr. Masson, the forester, and for this offence he was also convicted.

Mr. Ford maintained that he had not received a fire warning letter from the Forestry Commission. Since then it has been customary to deliver this letter to him by hand.

On May 2nd, 1946, a small fire occurred in P.33 Sitka spruce in Compartment 61, where the Harwood entrance road joins the Council road. 1 acre was destroyed; the outbreak being extinguished in half an hour. The cause of this fire is not known.

Animal

Rabbits have caused little or no damage to this forest, which was planted without rabbit netting. Rabbits are now established in the eastern portions, but not in large numbers. No rabbits exist on Chartners, and trapping is proceeding on Simonside.

Hares have caused a little damage in the P.52 area of Simonside, but are being eliminated. Elsewhere they are rare.

Deer are not numerous: there are probably 15 in the plantation of Harwood section, and these are kept in check. Hounds have been successful in deer drives on this area. Recent numbers of deer destroyed are:

1948 -	8
1949 -	9
1950 -	15
1951 -	14

Sheep occasionally enter the plantations, especially in snow when drifts cover the fences. Damage is negligible. Black game are now few, but they have caused heavy damage to Scots pine in the early years of the crop. Some pine weevil damage was reported on Sitka spruce at Peterstone bog in 1948, but such occurrences have been few.

Climatic

Little or no damage has occurred from this cause. The spruce have remained firm after all gales, probably as a result of extensive and efficient drainage upkeep. No snow-break has occurred, and drought appears to have affected the crop in no way. Frost damage occurs here and there along the burn valleys, but this has been minimised by the replacement of Sitka spruce with Norway spruce on those areas. There are no frost hollows in existing plantations. Exposure may be expected to cause some damage when the high ground of Simonside is planted, but it has had no effect on the plantations of Harwood section.

Other

Die-back of Norway spruce was observed in Compartment 29 in 1951. This occurs in groups of up to 9 or 10 trees, which otherwise seem perfectly healthy. Death is rapid, and there is no dying-back in the true sense of the term. The entire foliage turns yellow at once, falls, and death occurs all in a single season. This disease appears to be that described by Day in his Research Branch paper No.4 "Studies in the dying of spruces."

Losses by theft are negligible: occasional losses of produce in dumps along the Morpeth-Elsdon road occur.

Roads

At time of acquisition, the only road on the area was the entrance road to Haywood Farm. From the farm a rough bridle path ran to Redpath, by and over the northern boundary. The portion of this path within the forest was made up to light construction standard in 1948 by laying Sommerfield tracking and applying fine gravel chips. This road has become known as the Peth road.

An all-weather heavy construction road began in 1945. This ran from the Morpeth-Elsdon road, from Compartment 53, westwards to Compartment 23. It was completed in 1947. On the first portion of this was laid down a series of experimental surfaces. These were,

1. 120 yards treated with 30 tons of tarred chips, well rolled, with a further 10 tons small tarred chips on top, and rolled in.
2. 120 yards sprayed by a tar sprayer, and approximately 10 tons small tarred chips applied and rolled in.
3. 120 yards sprayed with tar only.
4. 120 yards with no treatment.

All these treatments were applied to the road formation after penning had been laid.

Of these, the first treatment had given the best wear, with the second treatment the next best. Treatments 3 and 4 show little difference. This road was named the Peterstone road.

In 1947-48 another stretch of all-weather heavy construction road was built from the Council road at Compartment 29 north-east to join the Peterstone road at Compartment 23. This last road was extended in 1951-52

north-eastwards on the same major ride to meet the north boundary of the forest at Compartment 1, then eastwards along the forest boundary to join the head of the Peth road.

These roads provide access to the greater part of the forest, and serve the area which is likely to be thinned within the next 10 years. No further road work is proposed for Harwood section.

The road system is augmented by a system of access routes, laid down for fire protection purposes. These are simply drained grass tracks with culverts put in where required.

During the winter 1951-52 a bull-dozed fair-weather road was constructed on Simonside, from the Lordenshaws-Tosson road to the head of the Coe burn, to provide access for fire protection and management purposes.

Road proposals include the making of a light construction road from the north boundary of the forest to Chartners Farm. It will be continued as a jeep track to link with the Simonside road. At present Chartners can only be reached from Ewesley by way of Newbiggin. From the latter farm the way is a bridle road only.

Labour

Work was begun in 1929 with a labour force of 10 men, who were housed in surrounding farms and in caravans. The forester lived at Harwood Gate until 1931, and from then the foresters have inhabited the old farm house of Harwood.

Labour supply on Harwood section has always been influenced by the supply of houses. It was originally intended to convert the farm house into two houses, and possibly convert some of the out-buildings into a cottage. In 1931 four Forest Workers' Holdings were established, with the four houses in two semi-detached blocks. The number of men employed remained steadily at four from 1931 onwards, falling to three during the war years, and increased to 6 when the children of one of the holders began work.

In 1951, a further 6 houses were built, in 3 semi-detached blocks. Three of these houses are at present occupied by forest workers, and three by supervisory staff, including the forester for Ray Forest. The Harwood forester occupies another, as the farm house is occupied by a Private

Woodland section forester. The number of men employed rose sharply in 1951; in that year a squad was formed at Rothbury for work on Simonside, and it was possible to recruit a number of men from the surrounding district for work on Harwood section.

German prisoners were employed in the summer of 1946 on nursery work. Between December 1948 and July 1949 men from the Displaced Persons camp at Rayless were employed on brashing. This gang consisted of 10 to 16 men, and gave good service.

Generally, labour supply has been adequate as long as the plantations were not in the thinning stage. The planting programmes on Harwood section were accomplished without difficulty, and no arrears of work have arisen. The onset of thinnings made an increase in labour force imperative, and this has been accomplished. The labour force is now 20 men.

SILVICULTURE

Preparation of Ground

All areas on Harwood section were hand-drained at 20 ft. intervals between drains, the turves being spread between them. The P.37 area, Compartments 45 to 48, was burned before planting, but elsewhere this was not done.

In 1949 the bog area of Peterstone Flow, (Compartments 4, 5, 6, and 7) was ploughed at 15 ft. by Cuthbertson plough; this area had been left unplanted since F.Y.32, and had been planted in F.Y.41 and 43.

The P.52 and P.53 areas on Simonside have been burned, to remove heather. There are patches of dense Pinus montana scrub on this area, and these are being cut and burned. There is also sparse birch, up to 6 ft. high on parts of this area; this is being thinned where necessary, otherwise it will be left to form part of the crop.

The old plantation on Harwood section was felled by Timber Production Department in 1943 and replanted in F.Y.49. 5 acres in extent, it consisted of mixed Scots pine and Norway spruce with birch and alder. It was only 50% stocked, however. Top height was 60-65 ft. and although much neglected and damaged by snow-break and wind, the trees were of good timber length and girth.

Choice of Species

The acquisition report for Harwood section proposed that species

should be planted as follows:

Norway spruce)	70%
Sitka spruce		
Scots pine		20%
Beech, sycamore, etc.		10%

The first planting, P.30, was done in the western corner of the section, and was 85% Sitka spruce 10% Norway spruce and the remainder Scots pine. The pine was planted in a chain-wide strip on the western boundary as a shelter belt and the Norway spruce was largely confined to stream sides. The years F.Y.31-35 saw nothing but Sitka spruce planted; during this period the western half and south-east corner of the forest was planted, and the results have shown that the species were correctly chosen.

