FORESTRY COMMISSION



Arkengarthdale

# HISTORY

OF

# ARKENGARTHDALE

## FOREST

NE(E) CONSERVANCY

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FORESTRY COMMISSION

# HISTORY

of

# ARKENGARTHDALE FOREST

1932 - 1951

NORTH EAST (ENGLAND) CONSERVANCY

# HISTORY OF ARKENGARTHDALE FOREST

Contents

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## GENERAL DESCRIPTION OF THE FOREST

### Situation

Arkengarthdale Forest lies in the North Riding of Yorkshire in the Parish of Hope, is 6 miles due south of Barnard Castle and 12 miles south of Hamsterley Forest. A good motor road leading from Swaledale Valley to Barnard Castle bisects the area.

In former times (circa 1670) the district was known as Archengarthdale which means "The Valley of Arkils' enclosure".

### Area and Utilisation

The Estate, 1,339.535 acres in extent, including two farm houses and buildings, was purchased from Edward Digby Hildyard on 31st December 1931 for £5,000.

The area has now been completely planted and the table given below shows the distribution of the area.

Distribution of Area

| | | | |
|---|---|---|---|
| (a) Plantations | | | |
| Acquired | | - | |
| Formed by Commission | | 1120.4 | 1120.4 |
| (b) In hand awaiting planting | | - | |
| Blanks after felling | | - | |
| Burnt areas | | - | |
| Other land | | - | - |
| (c) Nurseries | | - | - |
| (d) Agriculture | Number of Tenancies | 4 | 182.0 |
| (e) F.W.H. | Number | 1 | 37.1 |
| (f) Unplantable land in hand | | - | - |
| (g) Other land | | - | - |
| | | Total | 1339.5 |

The sporting has been let since 1931 at rentals varying from £17 to £40 per annum. The chief sport is grouse, black game and a few pheasants. In the early 30's the bag returned averaged approximately 80 brace of grouse, 35 brace of black game, 30 brace of partridge and 15 brace of pheasants. Although the rental of £40 is still being maintained, with difficulty, the present day returns are approximately 25% of those in

the early 30's.

Physiography

The forest lies on the southern side of Teesdale on a moderate to steep slope with a northerly aspect. It occupies the southern side of the basin of the Hope Beck. Towards the western end the aspect is north-east and the eastern end has a north-west aspect. Elevations are from 800 ft. to 1,550 ft. above sea-level and approximately 50% of the planted ground lies between the 1,100 ft. and 1,300 ft. contours. Despite the relatively high altitude exposure is only severe on the extreme southern boundary, the bulk of the forest, due to the northerly aspect, being naturally sheltered from the prevailing wind.

Geology and Soils

The area forms part of the Yoredale series and includes both shales and limestone. The soil generally found on the lower slopes is a dark loam, 6 in. to 9 in. in depth, over a deep and stony brown clay-loam. Over the moorland it is usual to find from 2 in. - 8 in. of mild peat or peaty loam over both a grey and yellowish clay, the latter often of a gritty nature and usually mixed with small stones. There are occasional places where the peat is over a foot deep, particularly on the unplantable ground in the south-west. A few small boulders are to be found here and there but there are no major outcrops.

Vegetation

The vegetation on the area can be divided into three main types:-

1. Nardus grassland - with a large proportion of Holcus lanatus and Deschampsia caespitosa. There is also present a certain amount of Molinia, Scirpus, Agrostis and Juncus communis.

2. On knolls there is a vegetation of nearly pure bilberry mixed with a little Calluna.

3. On the southern boundary on deeper peat the vegetation is mainly Eriophorum, Erica, Molinia and Juncus squarrosus.

Meteorology

The rainfall is in the region of 40 in. per annum. The rainfall figures given below were recorded at the museum in Barnard Castle (elevation circa 550 ft.).

