

FORESTRY  COMMISSION

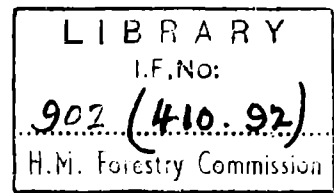
LIBRARY  
I.F.N.O.  
902 (410.92)  
H.M. Forestry Commission

HISTORY  
OF  
HALDON

FOREST  
SW(E) CONSERVANCY

FOR  
REFERENCE ONLY

Forestry Commission  
**ARCHIVE**



FORESTRY                      COMMISSION

HISTORY

of

HALDON                      FOREST

1920 - 1951

SOUTH WEST (ENGLAND) CONSERVANCY

## HISTORY OF HALDON FOREST

	<u>Contents</u>					<u>Page</u>
<u>GENERAL DESCRIPTION OF THE FOREST</u>	...	...	...	...	...	1
Situation	...	...	...	...	...	1
Area and Utilisation	...	...	...	...	...	1
Physiography	...	...	...	...	...	4
Exposure	...	...	...	...	...	4
Geology and Soils	...	...	...	...	...	5
Vegetation	...	...	...	...	...	8
Meteorology	...	...	...	...	...	9
Risks - Fire, animals, insects, fungi	...	...	...	...	...	11
Roads	...	...	...	...	...	13
Labour	...	...	...	...	...	14
<u>SILVICULTURE</u>	...	...	...	...	...	15
Preparation of ground	...	...	...	...	...	15
Felled woodland	...	...	...	...	...	15
Coppice	...	...	...	...	...	15
Birch	...	...	...	...	...	15
Heathland	...	...	...	...	...	16
Marsh or bog	...	...	...	...	...	16
Old agricultural land	...	...	...	...	...	16
Choice of species	...	...	...	...	...	17
Planting	...	...	...	...	...	17
Ploughing	...	...	...	...	...	18
Beating up	...	...	...	...	...	19
Weeding	...	...	...	...	...	20
Nurse species	...	...	...	...	...	21
Brashing	...	...	...	...	...	21
Pruning	...	...	...	...	...	21
Thinning	...	...	...	...	...	21
Rates of growth	...	...	...	...	...	23
Research	...	...	...	...	...	27
Conclusions	...	...	...	...	...	28
<u>APPENDICES:</u>						
I Notes from Inspection Reports	...	...	...	...	...	30
II Record of Supervisory Staff	...	...	...	...	...	35
III Plant spacing and annual rate of planting	...	...	...	...	...	36

## HISTORY OF HALDON FOREST

### GENERAL DESCRIPTION OF THE FOREST

#### Situation

The main block of Haldon Forest lies six miles south-east of Exeter. It is cut into two sections of about equal area by the main Exeter - Ashburton - Plymouth road.

The parishes which contain the whole of the forest area are as follows:-

Ashton  
Kenn  
Chudleigh  
Ashcombe  
Bishopsteignton  
Kenton  
Dunchideock  
Mamhead  
Ideford

The forest name originates in the fact that the main ridge of the hill on which the first acquisitions were made is called 'Great Haldon', and that this part of the forest area was, prior to acquisition, part of Haldon Estate.

Haldon House and its surrounding park land lie to the north and adjoin part, of the northern boundary of the main forest block.

#### Area and Utilisation

Acquisition and land utilisation details are given in the following tables (Tables I and II).