In F.Y.36, however, 80% of planting was with Norway spruce, 20% with Sitka spruce and up till F.Y.41, the bulk of the planting was with Norway spruce never less than 60% and mostly 100%. The reason for this change in policy is not easy to discover. Though P.36 and succeeding P.years are on lower and more sheltered ground, there is a slightly greater heather proportion in the vegetation. Where this was noticeable at time of planting, Sitka spruce were planted in place of Norway spruce but since then heather has become more extensive.

Little or no Scots pine was planted from P.30 until P.42 and 43, when Scots pine was planted in mixture with Norway spruce and with Sitka spruce on Calluna-Molinia vegetation.

The Calluna slopes of Simonside section P.52 area are being planted in with Scots pine with a 10% mixture of red oak through the pine in groups. The oak has been chosen so as to provide a broadleaved litter, with a view to improvement of the soil, but as soon as birch is available, it will be used instead for this purpose.

On the driest ridges Scots pine is being replaced by Corsican pine and on the lowest most fertile slopes, a Corsican pine/beech mixture, 3-row/3-row, is being planted. The main use of Japanese larch is as a protective fire-belt, and a strip is accordingly being planted with this species on the western boundary.

Species selection on Chartners section will be on the following lines:

Scots pine with 10% birch in group mixture, on pure Calluna.
Scots pine/Sitka spruce 3-row mixture, on deeper peats with Calluna/Eriophorum vegetation.

Scots pine/Corsican pine at high elevation, where it is desirable to "build up" shelter.

Planting

(a) Methods

The earliest planting, P.30, was done on turves cut from drains, using a semi-circular spade, and this method has been in continuous use since then on the Molinia ground. The only flat planting done was in P.30, when the small area of Scots pine was planted this way. Most of the ornamental belt which has been established along the roadside on Harwood section has been either flat or pit-planted.

Planting on the rough heather slopes of the P.52 area of Simonside section has been by the "straight-back" notched method, the heather being screefed off first of all.

(b) Spacing

5 ft. x 5 ft. has been the spacing for Norway spruce and Sitka spruce throughout. Scots pine has been planted at $4\frac{1}{2}$ ft. and this spacing is being used in P.51 planting on Simonside section. Corsican pine is also being planted at $4\frac{1}{2}$ ft. while Japanese larch and beech are being planted at 5 ft. The red oak in group mixture with pine are being planted at $4\frac{1}{2}$ ft.

(c) Type of Plants used

Size of plants has varied widely, with considerable difference between years and within any one year. No seedlings have been used, and very few transplants younger than 3 years. The oldest stocks used were apparently 2+2+2+2 Norway spruce, in F.Y.38, and the bulk of planting was done with stocks older than is now considered desirable. P.30 and 31 Sitka spruce were 2+2 and 3+2, Norway spruce 2+2, and from P.32 to 34, sizes of both spruces were 2+1 and 2+2. Between F.Y.35 and 39 however, bigger plants were used: 3+1, 3+2, and larger replaced the smaller size, though some 2+1 and 2+2 were still used. Since F.Y.40 sizes have varied a lot, but the tendency seems to have been to plant Norway spruce in a larger size than Sitka spruce. It would be unwise to draw any conclusions from these variations in size, or to say that they had been deliberately selected: it is likely that in many cases they would be the only plants available.

The bulk of planting stocks have been from nurseries in the north of England, i.e. Chopwell, Mortimer, Cannock, Hamsterley, and above all, Widehaugh. The Harwood nursery, supplied a considerable proportion of plant requirements from 1943 onwards.

(d) Annual Rate of Planting

During the first 3 years of planting on Harwood section, P.30-32, 422 acres were planted in the west corner of the forest. Mr. Telfer gave up his tenancy of Harwood farm in 1931, and the P.33 area was 122 acres north and south of the farm house, in the south-east of the forest. This was done with a view to providing shelter to the Forest Worker's Holdings. P.34, P.35, and P.36 completed the planting of the south of the area, and P.37-41 saw the greater part of the remainder planted. From P.42 until P.49 a number of small areas were completed which had been passed by previously.

The rate of planting is as follows:

P. Year	Annual area (acres)	Total to date (acres)
30	126	126
31	151	277
32	145	422
33	155	577
34	77	655
35	94	749
36	100	849
37	100	949
38	108	1057
39	100	1157
40	100	1257
41	71	1328
42	56	1384
43	50	1434
44	12	1446
49	5	1451
50	1	1452

The fire of 27th February, 1946, destroyed 2 acres of P.32, 11 acres of P.38, and 17 acres of P.41 and P.43, making 30 acres in all. This was replanted in F.Y.47, along with 1 acre destroyed by the fire on 7th May, 1946.

(e) Manuring

Only two areas have had manurial treatment. In 1931 a bog area in Compartments 13 and 14 was treated as an experiment in the use of basic slag. The P.30 area of Compartment 13 was treated with slag at 2 oz. per plant in April 1932, and again top-dressed in April 1934. The P.32 area of Compartment 14 was slagged in April 1932, and on part of the area the slag was mixed with the core, instead of applied as a top-dressing. The

P.32 areas were not slagged a second time. The slagged plants showed some beneficial effect, but by 1939 it was no longer apparent.

The bog area of Peterstone Flow was also treated with slag, after planting in F.Y.43. The Sitka spruce were given an application of 1 oz. per tree the summer after planting. This has been beneficial, and there is little or no check apparent on this area.

(f) Success of Establishment

Planting has been successful in almost every case, as a result of correct selection of species, good planting, and prudently avoiding the difficult ground of Peterstone Flow until P.41 and P.43. In 1949 it was possible to plough the area by Cuthbertson plough. Losses have been slightly higher in the north-east part of Harwood section than in the other portions, the result of greater heather growth among the Molinia vegetation.

Scots pine. This species has been disappointing, compared with results obtained by the spruces. Most of the Scots pine on the Harwood section is on the western boundary, and is undoubtedly affected by exposure. Much of the Scots pine were originally flat planted, and suffered considerable damage from black game, and so cannot be said to have had a fair trial. Where planted in mixture with Sitka spruce and Norway spruce, it has been outstripped by these species. Scots pine is intended to form the greater part of the crop on Chartners and Simonside sections, however, and its performance on these sites will be closely watched.

Japanese larch. Small clumps of Japanese larch have been planted along the roadside belt, and along the Harwood entrance road. It shows signs of blast, yet height growth is fair where it is sheltered. A wider use of this species on selected sites would have been interesting. No conclusions can be drawn from the small areas planted.

Norway spruce. This species has been consistently successful, and promises to maintain the good growth already shown. The oldest Norway spruce stands are P.30, and these include some of the poorer areas of this species; it was planted in the wetter, boggy areas and has suffered from prolonged check in some cases. As the surrounding Sitka spruce give suppression of vegetation, these groups will even up. The best development of Norway spruce is seen in Compartment 29, where it has kept pace with the surrounding Sitka spruce although the latter are now surpassing it. Along

the Harwood burn, in Compartment 57, the Norway spruce is also of good quality. On the heather areas of the east of the Harwood section there is a tendency to go into check, but this is not widespread, and canopy is closing over most of this area.