Monthly Rainfall for 1951 (in.)

| | | |
|---|---|---|
| January | - | 2.68 |
| February | - | 3.65 |
| March | - | 3.86 |
| April | - | 2.13 |
| May | - | 3.55 |
| June | - | 0.96 |
| July | - | 0.99 |
| August | - | 3.64 |
| September | - | 1.39 |
| October | - | 1.18 |
| November | - | 8.19 |
| December | - | 5.02 |
| | | 37.24 |

Average Annual (1918-1933) - 32.40 in. per annum

The prevailing wind is from the south-west and practically the entire area is sheltered on the south and west by higher ground which rises to an elevation of over 1700 ft. Frosts are occasionally severe and snowfall is usually heavy and lies for a considerable time, particularly on the southern boundary.

Risks

Fire: The public road through the centre of the property is frequently used in the summer months by holiday motorists. This fact, together with moor burning on adjoining estates, constitutes the chief fire danger to the forest.

Sheep: With a heavy fall of snow the southern boundary fences become covered and are no longer turnable. Sheep from adjoining areas have then easy access to the forest and in 1947 Compartments 41 and 42 (P.40) were practically ruined.

Rabbits: Rabbits were apparently numerous in the early years but are not much in evidence at the present time. In F.Y.46 rabbit netting was put on the boundary fences and a recent inspection of the P.49-P.51 areas - with snow on the ground - revealed no trace of rabbits.

Deer: There are three or four roe-deer in the forest at present and some damage has been caused to roadside ornamentals. Apart from this, damage has been negligible.

Insects: In 1941 there was a severe attack of Aphis on Sitka spruce. The trees recovered and since then no further attacks have been reported.

Roads

As stated previously the forest is bisected by the Swaledale to Barnard Castle tar macadam road. There is also a partly metalled road passing through East Hope Farm which serves the north-east corner of the forest. The progress of new road construction at this unit has not been too satisfactory due in part to the short working season for road making and the difficulty of obtaining suitable labour. It is hoped, however, that some $3\frac{1}{4}$ miles of all weather roads will be constructed in the next 5 years along the main east to west rides (shown on P.year map accompanying this history).

Labour

There has always been an adequate supply of labour and the labour force of five is sufficient for the time being. With the advent of thinning, however, in F.Y.54, and the commencement of road construction the labour force will have to be increased either by recruiting locally or by borrowing labour from Hamsterley Forest.

The existing labour force is drawn mainly from surrounding farms and is completely reliable.

SILVICULTURE

Preparation of Ground prior to planting

Spreading turves and ploughing, since 1945, has been the only preparation of ground before planting.

Temporary fences were erected as the ground was resumed. The area is now completely planted and only boundary fences have to be maintained.

Choice of Species (See Species Map - Appendix III).

Approximately 99% of the planted area of 1120.4 acres has been planted with spruce - Norway spruce, Sitka spruce and white spruce.

Generally the Norway spruce has been planted in the wet flushes at lower elevations but has, on occasions, been planted as high as 1300 ft. The Sitka spruce occupies the higher ground between 1200 ft. and 1400 ft. This species has also been planted at lower elevations where there was a certain amount of Calluna in the vegetation. White spruce occupies the most exposed site on the south-west boundary at an elevation of 1400 ft. to 1500 ft.

In P.50 and P.51, in the moderately sheltered north-east corner of the forest, small areas of Corsican pine, Japanese larch and beech were planted. The soil in this section is on the whole superior to that found over the rest of the area and the vegetation, in parts, is of a woodland type. The Corsican pine was planted on an area where the vegetation was predominantly Calluna and the Japanese larch was confined to the gill-sides. The beech was planted in a two-row mixture with Norway spruce. A small area (0.5 acres) of Scots pine was planted in P.37 as a shelter belt around Far East Hope holding.

Planting

(a) Spacing

From the commencement of planting in 1932 up to and including P.35 a 5 ft. spacing was employed for both Norway and Sitka spruces. In P.36 Sitka spruce was planted at 5 ft. and Norway spruce at 4 ft. 6 in. During the period P.37 to P.42 all species, with the exception of those in the ornamental belt, were planted at 4 ft. 6 in. When planting re-commenced in 1944 - there being no planting in 1943 - Sitka spruce, the only species planted that year, was planted at 5 ft. With the advent of ploughing in P.45 a 5 ft. spacing for all species became general and this was the spacing used till completion of planting in P.51.