TABLE I. Acquisitions

From	By	Date	Plantations Acquired	Plantable excl. Col. 4	Nurseries	Agricultural	F. W. H.	Units of Plantation	Other Land		Total
									Land permanently transferred Description	Acres	
C. J. Hannaford	Lease	13.6.20	392.916	474.073	-	-	4.587	-	-	-	871.576
Mrs. E. A. Owen	Conveyance	23.3.21	-	18.5	-	-	-	-	-	-	18.500
E. W. S. Bartlett	Lease	10.1.24	18.5	633.010	-	-	-	-	-	-	651.510
E. W. S. Bartlett	Lease	2.3.26	-	3.287	-	-	-	-	-	-	3.287
H. Holman	Lease	26.5.26	-	65.463	-	-	-	-	-	-	65.463
Hon. C. H. Clifford	Lease	2.6.26	-	173.746	-	-	-	-	-	-	173.746
Messrs. J & W. Tribe	Conveyance	11.8.26	-	-	-	-	3.0	-	House & Garden	1.413	4.413
H. N. Thomas	Conveyance	14.1.27	-	5.0	-	9.975	5.0	-	-	-	19.975
Rt. Hon. R. Granville	Lease	14.7.27	-	23.518	-	-	-	-	-	-	23.518
S. L. Merchant	Conveyance	13.8.27	1.463	98.177	-	-	0.5	-	-	-	100.140
E. W. S. Bartlett	Conveyance	27.3.28	-	65.607	-	-	-	-	-	-	71.107
W. J. Merchant	Conveyance	16.7.28	-	29.657	5.5	-	8.5	-	-	-	38.157
Dame I. S. Wills	Lease	22.10.28	-	751.709	-	-	-	-	-	-	751.709
Dame I. S. Wills	Lease	24.3.30	-	32.713	-	-	-	-	-	-	32.713
Dame I. S. Wills	Lease	5.7.34	-	22.186	-	-	-	-	-	-	22.186
Hon. C. H. Clifford	Lease	13.4.38	-	14.890	-	-	-	-	-	-	14.890
Lord Ramhead	Lease	24.6.40	24.0	124.487	-	-	-	10.0	-	-	158.486
Lord Clifford	Lease	3.5.51	-	131.298	-	-	-	-	-	-	131.298
											3152.674

TABLE II

(a) Plantations			
	Acquired	36.0	
	Formed by Commission	2929.0	2965.0
(b) In hand, awaiting planting	-		
	Blanks after felling	-	
	Burnt areas	.5	
	Other land	134.5	135.0
(c) Nurseries	-		-
(d) Agriculture - Number of tenancies	1		10.0
(e) F. W. H. Number	8		22.0
(f) Unplatable land in hand			6.0
(g) Other land - Quarries and roads			14.0
		Acres	<u>3152.0</u>

- Note.
- (a) Acquired plantations listed in Table I were mainly poor quality hardwoods which were felled and replanted.
  - (b) Other land is - New acquisition, and remainder of old nursery.
  - (f) Condition of Lease that this land be left unplanted for amenity and recreation.

### Physiography

The Forest of Haldon for the most part has been formed on a ridge of hills which is flattened on its top and thus becomes a kind of attenuated plateau. This ridge lies approximately in a north-west to south-east direction and thus lies across the direction of the prevailing south-west wind. Most of the ridge is between 750 ft. and 800 ft. high, and it rises to its highest point at Bullers Hill whose height is 827 ft.

This ridge is cut into on both sides by numerous small streams, and these stream valleys which are all fairly steep sided, give a good degree of shelter. It is on the slopes of these valleys that the most promising tree growth at Haldon is to be found.

The streams which drain the land to the north and west of the forest are tributaries of the river Kenn which flows into the estuary of the Exe; while the streams to the east and south drain into the river Teign.

The side of the forest ridge which drains into the Exe slopes rather more steeply than does that on the west, but there is not much forest on the eastern slope, because the ground is sheltered from the prevailing wind, and good quality agricultural land consequently reaches a higher elevation on this side. The lowest point on the east side is at 450 ft. where it slopes down to Underdown, but in the main the eastern forest boundary is above the 600 ft. contour. On the west side, however, the forest comes down to the 200 ft. contour at the southern tip of Whiteway, and the bulk of the western boundary lies between the 300 ft. and 500 ft. contours. The lowest point in the forest is in Well Covert at about 150 ft.

### Exposure

The exposure of the forest varies considerably. The eastern and north-eastern slopes are well sheltered during most of the year from the prevailing wind, but even the lowest point at Underdown occasionally suffers from north and north-west gales, which are extremely cold and often fairly violent.

The forest is on the whole fortunate that it lies end on to north-west gales of the equinoxes, but there have been occasional cases of wind blow caused by these winds, chiefly in the lower and damper areas where Sitka spruce and Douglas fir have suffered most damage.