Sitka spruce. The best stands on the forest are of this species. The early plantations were almost entirely Sitka spruce and these have produced even, well-stocked stands of good form and growth. The later Sitka spruce plantations on the east of the forest, have not been up to this standard. Here there is a tendency to check where heather has come in, even in mixture with Scots pine though once canopy has closed, growth quickens. On the Molinia ground Sitka spruce is the fastest-growing species of all. Its suitability to this type of shallow peat ground was seen in 1951, when exceptionally good Sitka spruce natural regeneration appeared, following the heavy seed crop of the previous autumn. Wherever sufficient light was available, in racks and on stacking sites, a dense crop of seedlings appeared.

Other species. These have been planted in the ornamental belt along the road side. Various hardwood species have been tried, but of these birch and rowan have been most successful. Sycamore has been planted repeatedly in this belt, and results are not encouraging. Few of the original plants survive, and these show little promise.

Mixtures

Up to F.Y.42 all species were planted pure, though in these early P.years occasional patches of mixture are found, as where the P.30 Scots pine shelter strip on the western boundary has been beaten up with Sitka spruce and now is virtually a mixture.

In P.42 1 acre of Scots pine/Sitka spruce mixture was planted in Compartment 58. This was mixed 1 row of Scots pine to 2 rows of Sitka spruce. 9 acres of Scots pine/Sitka spruce mixture were planted in Compartment 44 in P.43, and 9 acres of Scots pine/Norway spruce in Compartment 31 the same year. Both these mixtures were 2 rows of Scots pine to 2 rows of spruce.

Of these mixtures only the P.42 remains intact. The P.43 mixture of Scots pine/Sitka spruce in Compartment 44 has been beaten up with Sitka spruce as to be now pure Sitka spruce, and Sitka spruce was used to beat up Scots pine in the Compartment 31 mixture, making this now a Sitka spruce/Norway spruce mixture.

There is little evidence as to whether one species has had a nursing effect on another in any of these mixtures.

Little underplanting has been done. In F.Y.51, beech were underplanted below the P.49 Sitka spruce and few old Scots pine still remaining in the old wood in Compartment 40 (6 acres). Small-scale underplanting has been done from time to time in the ornamental belt along the road side.

Ploughing

This has been done only on the deep peat on the Peterstone Flow, in Compartments 4, 5, 6 and 7. This area, 30 acres, had been planted in P.43 and P.47, and required additional drainage. This was done by ploughing deep drains through the crop at 15 ft. intervals by Cuthbertson plough in October 1949, prior to beating up. The vegetation is Calluna with Eriophorum and Molinia. Planting had been done with pure Sitka spruce turf-planted with semi-circular spade.

This draining has undoubtedly had a beneficial effect on the crop, which shows little sign of check.

Beating-up and subsequent operations

The early plantations were very successful, and little beating up was necessary, usually less than 3%. Up till F.Y.38 it was rarely necessary to beat up more than once, in the year after planting. From F.Y.38 onwards the rate of beating up increased slightly, probably as the result of greater weed competition. The heaviest beating up has been necessary in Compartments 31 and 44, in the north-east of Harwood section. Here P.43 Sitka spruce has had to be virtually replanted, and P.42 Norway spruce has required 45% beat up. This is due to the strong heather growth in this area. 30% beat up was required in P.40 Norway spruce also on an area where heather has greatly increased since enclosure.

The success of beating up in the P.30-31 areas has been above average. This has been apparent in those parts which have had a first thinning, when stocking has been consistently high. 1400-1500 stems per acre is the normal density, and 1600-1700 stems per acre is not unknown.

Beating up has normally been done up to 3 years after planting, and rarely beyond 5 years. The average beating up rate over the forest as a whole has been approximately 10%. Usually beating up has been done with

the originally-planted species. Sitka spruce has been used to beat up Scots pine, however, with the result that the Scots pine has almost disappeared from the mixtures planted in P.42 and 43, and the shelter strip of Scots pine on the western boundary is now a Scots pine/Sitka spruce mixture. Plants used in beating up have been the same size as those planted. 2+2 have been common, both Norway spruce and Sitka spruce, and 3+1, 3+2, and 2+1+2 have also been used. The planting has been done with semi-circular spade, normally on the original turf; where flat planting was done, however, as in the case of P.30 Scots pine, the beating up has been done on turves.

Weeding has been necessary on all areas, and the intensity does not appear to have affected the success of the crop to any extent. The heather areas on the P.40 area and in Compartments 31 and 44 have required the greatest attention. There is no evidence of lack of weeding at any time.

Drainage maintenance has also been carried out methodically and the system is fully effective over the whole area. Maintenance was carried out at time of weeding, and as required up to the thicket stage. Further cleaning was done where necessary at time of brashing, and now drainage maintenance is carried out immediately after thinning. In this way the drainage plan follows the pattern of the thinning plan in every respect.

Rates of Growth

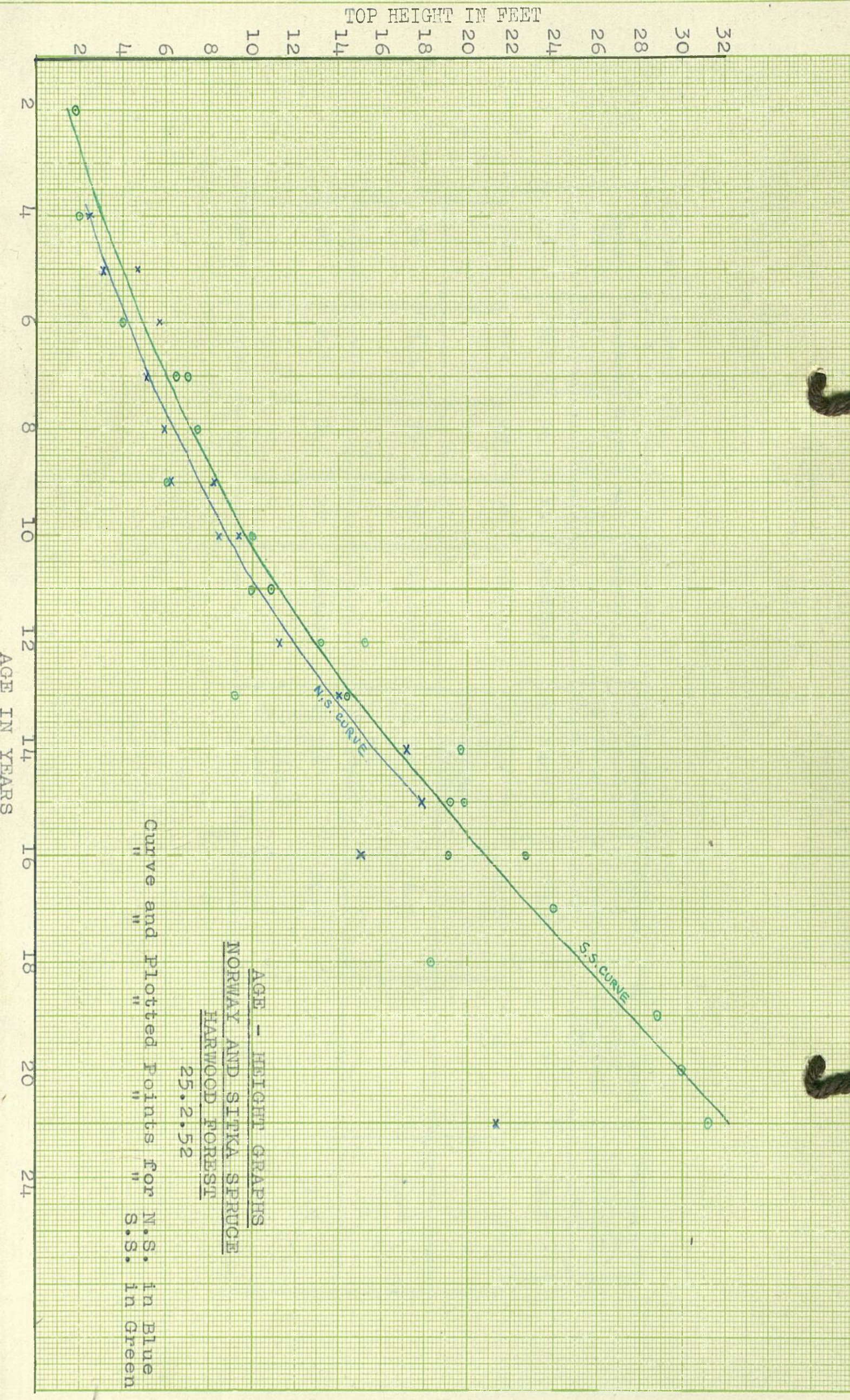
The crop as a whole has been remarkably even in growth. After some initial checking, all P.years have progressed favourably. Forester Hodgson in an article in the Forestry Commission Journal for 1938, gave the following data on rates of growth for Sitka spruce up to F.Y.37.