(b) Type of Plant

The following types of plants have been used:-

Norway spruce - 2 + 2 (usual), 2 + 3, 3 + 2, 3 + 2 + 1, 1 + 1, 3 + 0, 7 + 0.
Sitka spruce - 2 + 2 (usual), 3 + 2, 2 + 1, 2 + 1 + 1, 1 + 2 + 1.
Japanese larch 1 + 1, 2 + 1.
Scots pine - 2 + 1.
White spruce - 2 + 2.
Corsican pine - 1 + 1.

Most of the plants have come from nurseries within the Conservancy,

e.g. Chopwell, Widehaugh, Hamsterley. There have, however, been importations from Thornthwaite, Parkhurst and Scotland.

(c) Methods of Planting

There has been little variation in the method of planting. From P.32 to P.44 circular spade on turves was the usual method. Screef and mattock planting has been done in special cases. From P.45 to date practically all planting has been notch on ploughed ground.

(d) Annual Rate of Planting

The rate of planting has varied considerably from year to year, rising to a maximum of 115 acres in P.34. In 1943 there was no planting. The Ministry of Agriculture apparently objected to the proposed planting area for this year (P.43) on the grounds that it was being utilised for sheep grazing and, in view of the food shortage, should not be planted. The area in question was planted in P.47 and P.48. The following table gives the areas planted since P.32 to completion in P.51.

| Year | Area Planted (to nearest acre) |
|---|---|
| 1932 | 47 |
| 33 | 101 |
| 34 | 115 |
| 35 | 114 |
| 36 | 98 |
| 37 | 108 |
| 38 | 75 |
| 39 | 66 |
| 40 | 73 |
| 41 | 72 |
| 42 | 16 |
| 43 | - |
| 44 | 27 |
| 45 | 32 |
| 46 | 16 |
| 47 | 31 |
| 48 | 57 |
| 49 | 16 |
| 50 | 10 |
| 51 | 47 |
| | 1121 acres |

Annual Average - 59 acres

(e) Manuring

As far as can be ascertained no manuring has been done in the forest.

(f) Establishment

Establishment has generally been good. On the unploughed ground, growth in the first few years was slow but on the ploughed ground the rate of establishment has been very satisfactory. Only at the highest

elevations are there any signs of checking.

Ploughing

Deep R.L.R. ploughing started in P.45. There was no preparation of ground prior to ploughing and the type of ground ploughed was similar to that which had hitherto been unploughed, i.e. a fairly heavy clay soil with a vegetation of Holcus, Nardus, Agrostis, Molinia, etc. The furrow spacing was 5 ft. and generally a 2 + 2 transplant has been used, step planted in the furrow slice with a garden spade.

Establishment on ploughed ground has been extremely good. (See Rates of Growth).

Beating Up

Where beating up was carried out it has been done up to four years after planting but seldom longer. Generally a plant of the same species, but one or two years older than the original, has been used. Occasionally Scots pine has been used for beating up Norway spruce on heather knolls.

Weeding

Due to the heavy grass growth, weeding at Arkengarthdale has been a costly item. On both ploughed and unploughed ground it has been necessary in certain areas to commence weeding the year of planting and continue it for 5 to 6 years. Without this intensive weeding the damage to the crop would be extensive and establishment slow. Careful attention has always been given to weeding and there is little evidence of damage caused through neglect of this operation.

Mixture of Species

In P.51, 4 acres of ploughed ground were planted with Norway spruce and beech in a two-row mixture. The two species were planted contemporaneously in a sheltered site where the vegetation tends to be of a woodland type. It is, as yet, too early to assess the efficiency of the mixture.

Rates of Growth

Apparently the rate of growth in the early years was not too satisfactory and many areas were slow in getting away. Now, however, all the plantations with very few exceptions are growing well and growth on ploughed ground has been extremely good.