The forest is also fortunate that to the west lies the Dartmoor massif, which provides some shelter from the prevailing winds. Nevertheless the high ground of the plateau is extremely exposed, and writing in 1808 Charles Vancouver in his survey of farming reports as follows:- "The north-west winds from the forest of Exmoor produce much frost and cold driving rains in the spring of the year, and are greatly dreaded; but it is the westerly or Dartmoor winds that are stated to produce the greatest mischief at all seasons, and the excessive violence of the westerly winds is such as to baffle almost every effort of the industrious cultivator of woodland". From this description it is easy to see why the trees planted on the top of the plateau suffer in places from wind blast.

### Geology and Soils

Haldon Forest lies more or less along the line where the division between the New Red rocks of the Permian age and the shales and shillots of the Carboniferous age occurs.

The shale beds, or Culm Measures as they are called because of the lumps of sooty coal which they contain and which is known in the West Country as Culm, lie to the west of the forest.

The Upper Culm Measures, which are the local type, consist of shales and sandstones with rare nodules of the limestone.

Near Chudleigh, at the base of the Upper Culm Measures, there are beds of conglomerate in sandstones which rest unconformably on the Cherts of the lower Culm beds and locally overstep them and lie on the Devonian rocks. The conglomerate contains pebbles of a granitoid rock unlike the granites of Dartmoor, of Chert, and of decayed volcanic rock.

These beds of shale have been folded and crumbled by the **Armorican** earth building movements which took place at the end of the Carboniferous age.

The eastern part of the forest lies on the New Red rocks of the Permian age. These consist locally of beds of sandstone and breccia.

In the Exeter district the breccias are gradually succeeded by sandstones, and these in turn pass up into the red marls with lenses of sandstone. The higher breccias contain a large number of volcanic rocks. Far the commonest constituent of these rocks is a peculiar red quartz porphyry. The breccias extend to Dunchideock and Ide.



Compartments 85 and 86 are said to lie on the Hatherleigh series of the Exeter lavas which over-lie the New Red rocks, but are proved to belong to the same age. The local or Dunchideock type includes grey and purple fine grained compact basalt in which quartz inclusions are occasionally present. The same lavas occur again at Pocombe Bridge.

The top of the Haldon plateau is something of a geological puzzle. It consists of a bed of blackish grey sand with many flints, which overlies a layer of greensand, which in turn rests on the New Red rocks. The sands are identified as being the same as the Bagshot beds, but the puzzle is to know what happened to the chalk which almost without doubt was associated with the flints and the typical layer of greensand below. The nearest chalk is in the neighbourhood of Sidmouth.

### Soils

The soils of Haldon Forest are of two main types. The first is formed on the plateau layer of sand and flint and is of a podsollic type. It may be classed as a mature podsol, for though there is no real hard iron pan, there are signs of a layer of iron deposition at a depth of 18 in. to 24 in. over much of this area. Also there is a bleached horizon which in places reaches a thickness of 4 in.

This soil is almost entirely sand, for there is very little silt, and no clay. However, although the percolation is easy it is not particularly well drained due to the flatness of the top of the plateau; and it seems that often after heavy rain the water table rises to very near the surface, and water may occasionally be seen lying in pools for days after the rain.

Round the edges of the plateau the erosion caused by run off is locally considerable. This takes the form of gully erosion, and all the sand is washed away leaving only a flint bed.

The second soil type is found on the lower slopes, on the Culm measures on the west, and on the New Red rocks on the east. Both of these areas carry what may be called a Brown Earth type of soil, though in their make-up there is a considerable difference.

On the Culm measures, which are mainly characterised here by the more sandy layers with lumps of sandstone, the soils found are described in 'Geology of the South West' as being: "Shallow, stony, agriculturally

immature soils, which rapidly improve where there are sheltered sunny slopes."

An examination of these soils shows that they consist of only three easily distinguishable layers above the parent material.

0 - 2 in.	Litter layer and humus layer
2 - 8 in.	Dark brown layer of humus deposition
8 - 12 in.	Lighter brown, light sandy texture
12 in. +	Parent material. Yellowish brown.