P. year	Max.Height	Max. Annual height growth, F.Y.37	Mean height	Current annual ht. growth, F.Y.37
30	12' 4"	3' 8"	7' 8"	1' 11"
31	10' 6"	3' 6"	7' 4"	1' 11"
32	7' 9"	3' 0"	5' 0"	1' 8"
33	5'10"	2'10"	3' 2"	1' 3"

Hodgson noted that while sheltered sites gave better growth rates than exposed, height was influenced more by soil than exposure. The height figures given above were taken, rightly, from measurements on one vegetational type only, i.e. Molinia, where peat depth varied from a few inches to two feet. P.30 Sitka spruce planted on deep peat averaged 2 ft. height

and 9" current annual growth in F.Y.37, and similar trees on heather averaged 3 ft. height and 12 in. current annual growth. It is also recorded that canopy was beginning to close in the P.30 Sitka spruce. Only small patches of Norway spruce had been planted up to this time; the average height of P.30 Norway spruce was 4 ft. 6 in. with current annual height growth of 1 ft. 3 in.

The height increment data given overleaf were obtained by a modification of a strip-sampling method devised by Mr. R. F. Wood. This allows the equivalent of the 100 largest trees per acre to be measured, thus obtaining the top height of the crop.



Rates of Growth

Compt. No.	Species	P. yr.	Age	Vegetation	a) Altitude b) Aspect c) Slope d) Exposure	Top ht. of crop (ft)	Mean annual height increment (ft)	Current annual ht. increment (ft)
3	S.P.	38	13	Molinia	a) 1000' b) S c) Slight d) Moderate	11.9	0.9	1.2.
12	N.S.	30	21	Molinia	a) 1000' b) N.W. c) Slight d) Moderate	21.5	1.0	1.3
52	N.S.	36	15	Molinia	a) 800' b) S c) Slight d) Slight	18.0	1.2	1.7
46	N.S.	37	14	Molinia	a) 800' b) S c) Slight d) Slight	17.2	1.2	1.8
15	N.S.	38	13	Molinia	a) 900' b) S c) Slight d) Moderate	14.0	1.1	1.6
19	N.S.	39	12	Molinia	a) 950' b) S c) Slight d) Slight	11.2	0.9	1.2
36	N.S.	40	11	Molinia	a) 850' b) S.E. c) Slight d) Slight	9.7	0.8	1.1
33	N.S.	41	10	Molinia	a) 900' b) S c) Slight d) Slight	8.5	0.8	1.1
44	N.S.	42	9	Molinia- Calluna	a) 800' b) S c) Slight d) Moderate	8.5	0.9	1.2
12	S.S.	30	21	Molinia	a) 1000' b) S.W. c) Slight d) Moderate	31.4	1.5	1.7
26	S.S.	31	20	Molinia	a) 950' b) S c) Slight d) Slight	29.8	1.5	2.1
24	S.S.	32	19	Molinia	a) 950' b) S c) Slight d) Slight	29.0	1.5	1.9
56	S.S.	33	18	Molinia	a) 800' b) S c) None d) Slight	18.2	1.0	1.8
42	S.S.	34	17	Molinia	a) 900' b) S c) Slight d) Slight	24.0	1.4	1.8

Compt. No.	Species	P. yr.	Age	Vegetation	a) Altitude b) Aspect c) Slope d) Exposure	Top ht. of crop (ft)	Mean annual height increment (ft)	Current annual ht. increment (ft)
39	S.S.	35	16	Molinia	a) 850' b) S c) Slight d) Slight	19.6	1.2	2.0
52	S.S.	36	15	Molinia	a) 800' b) S c) Slight c) Slight	19.9	1.3	2.0
2	S.S.	38	13	Molinia	a) 1000' b) S.E. c) Slight d) Moderate	14.4	1.1	1.4
19	S.S.	39	12	Molinia	a) 950' b) S c) Slight d) Slight	13.1	1.1	1.4
37	S.S.	40	11	Molinia	a) 850' b) S c) Slight d) Slight	10.9	1.0	1.4
60	S.S.	42	9	Calluna	a) 750' b) S c) None d) Slight	6.0	0.7	0.8
31	S.S.	44	7	Molinia-	a) 900' b) S c) Slight d) Moderate	7.0	1.0	1.0

Treatment of Established Plantations

Brashing has been done systematically as soon as the lower branches have died off to 6 ft. from the ground. This operation was begun in F.Y.46 in P.30 and P.31 stands, 70% of the trees only being brashed. All brashing is done by pruning saw, on piece-work wherever possible. 382 acres have been brashed so far, 26% of the total planted area.

Cleaning has been done at the time of the first thinning. There are no weed species. Before thinning, extraction racks are cut in each compartment. A central rack is cut through the compartment longitudinally and from it side racks are cut on a herring-bone pattern, so that they branch first to one side and then to the other alternately. These side racks are 3 chains apart. This pattern of racking was first done at Harwood, in F.Y.50.

Thinning was begun in F.Y.50, in P.30 Sitka spruce in Compartment 29, on a "C" grade. The Director General criticised this early start in October 1950, when the Technical Committee of the Forestry Commission visited the area (see Appendix I). It was considered desirable to make a start as soon as possible, with a view to training workers in utilisation in preparation for the large thinning programme to come.

Thinning costs have been high, due to the low volume per acre being taken out and, in the early stages, to the inexperience of the workers. As much as possible is now being done on piece-work, and in stands where stocking is very dense, crown thinning is being done. By this means only dominants and co-dominants are removed, leaving in the small poles of no economic volume which do not interfere with the development of the best trees of the crop.