The following table gives samples of measurements taken throughout the forest:-

| Cmpt. | Species | P.Yr. | Age | Geology, Soil and Vegetation | a) Altitude<br>b) Exposure | Mean Ht. of Dominants ft. | Mean Annual Height Increment in. | Current Annual Ht. Increment during last 5 years in. | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| 3 | S.S. | 32 | 20 | Carboniferous Limestone. Clay soil Nardus/Agrostis | a) 1150<br>b) Moderate | 23 | 14 | 17 | Turf planted |
| 15 | S.S. | 34 | 18 | ditto. | a) 1200<br>b) Mod Sheltered | 26 | 17 | 30 | " " |
| 16 | S.S. | 35 | 17 | ditto. | a) 1300<br>b) Moderate | 19½ | 14 | 18 | " " |
| 19 | S.S. | 36 | 16 | Carboniferous Limestone. Clay soil. Nardus/Agrostis with small amount of Eriophorum. | a) 1200<br>b) Mod Sheltered | 18 | 14 | 21 | " " |
| 25b | S.S. | 37 | 15 | ditto. | a) 1200<br>b) Mod Sheltered | 18 | 14 | 24 | " " |
| 26 | S.S. | 38 | 14 | ditto. | a) 1300<br>b) Mod Sheltered | 19 | 16 | 29 | " " |
| 32 | S.S. | 39 | 13 | ditto. | a) 1300<br>b) Moderate | 15 | 14 | 22 | " " |
| 41 | S.S. | 40 | 12 | ditto. | a) 1350<br>b) Severe | 7 | 7 | 11 | " " |
| 43 | S.S. | 41 | 11 | Carboniferous Limestone. Clay soil Nardus/Agrostis with small amount of Eriophorum. | a) 1300<br>b) Mod Exposed | 7½ | 8 | 14 | " " |
| 43 | S.S. | 44 | 8 | ditto. | a) 1170<br>b) Mod Exposed | 8½ | 13 | 14 | " " |
| 44 | S.S. | 45 | 7 | ditto. | a) 1125<br>b) Mod Sheltered | 8½ | 14 | 13 | " " |
| 45 | S.S. | 46 | 6 | ditto. | a) 1075<br>b) Mod Sheltered | 9½ | 19 | 14 | On Ploughing R.L.R. |
| 38 | S.S. | 47 | 5 | Carboniferous Limestone. Clay soil and Peat. Calluna/Molinia/Eriophorum | a) 1125<br>b) Moderate | 6½ | 15 | 13 | ditto. |
| 46 | N.S. | 32 | 20 | Carboniferous Limestone. Clay loam. Festuca/Agrostis/bracken | a) 875<br>b) Sheltered | 27 | 16 | 24 | Notched Unploughed |
| 6 | N.S. | 33 | 19 | Carboniferous Limestone. Clay (some peat) Nardus/Agrostis | a) 1150<br>b) Mod Sheltered | 21½ | 14 | 14½ | Turf planted |
| 13 | N.S. | 34 | 18 | ditto. | a) 1175<br>b) Mod Sheltered | 23 | 15 | 30 | " " |

| Cmpt. | Species | P.Yr. | Age | Geology, Soil and Vegetation | a) Altitude<br>b) Exposure | Mean Ht. of Dominants ft. | Mean Annual Height Increment in. | Current Annual Ht. Increment during last 5 years. in. | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| 24 | N.S. | 36 | 16 | Carboniferous Limestone Clay.<br>Nardus/Agrostis Eriophorum/Molinia | a) 1075<br>b) Sheltered | 14 | 10 | 21 | Turf planted |
| 25 | N.S. | 37 | 15 | ditto. | a) 1200<br>b) Mod Sheltered | 17 | 14 | 23 | " " |
| 28 | N.S. | 38 | 14 | ditto. | a) 1125<br>b) Mod Sheltered | 16 | 14 | 20 | " " |
| 33 | N.S. | 41 | 11 | ditto. | a) 1000<br>b) Mod Sheltered | 8½ | 9 | 12 | " " |
| 34 | N.S. | 42 | 10 | ditto. | a) 1075<br>b) Mod Sheltered | 7 | 8 | 11 | " " |
| 40 | N.S. | 47 | 5 | Carboniferous Limestone Clay (with peat) Calluna/Molinia/Eriophorum | a) 1150<br>b) Moderate | 5 | 12 | - | On Ploughing R.L.R. |
| 18 | P.Alba | 34 | 18 | Carboniferous Limestone. Clay soil. Nardus/Agrostis/Eriophorum | a) 1400<br>b) Moderate | 14 | 9 | 12 | Turf Planting |
| 41 | C.P. | 44 | 8 | ditto. | a) 1400<br>b) Severe | 6 | 9 | 12 | " " |

Past Treatment of Established Plantations

The thinning programme is scheduled to start in F.Y.54 when 25 acres of the P.32 Sitka spruce will be thinned. Some 40 acres have been brashed to date and the practice is to brash 70% of the crop endeavouring to leave unbrashed those trees which will be removed in the first thinning.