The second, third, and fourth horizons were all of an open sandy texture with some silt, and a very small percentage of clay. In addition, <sup>they</sup> all contain fairly large lumps of semi-weathered sandstone. It was noticeable that the sandstone near the surface was almost entirely weathered, was easily broken, and was penetrated in places by the roots of the surface vegetation.

The root penetration of the purely surface vegetation i.e. herbaceous, is good, going well down into the parent material to a depth of 24 in. to 30 in.

On the steeper slopes drainage tends to be excessive.

The differences found on the eastern side of the forest lie mainly in the amount of clay found in the soil. Agriculturally it would be described as a heavy loam, and it is very much heavier and more red in colour than the soils of the culm measures. Root penetration is less deep but the vegetation is more lush and probably the soil is more fertile.

In some of the lower and permanently waterlogged parts there are small areas of peat bog. This is characterised by an over-all growth of Molinia, though there are occasional patches of cotton-grass. The peat is generally shallow, though it may extend to 3 ft. in some parts.

On the lavas of the Exeter beds a very red, fertile, and medium heavy soil is formed. Below the litter layer the first 6 in. are reddish brown with humus deposition. From 6 in. to 24 in. the soil is brownish red, fully weathered, with root penetration to the bottom. Below 24 in. is the parent material. This is weathered rock, crumbly but undisturbed, and of a rich red colour. This last type occurs only in Compartments 85 and 86.

## Vegetation

The vegetation types follow the soil types fairly closely.

### Poor heath types

There are two of these, one characterising dry, and the other, wet heath conditions. They may be differentiated by the presence of Erica cinerea or Erica tetralix. The cinerea shows the dry and the tetralix the wet heath conditions.

Neither is a typical heath community for the number of species is not great, and one of the most remarkable features is the almost complete absence of mosses of any kind. Where the heath has had tree cover for some years the mosses begin to come in. Hypnum cupressiforme, Brachythecium purum, and Polytrichum commune are the most common species.

Species commonly found are:-

<u>Ulex</u> spp. both large and dwarf.	Abundant.
<u>Pteris aquilina</u> .	In shaded and damper parts. Frequent.
<u>Rubus fruticosus</u> .	Frequent.
<u>Calluna vulgaris</u> .	Abundant and dominant.
<u>Erica cinerea</u> .	Abundant.
<u>Deschampsia flexuosa</u> .	Occasional, not so frequent as is usual on dry heaths.
<u>Potentilla repens</u> .	Frequent.
<u>Polygala vulgaris</u> .	Occasional.

On the wet heath there is little bramble or gorse, the Erica species is tetralix, and the Deschampsia is largely replaced by coarser species as Holcus lanatus. Some rushes are found in the wetter places, and there are a few small clumps of the moss Leucobryum glaucum.

Charles Vancouver wrote thus about the neighbourhood:

"Whilst the country in many places exhibits a most delightfully varied and picturesque appearance, it more frequently presents deep and fatal impressions of a much worn and exhausted soil generally characterised by a tough, wiry, and sour herbage."

### Brown earth soil type - On Culm Measures

The vegetative cover is much more luxuriant than on the heath types.

The following are the main species:- Common names will be used where practicable.

Shrubs.	Hazel
	Birch
	Ash
	Elder
	Holly
	Gorse (large)
	Willow
	Wild Rose
	Bramble

Herbs        Bracken  
               Thistle spp.  
               Ragwort  
               Common St. John's Wort  
               Foxglove  
               Black Knapweed  
               Coltsfoot  
               Centaury  
               Wood Sage  
               Mallow  
               Orchis mascula  
               Honeysuckle

The general character of this vegetation indicates a fairly fertile soil from a forest but not from an agricultural point of view, and also very free if not excessive drainage. The Orchis and the mallow indicate damper, more shaded conditions, than the other vegetation, and these conditions occasionally occur, but they are the exception rather than the rule.

Grasses are mainly rather coarse, and mosses are few, species found being - Hylocomium squarrosus, Thuidium tamariscinum and Polytrichum commune.

Vegetation on the New Red rocks and on the lavas of Compartments 85 and 86 is remarkably similar. The chief difference is that on the lavas the growth of brambles and nettles is exceptionally strong. In spring time on the New Red rocks there is an abundance of Scilla non-scripta and more Orchis mascula, than is found on the lavas.