A thinning plan was prepared in F.Y.51 when a Plan of Operations was drawn up for the area. This plan prescribed a continuance of early thinning on the existing pattern, and increasing the density of thinning to "C/D" grade where height growth warranted it. A 3-year thinning cycle is prescribed. Areas thinned per year are as follows:-

F. Y.	Area thinned (acres)	Volume of Yield (cu. ft)
50	20	1600
51	52	5500

162 acres are prescribed for thinning in F.Y.52. Of this, 16 acres have been completed, yielding 7,400 cu.ft.

Nurseries

In November 1942 a temporary nursery was formed, from portions of F.W.H.1 and F.W.H.2, and of a total area of 2.7 acres. This nursery was used solely for lining-out, seedlings being imported from Kielder and Widehaugh nurseries. Norway spruce and Sitka spruce were the principal species raised, and the bulk of stocks produced were used on Harwood, though some exports were made. These were mainly sent to Redesdale, especially from 1948 onwards, when Harwood's annual planting programme became very small. The nursery was finally closed down in F.Y.50, and the area planted with Norway spruce as Christmas trees.

Research

There have been no Research Department experiments on Harwood Forest. The only local experiments on record are the manurial trials carried out in 1931-1934 in the bog areas of Compartments 13 and 14, described under section on Manuring page 18, and the experiment with different types of road surface carried out in 1947 (Roads page 13).

Conclusions

Harwood Forest has been an area remarkably free from difficulties. There are no "problem areas" and the success of planting and establishment on Harwood section is due to the close resemblance of this area to the Molinia ground of the North Tyne. The lessons learned at Smales from 1926 onwards have been applied here, with good result. Harwood has been treated, rightly, as an outlier of Kielder, and it is only in F.Y.51 that it was included in what was then Central District.

The planting methods employed were as correct as technique allowed. Were this area being planted today the ground would be ploughed, but hand-draining and turfing has given excellent results. The choice of Sitka spruce as principal species was also correct; while this species could have been planted even more widely, the Norway spruce has given equally good results, as height-growth records show. It may be that the change in species from Sitka spruce to Norway spruce in F.Y.36 was made as a result of the very severe frost in 1935, when Sitka spruce everywhere suffered heavy

damage. There is no evidence to show that this was so, however.

Thinning is not sufficiently far advanced to show whether the present policy of thinning early and fairly heavy is correct though we are confident that this is so. This policy is carried out to ensure stability of the crop on this peat ground, and to prevent slowing-down of growth by congestion of these densely-stocked stands, allowing the best trees of the crop as little restriction as possible.

Afforestation of Chartners and Simonside sections will be very different to that already done on this forest. The Fell Sandstone area of Rothbury Forest is more akin to these sections, and the experience gained on Rothbury will be of value here. The introduction of broadleaved species (birch and red oak) on this type of ground is a new venture, and development will be closely watched.

A. A. ROWAN.

March, 1952.

History of Harwood Forest

APPENDIX I

Notes from Inspection Reports

Visit of Technical Commissioner 22nd April, 1930.

The Technical Commissioner considered that the whole area should be planted with Sitka spruce on turves, and commented that the work was obviously being rushed. More care should be taken in placing the turves.

Visit of Assistant Commissioner, 6th September, 1930.

Both draining and planting were considered satisfactory and little weeding would be necessary. The proposed holdings (at Harwood Gate) were inspected.

Visit of Technical Commissioner and Assistant Commissioner, 4th October, 1931.

The land surrounding the farm and holdings to be planted as soon as possible to provide shelter (Compartments 55-63). Sitka spruce turf-planted on bog in Compartment 13 (P.30) doing well, but secondary check was considered probable. This area was to be divided into 4: one portion top-dressed with slag this year at 2 oz. per plant, another portion to be treated the following year, and so on. Some damage by black game was noted.

Visit of Assistant Commissioner, 21st August, 1934.

Parts of the P.30 and P.31 areas inspected; growth and stocking were considered satisfactory.

Visit of Chairman, 5th October, 1934.

The slagging experiment on Compartments 13 and 14 was inspected. The Chairman was well satisfied with the growth of the plantations and considered it as promising as anything he had seen.

Visit of Sir Alexander Rodger, 6th April 1936.

Sir Alexander suggested cutting out the birch and scrub from the Old Plantation and underplanting with Tsuga or beech, and was impressed by the regularity of stocking and uniformity of growth of the plantations. The plants on the bog area which had been mulched in the course of drain-cleaning on the bog in the P.30 area showed better growth and colour. The

Scots pine on the northern boundary had failed because of depth of peat and continued black game attack.

Visit of Assistant Commissioner, 8th May, 1938.

Good growth of birch and poor growth of sycamore was noted in the roadside belt. It was considered useless to plant anything but large sycamore. The deep peat area of Compartment 14 shows a great improvement where peat from the drains has been placed round the trees. The general appearance of the forest was satisfactory.

Visit of Chairman, 24th September, 1938.

Clumps of Japanese larch should be planted along the roadside, and along fire lines.

Visit of Chairman and Forestry Commissioners, 29th May, 1939.

The P.30 area was visited, and growth of spruces was considered satisfactory. The mulching experiment in Compartment 14 was inspected: much of the original effect was no longer noticeable.

Visit of Acting Divisional Officer, 7th December, 1939.

It was decided to begin planting on the unplanted area in Compartments 6 and 7, 10 to 15 acres to be planted in F.Y.41.

Visit of Chairman, 29th August, 1942.

Considerable variation in growth of spruce in P.30 and P.32 areas was apparently due to frost, intensified in early years by inadequate main drains. The most backward Sitka spruce is on the deep peat bog in Compartment 14. The Scots pine showed very fair growth, though most Sitka spruce over-top it by far. Fire protection measures were not adequate: fire breaks were absent and there were no access roads. The roadside belt, chiefly hardwoods, was very backward and was little more than a fire trap.

Visit of Acting Divisional Officer, 8th July, 1943.

After the timber from the old plantations has been cleared, two years should elapse, to see what amount of regeneration is obtained.

Visit of Director, 30th August, 1946.

The siting of further housing was considered, and experimental road surfaces were inspected. Brashing should be begun in P.30 Sitka spruce.

Inspection of Simonside, by Silviculturist (N), Mr. J.A.B. MacDonald -
17th February, 1949.

Silviculturist (N) agreed that hand preparation of ground would be necessary and expensive. The area was considered suitable for acquisition, and the following species selection suggested:

- | | |
|--|---|
| 1. On deep peat | - Sitka spruce pure |
| 2. On better rocky slopes particularly where bracken is present. | - Japanese larch |
| 3. On higher bracken slopes | - Hybrid larch |
| 4. On exposed areas with no deep peat | - <u>Pinus contorta</u> |
| 5. On deep peat bog north of the rocky summit. | - Sitka spruce/ <u>Pinus contorta</u> in 50% mixture. |

Mr. MacDonald considered that the vegetation did not indicate a bad soil and that Scots pine could be grown on the better rocky ground. He also considered that the land to the south of Simonside Hill was difficult for ploughing, and inaccessible, and that he might accept it if it had been offered with a larger area of lower and better land. With a large percentage unplatable, he was not in favour of recommending acquisition.

Visit of Conservator N.E. (E), 13th September, 1949.