The thinning programme up to F.Y.56 is as follows:-

| Forest Year | Area to be thinned | Anticipated Yield (cu.ft.). |
|---|---|---|
| 54 | 25.0 acres | 3,000 |
| 55 | 21.0 " | 2,520 |
| 56 | 50.0 " | 6,000 |

Rustic poles, obtained from felling extraction racks have been sold locally. In the winter of 1951-52 a strip was cut through part of the P.32, P.33 area along a proposed road alignment. The boles obtained from this felling were sold as rustic poles and the tops as Xmas trees. The revenue from these sales was approximately £3,000.

Research

No research has been carried out in the forest by the Research Branch.

Conclusions

a) Choice of Species

There has been a tendency in the past to plant Norway spruce where the exposure has been too severe. It will be seen from the Species Map (Appendix III) that this species has been planted as high as 1300 ft. and has, as a result, suffered from blast. It would appear, therefore, that where there was the slightest risk of exposure and a tendency to Vaccinium and Calluna, Sitka spruce should have been planted. All Sitka spruce plantations, with few exceptions, are growing satisfactorily, and it is to be regretted that a larger proportion of the forest was not planted with this species.

b) Grazing

The cattle grazing of the rides on the west side of the forest has been a marked success and excellent fire lines have been formed. This close grazing has resulted in a considerable saving as it is no longer necessary to mow the rides and the fire hazard has been considerably reduced.

c) Ploughing

Species planted on R.L.R. ploughing have grown extremely well and

and it is unfortunate that this method of cultivation was not available in the earlier years.

d) The belt of ornamentals on either side of the road is a pleasing feature of this forest which has brought much favourable comment from various public bodies. Wild cherries and rowans are growing particularly well and have been kept pruned.

## APPENDIX I

### Notes from Inspection Reports

Inspection by Chairman - Lord Robinson O.B.E.

8th September, 1937.

The best grown and most even portion seen on this visit was the P.35 Sitka spruce in Compartments 16 and 18. The P.32 Sitka spruce (Compartments 3 and 6) was considered disappointing and it was explained this was due to (a) use of seedlings (b) occasional late frosts and (c) black game.

It was observed that little or no weeding is required over a great part of the area but that certain portions would require careful attention.

The ornamental belts along the main roadside were considered too ragged and not sufficiently dense.

The general impression gained was good and the Chairman observed that Arkengarthdale should make a satisfactory spruce forest.

3rd June, 1942.

On this inspection it was noted that growth in the P.32 - 34 areas was satisfactory, though nearly all plants had been slow in getting away. It was noted that the Sitka spruce which had been attacked by black game and damaged by frost was now growing well but Norway spruce planted at about 1200 ft. showed signs of blast.

The Chairman instructed that Tsuga be planted in the small gaps in the Sitka spruce when the latter had reached a height of 6 ft. - 8 ft. but that no attempt should be made to raise this species on the drier sandy places where Calluna is abundant.

13th May, 1949.

On this visit the Chairman raised the question of acquisitions in the neighbourhood of the forest. The Conservator (Mr. G. Batters) said he thought the land to the North was owned by the Ecclesiastical Commissioners who had been approached without result. The Chairman thought that further efforts might prove fruitful.

Lord Robinson showed interest in the comparative growth of Norway and

Sitka spruce. It was noted that the Norway was not very much less in total height but that the present rate of growth of Sitka was approximately 10% ahead of the Norway spruce. Some Tsuga, which had been planted after the Chairman's visit of 1942, were seen and it was noted that damage by voles had been serious.