Other species common to both include:-

Ash, hazel, sycamore, Spanish chestnut, elder, burdock, Scots thistle, ragwort, wood anemone, climbing nightshade, Herb Robert, Self heal, Dog's mercury, Enchanter's nightshade, primrose sanicle, honeysuckle, and hemp agrimony.

### Meteorology

#### Rainfall

The table below has been corrected for Haldon from the published records of Exeter and Teignmouth during the period, 1881 - 1915.

<u>Month</u>	<u>Rainfall. in.</u>	<u>No. of Wet Days</u>	<u>Humidity</u>
January	3.6	24	86%
February	3.3	20	79%
March	3.28	16	82%
April	2.67	14	74%
May	2.0	10	68%
June	1.67	9	72%
July	1.2	7	74%
August	2.27	11	79%
September	1.82	10	81%
October	3.92	19	84%
November	4.32	23	86%
December	5.30	26	84%
	<u>35.35 in.</u>	<u>199 days</u>	

Wet days are classed as being those on which more than 0.1 in. of rain have fallen.

#### Wind

As has already been mentioned, the prevailing and indeed the most damaging winds are the westerlies.

In winter and in the equinoxes there are occasional north or north-west winds which reach gale force, but though there has been some windblow this has not been severe, and in no case have large holes been made in the canopy.

#### Temperature (°F.)

The following readings are those for Teignmouth corrected to 800 ft. for Haldon. The figures are only available for 1948 and 1949, so a true picture is not necessarily given.

<u>1948</u>	Lowest	Highest	Mean	<u>1949</u>	Lowest
Jan.	29	54	42		29
Feb.	19	54	40		25
March	32	56	45		26
April	33	61	46		29
May	32	70	52		36
June	42	73	56		37
July	46	78	59		46
Aug.	42	69	58		47
Sept.	34	68	55		47
Oct.	28	64	50		32
Nov.	31	60	47		28
Dec.	31	56	43		27

From the above figures it will be seen that in 1948 and 1949 the months of June, July, August and September were without frost, but that during the other eight months there is generally some frosty period. The severest frost experienced during these years was 13 degrees during February 1948.

It will be remembered that the winters of 1947-1948, 1948-1949, and 1949-1950, were all considered to be relatively mild, so that lower temperatures may often be reached. On the other hand, though there may be occasional frosts in September, the four summer months are generally free from frost damage in the south-west of England. May frosts, however, can sometimes be severe.

Haldon Forest does not suffer much from frost damage except for certain frost hollows. The Sitka spruce in the Whiteway valley was held in check by frosts for several seasons. The last three seasons have been

free from spring frosts, and in fact they are the exception rather than the rule.

#### Snow

There has been no recorded snow damage. Most of the snow that falls is not usually heavy. In the ten years from 1935 to 1945 there was only one year of heavy snow fall, and that was in 1935. No damage was done to the forest on that occasion however.

Snow storms when they occur are generally in January or February, and seldom before the New Year.

#### Risks.

##### Fire.

There is considerable fire risk. Haldon Forest and the open moorland in its neighbourhood is the nearest easily accessible picnic area to Exeter. Throughout the summer cars are to be seen pulled off the road, caravans parked over night, cyclists and motorcyclists resting by the roadside, and all are a potential source of fire.

The forest is crossed by two main roads, Exeter - Newton Abbot, and Exeter - Plymouth, and it is from the neighbourhood of these roads that the greatest fire danger may be expected.

One serious cause of fires fortunately no longer exists. In the past the heavy lorries which used these main roads were frequently driven by steam, and Forester Scott says that in the 1920s it was not unusual for one of these traction engines or steam lorries to start a whole line of fires as it crossed the moorland.

The second fire risk comes from "swaling" in the vicinity of the forest boundaries. The adjoining tenants very rarely give any warning that they are going to burn. The most dangerous land in this respect is that adjoining Compartments 76, 98 and 99.

##### Domestic Animals

No damage.

##### Wild Animals

Rabbits. These were plentiful and did a fair amount of damage to young plantations. At the present time the rabbits are very scarce and the trees are nearly all beyond the age when <sup>they</sup> can be seriously damaged by rabbits.