The bog area at Peterstone should be drained by Cuthbertson plough. Beech and other hardwoods should be established on ridesides where mineral soil is present.

Visit of Forestry Commissioners (Technical Committee), 17th October, 1950.

The Director General considered that thinning in P.30 Sitka spruce (Compartment 29) could safely have been deferred for two or three years. Conservator N.E. (E) explained the desirability of training men in utilisation before the start of a large programme.

Visit of Conservator N.E. (E), 16th February, 1951.

Simonside is essentially a pine site: Scots pine to be planted over bulk of area with Corsican pine on deeper sands and Pinus contorta (coastal type) at high elevation, in mixture with Scots pine. A vista is to be left unplanted up the Coe Burn, so that the top of Simonside can be seen from the Council road. Pre-drainage of the bog under Simonside Crag should begin in F.Y.51. All pines will be given 1 oz. ground mineral phosphate the summer after planting. Planting will start in P.52 and continue at the rate of 50 acres per year.

Visit by State Forest Officer, 30th August, 1951.

A 10% admixture of birch should be planted in groups among Scots pine as a soil improver, at the rate of 25 groups per acre. On Simonside and Chartners, Scots pine will be planted on all pure heather sites over sandy soil, on rocky knolls and unploughable slopes. Scots pine/Sitka spruce 3-row mixture will be planted on Calluna/Eriophorum peat and over clay. Scots pine/Pinus contorta 3-row mixture will be used at high elevations where it is necessary to plant to "build up" shelter. On the grass slopes of Redpath, Sitka spruce will be planted. The deep bogs on Chartners must be considered unplantable.

Visit by State Forest Officer, 12th September, 1951.

Thinning in P.30 Sitka spruce now being done at "C" grade was considered correct. Die-back of Norway spruce was noted in Compartment 29. Exceptionally good Sitka spruce regeneration was seen on bare stacking sites, racks, etc.

Visit by Conservator, 12th December, 1951.

Planting should be begun on Chartners at the south end, proceeding northwards, the entire plantable area to be planted by P.57. On Simonside, all low ground should be planted first, and annual programme increased so that the entire section is planted by P.60.

History of Harwood Forest

APPENDIX II

Supervision

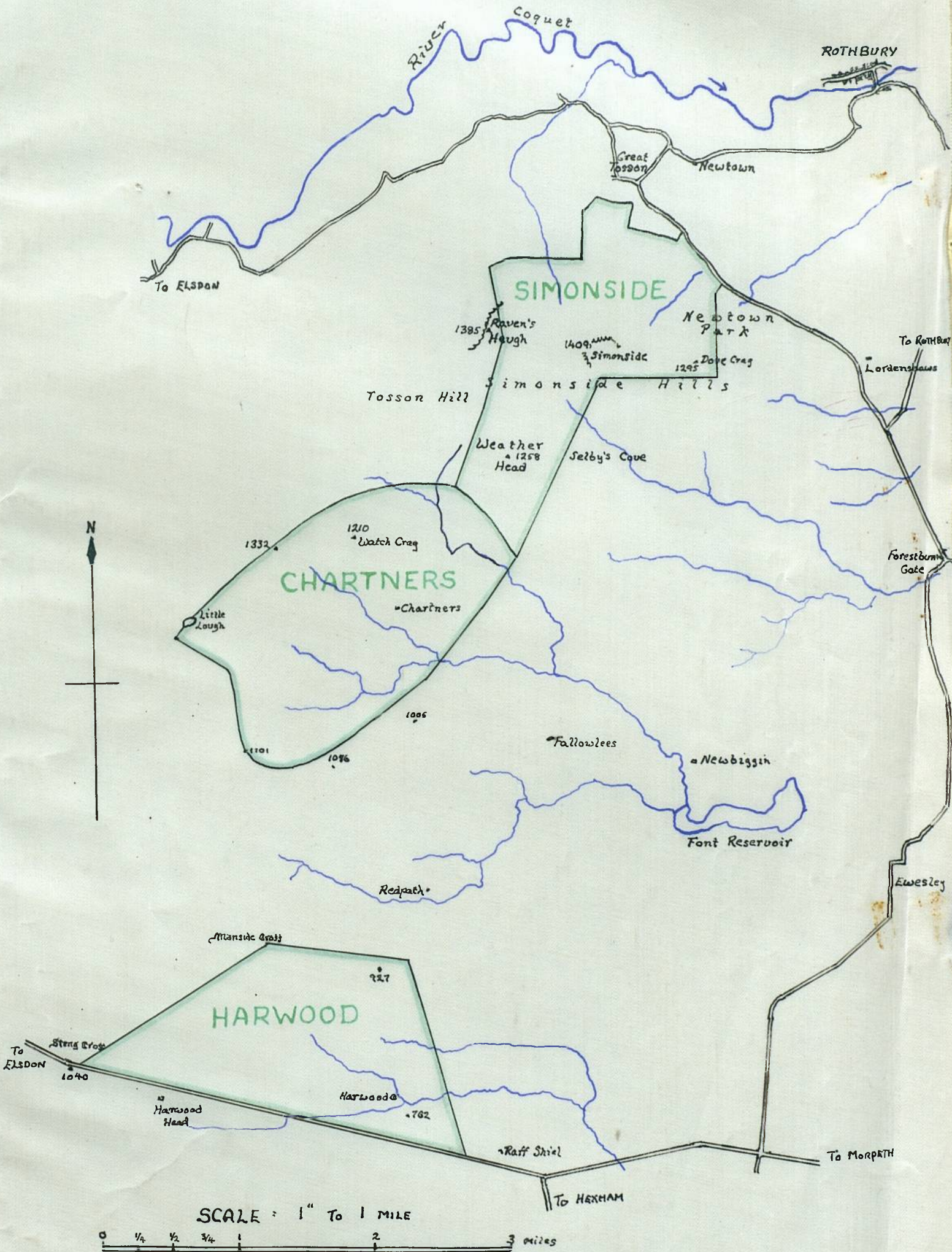
<u>Conservators</u>	1946-47	R.E. Fossey (Acting)
	1947-50	G.J.L. Batters
	1950 to date	C. A. Connell
<u>Divisional Officers</u>	1922-40	A. D. Hopkinson
	1940-46	R.E. Fossey (Acting)
<u>State Forest Officers</u>	1947-48	R.E. Fossey
	1948-50	W. Forsyth
	1950 to date	P. F. Garthwaite
<u>District Officers</u>	1929-37	G.J.L. Batters
	1937-46	W. Forsyth
	1946-48	S. W. Rogers
	1948-49	S. Forrester
	1949-51	P. F. Garthwaite
	1951	S. Forrester
	1951 to date	A. A. Rowan
<u>Foresters</u>	1929-31	W. C. Brown
	1931-38	W. Hodgson
	1938-39	G. Stokoe
	1939-40	E. Fawcett
	1940-45	B. Dickson
	1945-51	R. H. Masson
	1951 to date	R. L. Baird