The Chairman expressed satisfaction with the growth in the forest and commented favourably on the appearance of the amenity belt.

Inspection by Deputy Director General - W. H. Guillebaud, C.B.E.

17th August, 1951.

Throughout the inspection the Deputy Director General noted areas planted with Sitka spruce which could well have been planted with Norway spruce e.g. the good grassy flushes on the lower slopes.

A small area of unsuccessful Corsican pine which had been planted in P.39 at an elevation of over 1,200 ft. was inspected. Mr. Guillebaud suggested beating up with Pinus contorta and also recommended Abies procera for the rocky outcrops which occur sporadically.

The Deputy Director General noted that the cattle grazing of the rides on the west side of the forest had been a marked success and excellent fire lines had been formed as a result.

Mr. Guillebaud asked what markets there were in the neighbourhood for the disposal of produce when thinning commenced. The State Forest Officer, Mr. Garthwaite, explained that the forest was well situated for supply of props to the Dunham coalfield and pulpwood to the new factory at Wigan.

The Deputy Director General observed that Arkengarthdale was a successful forest with a minimum of checked or backward areas.

Visit of Director (E) - O. J. Sangar, 1st March 1949.

The Director paid a passing visit to the forest en route from Hamsterley to Leyburn. The plantations were not inspected.

It was pointed out that the area would be completely planted by 1951 and that Norway spruce and Sitka spruce, the main species used, had been successful. It was suggested that Abies grandis, Tsuga and Japanese larch might have been planted in certain localities.