## Fallow Deer

These escaped from the estates of the Earl of Devon and Lord Clifford. Present estimates indicate that there are more than two hundred in the forest, but the damage they do is very slight. Again, as with the rabbits the damage used to be greater, and they were largely responsible for the failure of the European larch and the beech of the early plantings.

Occasionally a tree is rubbed, but the damage is not worthy of notice. Beside the fallow deer two red deer stags have been seen but no ~~does.~~ <sup>hind:</sup>

## Squirrels

There are very few of these.

There have always been a few red squirrels in the forest, and a grey one, the first to be seen, has recently been shot by the trapper. Squirrel damage is negligible.

## Trespass

No damage is done in the ordinary way by trespassers, though of course all are a potential source of fire. Besides these, there have been a few Christmas trees stolen each season, but this had not been on a large scale so far.

It is also suspected that the pitwood which has disappeared has been stolen for firewood. Losses of this kind have so far not been great, but Haldon is intersected by a great many council roads, and as more of the outlying areas come into production it is thought that losses may increase.

## Insects

There are large areas of Haldon where the tree growth is not at all healthy, and the trees are predisposed to attack by many insect pests.

### Myelophilus piniperda

This is a most serious pest and has caused great damage amongst the Scots pine plantations on the top of the plateau. This pine was unhealthy as a result of soil and climatic conditions, and the activities of Myelophilus have made the tree form even worse than it otherwise would have been. It has also slowed down the rate of growth.

Hylobius abietis. This has not been a serious pest in recent years as there has been little fresh planting. In 1925, however, there

was serious damage to the Corsican pine in Compartments 10 and 11, and these had to be thoroughly beaten up.

Hylastes ater. As with Hylobius this has in the past been serious on new planting, but it is not serious now though it is still present.

Sirex gigas. Some Sirex gigas has been found, and on occasions the borings found in freshly cut pitwood have been quite frequent, but not so much as to affect the quality of the produce. When the trees reach saw timber size these attacks will be more important.

Neomyzaphis abietina. All ages of Sitka spruce at Haldon are attacked very severely. Vigour seems to have no effect in combating the attacks, because even in Compartment 36 where the Sitka spruce growth is very rapid many of the trees are severely defoliated in the spring time before the flush. One tree has apparently died, but so far there is no sign of disease. It is, however, almost entirely defoliated. The leaves which remain are still green, so it will be watched with interest next spring.

#### Nursery Damage

The nursery at Haldon has recently closed down. When it was in use there was occasional slight damage from chafers, cutworms, and wireworms. These attacks were not usually serious.

#### Fungi

Honey Fungus. There has been some, but not extensive damage of conifers on old hardwood areas. The Lawson cypress in Compartment 94 has had a number of isolated trees killed.

Fomes annosus. The only sign of this fungus on any scale is in Compartment 3. on the acquired European larch. A number of trees have been attacked in recent years, but so far the damage has not become extensive.

#### Roads

Since the 1939-45 war four roads have been built in the oldest or northern block of Haldon Forest. This road building started in 1946 with the Kiddens road, which was finished in 1947. Then the main Whiteway road was started which joined up with the Kiddens road in Compartment 22 and continued on to the very point of the Whiteway acquisition in Compartment 39.



This road was finished in 1948, and the Gate Park and Lucy Ball roads were started. The Gate Park road joins the Whiteway Road at the lower end of Compartment 34, and this was completed late in 1949, while the Lucy Ball road was completed in early 1950.

The construction of these roads has not really made much difference to the progress of forest work, except that it has made extraction easier and quicker, and therefore cheaper. Without the roads it would certainly have taken longer to catch up the arrears of work left from the war years.

There are also two hard roads which existed before the forest started. These are (1) Spicers Road, which leads from the New Chudleigh Road beside the Race Course, to the Old Chudleigh Road, passing through Compartments 47, 48, 49, 50, 51 and 52. (2) Harcombe Back Drive which serves Compartments 65 and 66.

#### Labour

Local labour, which is of fairly good quality, is not available to a sufficient extent, and the strength has to be made up by transporting extra men from Exeter each day.