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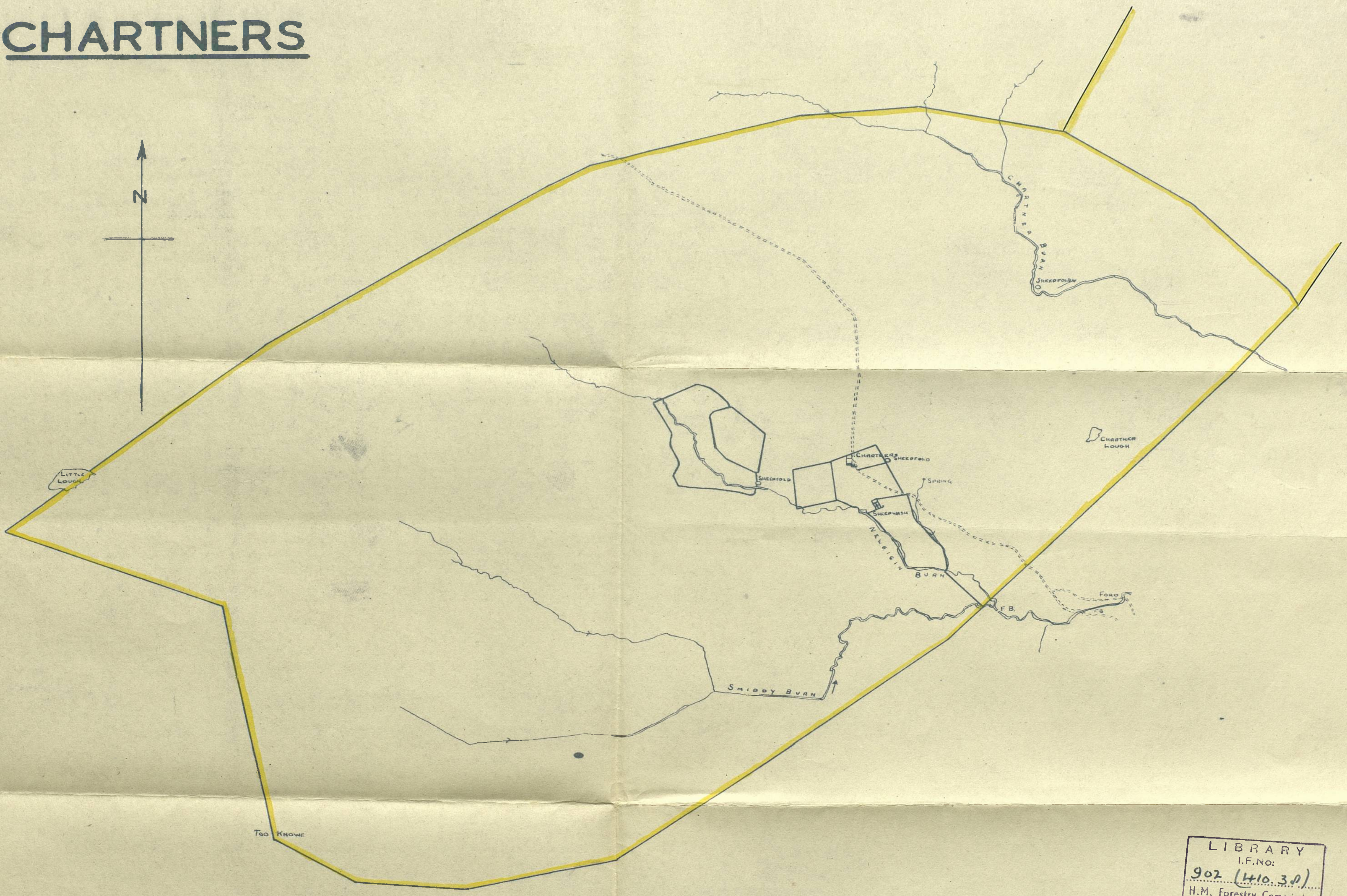
Harwood

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H.M. Forestry Commission

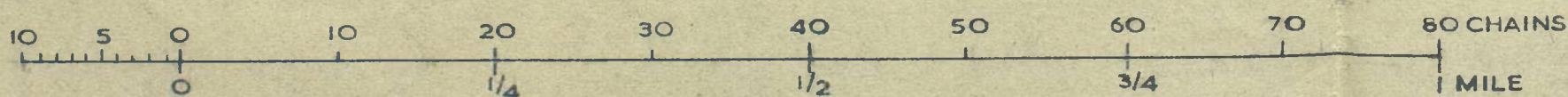
HARWOOD FOREST



CHARTNERS



Northumberland 49 S.W. & 58 N.W.
Scale:- Six Inches to One Mile



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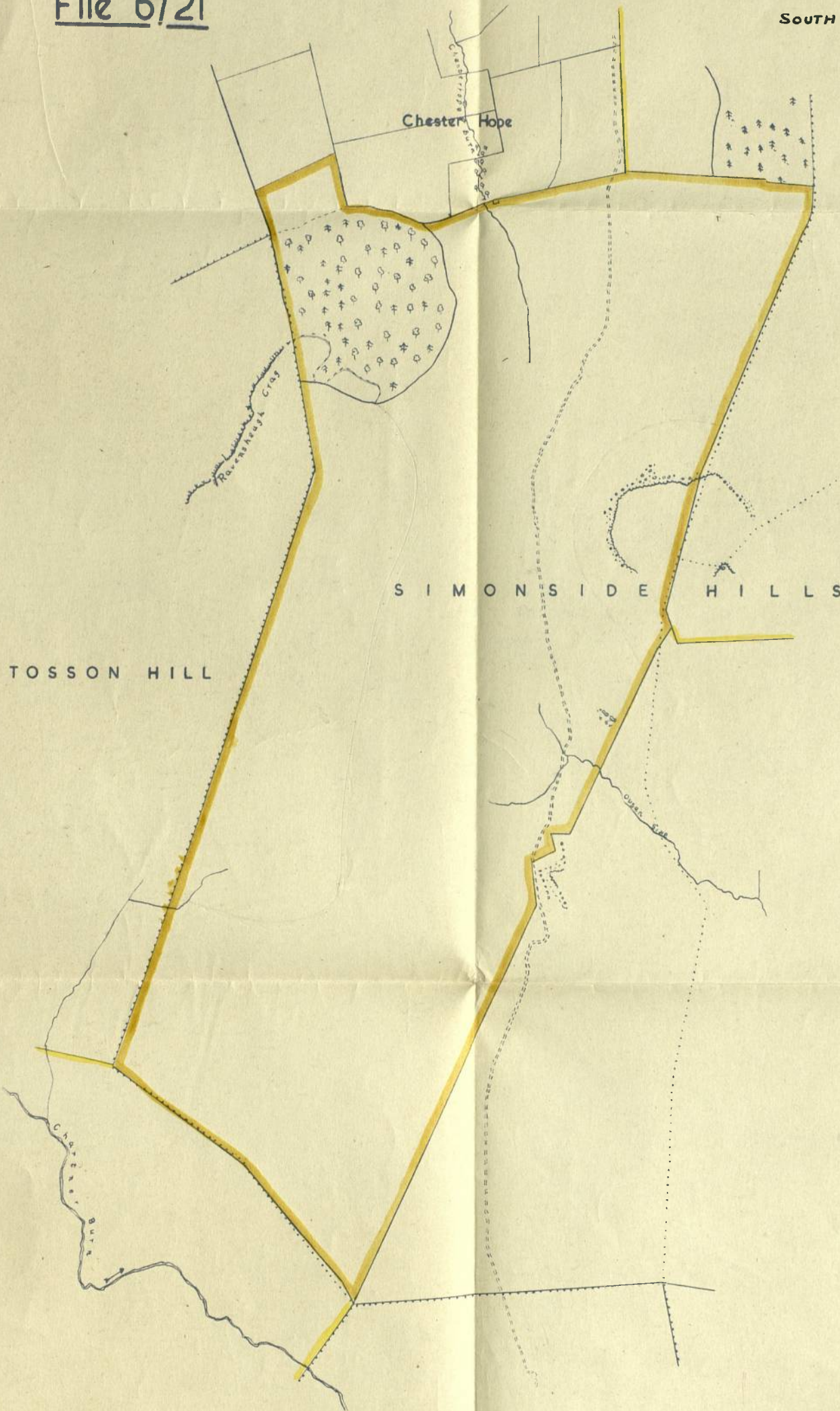
TOSSON HILL

File 6/21

HARWOOD FOREST

SIMONSIDE

SOUTH PORTION.