## APPENDIX II

## Supervision

The supervision at Arkengarthdale, as far as can be ascertained, has been:-

### Divisional Officers

A.D. Hopkinson, 1932 - 1939

R.E. Fossey, 1939 - 1945

### Conservators

R.E. Fossey (acting), 1945 - 1947

G.J.L. Batters, 1947 - 1950

C. A. Connell, 1950 to date

### State Forest Officers

R. E. Fossey, 1947 - 1948

W. Forsyth, 1948 - 1950

P.F. Garthwaite, 1950 to date

### District Officers

A. Paterson, ? - 1940

J.H. Edwards, 1940 - 1942

M.F. Adams, 1943 - 1949

S. Forrester, 1949 - 1952

T.C. Mitchell, 1952 to date

### Foresters

J. W. Shaw, 1932 - 1941

W.L. McCavish, 1941 - 1945

J. Hird (Foreman in Charge), 1945 to date

# — ARKENGARTHDALE FOREST —

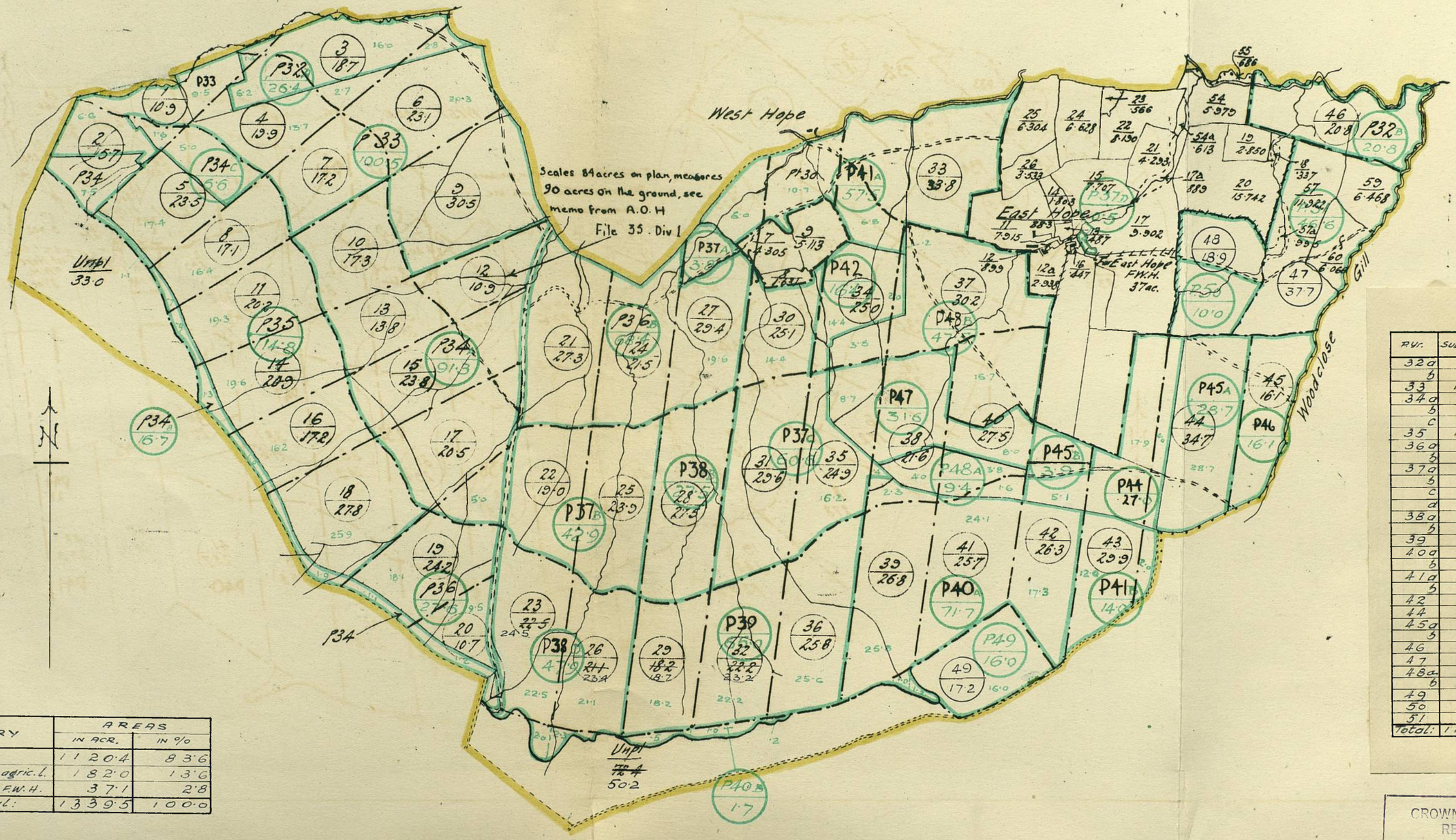
Purchase from E.D. Hildyard

31-12-31. 1339·535 Acres.

Yorkshire 23 all.



# P. Yr. Map




| SUMMARY | AREAS | |
|---|---|---|
| | IN ACR. | IN % |
| Planted area | 1120·4 | 83·6 |
| Farm build. & agric. l. | 182·0 | 13·6 |
| Buildings & F.W.H. | 37·1 | 2·8 |
| Total: | 1339·5 | 100·0 |

| P.Yr. | Sub-area | Total area |
|---|---|---|
| 32a | 26·4 | |
| b | 20·6 | 47·2 |
| 33 | 100·5 | 100·5 |
| 34a | 91·3 | |
| b | 1·67 | |
| c | 6·6 | 114·6 |
| 35 | 114·8 | 114·8 |
| 36a | 27·6 | |
| b | 68·4 | 96·0 |
| 37a | 3·8 | |
| b | 42·9 | |
| c | 60·6 | |
| d | ·5 | 107·8 |
| 38a | 47·9 | |
| b | 27·5 | 75·4 |
| 39 | 66·0 | 66·0 |
| 40a | 71·7 | |
| b | 1·7 | 73·4 |
| 41a | 57·5 | |
| b | 14·0 | 71·5 |
| 42 | 16·4 | 16·4 |
| 44 | 27·0 | 27·0 |
| 45a | 28·7 | |
| b | ·39 | 32·6 |
| 46 | 16·1 | 16·1 |
| 47 | 31·6 | 31·6 |
| 48a | 9·4 | |
| b | 47·5 | 56·9 |
| 49 | 16·0 | 16·0 |
| 50 | 10·0 | 10·0 |
| 51 | 4·66 | 4·66 |
| Total: | 1120·4 | 1120·4 |

Scale:- Six Inches = One Mile.



Approved. Jan 31/52