The quality of the workmen obtained from the Labour Exchange is not high, nor is it reliable. Too many of the men come for a short time and then leave again. At the present time there are plenty of labouring jobs for good men to be had in Exeter, and this will continue while the rebuilding of the bomb damaged areas continues.

The labour strength now varies between 26 and 29, and this is sufficient for the forest needs. But during the years immediately following the war the strength was generally over 50, for there were six years arrears of work to be caught up, mostly cleaning brashing and thinning. The reason for this is that during the war the forest was run by only a skeleton staff who were not at all able to contend with the amount of work which should have been done.

It has now been possible to catch up on these arrears of work, and so the staff has been reduced steadily since 1949. As more and more plantations come in for first thinning it will be necessary to expand in the future, but the prospect is not very hopeful in view of the demand for labour in Exeter.

So far as can be found out, labour conditions in the early days of

the forest were much easier than they are now. Only once during the period 1921-1930 was any mention made of labour shortage. This occurred in 1925 when the local road building contracts took away many men, and the planting programme had to be cut down.

## SILVICULTURE

The forest records up to 1930 were kept carefully, but after that time and until 1946 there were no records at all. It is known that a compartment history was kept for part of this time, but at some time this must have been destroyed or lost. Also missing are all reports of visits and inspections before August 1946.

The following therefore is a fairly full account of the treatment from 1921 to 1930 and a less full account of the treatment after that time.

### Preparation of Ground

#### (1) Felled woodland areas.

In the early days these were left in rather an untidy state by the contractors who had felled the timber, and a lot of work was entailed in preparation of ground. Lop and top was burned, and scrub, including a lot of rhododendron in Compartments 6 and 7 also had to be cut down and destroyed.

#### (2) Coppice growth

It is not altogether easy now to tell which areas were felled by Timber Supply Department during the 1914-18 war and which were coppice growth. It appears, however, that much of the coppice was allowed to stand, and was underplanted with Douglas fir and Sitka spruce. Some of this occurs in the Whiteway area where it seems to have been remarkably successful. The Douglas fir in this area grew through it well, but the cleaning which had to be done with or immediately before the brashing was very difficult and expensive. Part of the cause for this was the delay occasioned by the 1939-1945 war. There are other areas, however, especially in Deadman's Combe, (Compartments 44 and 45 Douglas fir P.30 and P.31) where the coppice has more than competed with the Douglas fir and here the crop is very patchy, having large groups of almost pure ash.

#### (3) Natural birch

In Compartment 40 there is a small area of tall birch which was

underplanted with Tsuga in 1940. This was neglected and many of the Tsuga died. Some effort was made to beat it up with beech, but this also was neglected. There is now something of a mixed crop of Tsuga and beech competing with the shrub undergrowth, and these give the impression that had they been kept clear of weeds they would have profited from the underplanting.

In Compartments 74 and 75 in F.Y.30 Corsican pine was interplanted amongst a good crop of natural birch. The present condition of the plantations would not seem to indicate that there had been any great advantage in keeping the birch as opposed to clearing the whole site. In many parts the crop shows very poor and irregular growth.

(4) Heathland

An extensive summer fire in 1919 had burned off all the vegetation and much of the peat from the heathland of Bullers Hill, leaving only flint and sand. In February of 1920 the rest of the vegetation was burned off, but without destroying the peat. A dense growth of bracken came again on the lower slopes during the summer, but the top remained fairly clean. As it happens it was a mistake to burn off the vegetation, for the summer of 1921 was one of exceptional drought and heat, and on these barren sandy soils the deaths were very heavy.

Burning of this type of heath vegetation continued until 1930 when it was noted that where no burning was done there was seldom any rabbit damage and it was not therefore necessary to fence. This system was tried in Compartments 77, 78, 79, 80 and 81 apparently with success.

(5) Marsh or Bog

The only mention of preparation of ground on this type of land is in F.Y.22 Compartment 34, where it is noted that there was a dense growth of birch, alder, and brambles which had to be cleaned off. No drainage seems to have been done, which is probably the reason why the Norway spruce and Sitka spruce which were planted on these areas were very slow to come away. In some areas it is still in check.