TOSSON HILL

SIMONSIDE HILLS

Chester Hope

Racing Hoag Crag

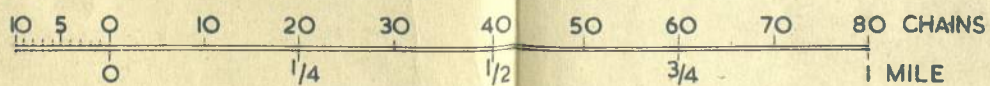
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Outer Crag

Scale: Six Inches to One Mile

Sheet No. Northumberland 49 N.W., N.E., S.W., S.E.

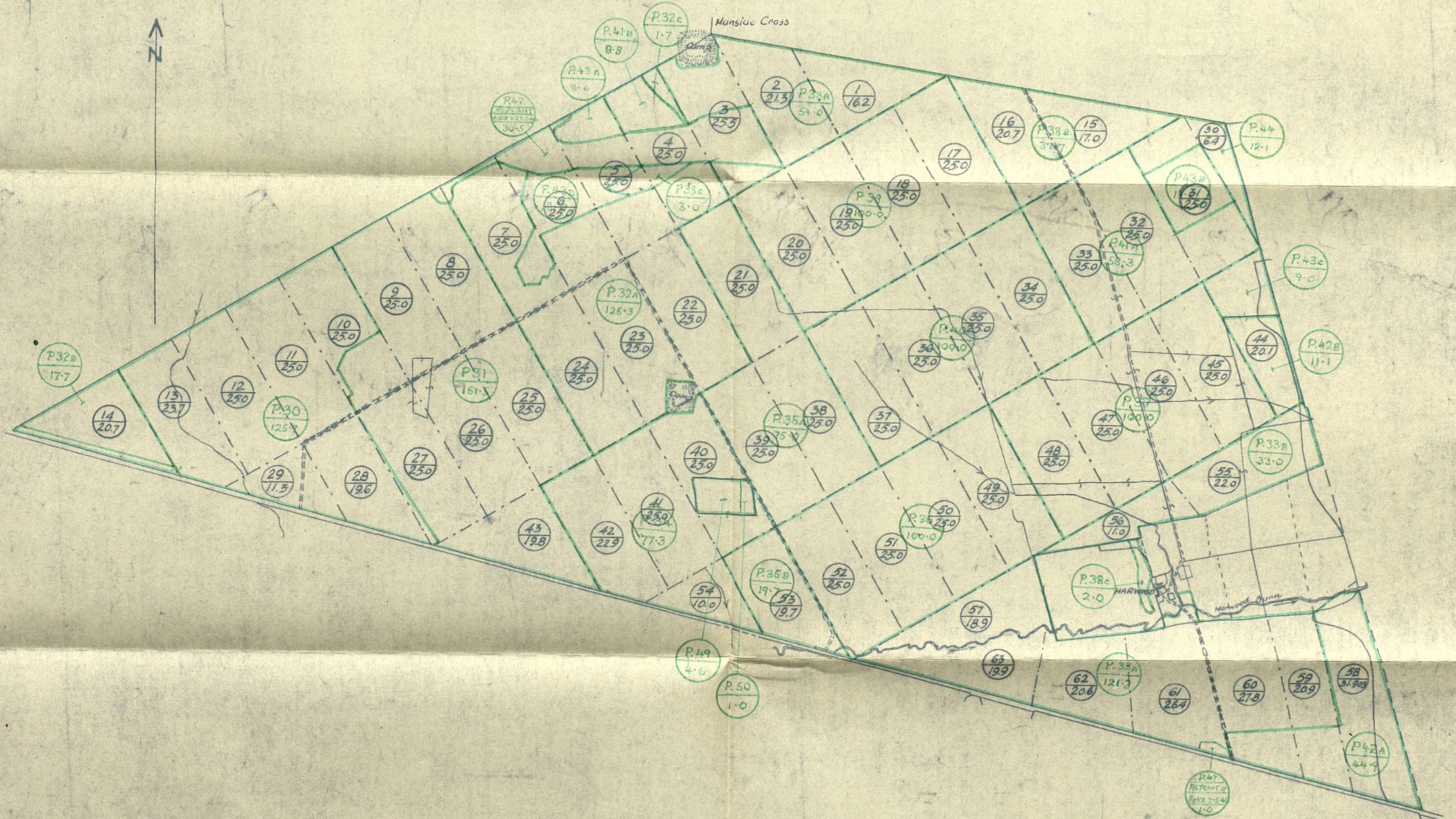
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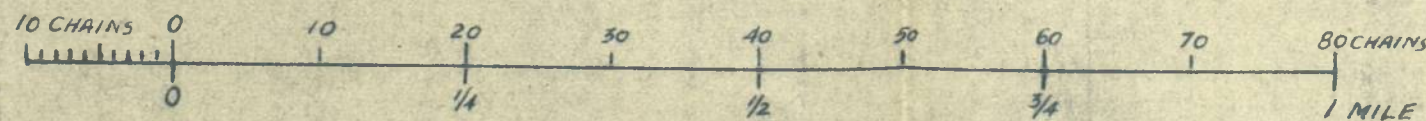
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HARWOOD SECTION : P. YEAR MAP



Scale:- Six Inches to One Mile



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HARWOOD (Simonside)

- NORTH PORTION -



Surveyed in 1883. Revised in 1921. Levelling Revised in 1896.

CHARACTERISTICS AND SYMBOLS

- | | |
|---------------------------------|--|
| County Boundary | Antiquarian Site of |
| Parliamentary Division Boundary | Arrow showing direction of flow of water |
| Union Boundary | Barometrical |
| Rural District Boundary | Contours |
| Parish Boundary | Trigonometrical Station |

For other information see Characteristic Sheet.

Price 2 net.

Printed and Published by the Director General at the Ordnance Survey Office, Southampton.

The Altitudes are given in Feet above Ordnance Survey Datum (approximate Mean Sea Level at Liverpool.)

Altitudes indicated thus (2, 2 1/2) refer to bench marks on buildings, walls, etc. those marked thus (1) preceded or followed by the height, to surface levels.

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Scale Six Inches to One Statute Mile or 800 Feet to One Inch - 1:133,333



N.B. The representation on this map of a Road, Track or Footpath is no evidence of the existence of a right of way.

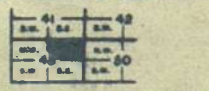
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