(6) Old agricultural land

Compartment 7a is the only part which comes under this heading. No preparation of ground was done and the species planted was Douglas fir which has done quite well.

### Species chosen for each type of land

- (1) Sitka spruce, Norway spruce, Douglas fir, Silver fir.
- (2) Sitka spruce, Norway spruce, Douglas fir.
- (3) Tsuga and beech.
- (4) Scots pine, Corsican pine, Pinus contorta, European larch, beech, Japanese larch, Douglas fir.
- (5) Sitka spruce, Norway spruce.
- (6) Douglas fir.

### Methods of Planting

There is no record of planting methods before 1924, but in this year and in 1925 the planting on the moors was as follows:-

The surface was well screefed, and then the soil was broken up with a pick. Into this loose soil a hole was bored with an iron dibber, and the tree planted like pricking out a cabbage. This practice was not continued after 1925.

On the lowlands, planting was at first done by screefing with mattocks and then using a Schlich spade, but this method also gave way to mattock planting.

A note from the beating up of 1924 says; "Where beating up was done, the attempt was made to do it very well by screefing and picking before planting, and in those parts so beaten up there is now a crop of healthy trees.

This was done in Compartments 1 and 19, but the 'health' did not last, for now there is little difference between the Scots pine plantations on all parts of the uplands. All of them are poor, and some are very poor, but nearly all carry a full stock.

### Further notes on planting

By 1937 there were <sup>such</sup> extensive failures of Scots pine and Douglas fir in Compartments 57, 59, 62 and 64, that it was decided to scrap them and start again. Consequently the area was burned, ploughed, and replanted. This time the upper land was replanted with Corsican pine and the lower with Norway spruce and Sitka spruce.

This rather drastic action has proved to be mainly successful for the fresh species have done much better than the previous crop. The ploughing was done with a Ransome plough.

In 1938 it is noted that for the first time at Haldon a real effort was made to plant the best species for the area in relation to minor soil variations. Previously it had simply been broadly decided that certain soil types should have certain species planted on them, but little effort was made to vary the species within the soil types according to local variation.

In F.Y. 38 in Compartment 91, Norway spruce was planted on turfs, and Japanese larch was straight planted. Many of the Japanese larch were large, and as they swung in the wind they girdled themselves against the stones in the soil. The remainder, however, have done quite well.

Many of the Norway spruce died because of drought. This is thought to have been caused by the number of rabbits which had cleared the soil of vegetation and so predisposed it to drought. The Norway spruce was beaten up with Tsuga in 1939, and when the vegetation cover was again complete, both the Norway spruce and the Tsuga grew well.

During 1940 and 1941 the remainder of the acquired land was planted up (Mamhead acquisition). Here it is seen that the lessons taught by the failure of the Scots pine in the early upland planting have been appreciated. On the Mamhead area the upland planting is mainly of Corsican pine, which is showing signs of a profitable future.

After 1941 the only planting done was the replanting of felled or burned areas.

#### Ploughing

The first recorded ploughing at Haldon was done in Compartment 34 in F.Y. 22. Here a small piece of single furrow horse ploughing was done at a spacing of 4 ft. The furrows were not more than 6 in. deep. This was planted with Sitka spruce but as it is in a part of the forest where Sitka spruce grows well anyway, it is difficult to tell whether the effect was especially beneficial, though it may have had some useful drainage effect.

The Oliver double furrow plough was used in F.Y. 34 in Compartments 1 and 19, the furrow spacing being 5 ft. These compartments are on the sand and flint beds which caused considerable wear of the plough-share. The furrows were shallow and it is possible that they did not go deep enough to disturb the soil sufficiently, for the trees on the ploughed part do not seem to have profited at all.

In 1942 and 1943 the Ransome plough was used on the sand and flint beds, and was able to penetrate to about 8 in. This ploughing was done in Compartments 73, 75, 76, 83 and 96 and it is noticeable that the trees on the ploughing have done considerably better than those on the unploughed land. This is especially pronounced in Compartment 96. (A burned area).

In most cases the heather and gorse were burned off before ploughing, but this was not done in Compartments 73 and 75 which is the only area where the R.L.R. has been used at Haldon. It must be remembered that this had been burned by German incendiary bombs in 1942. The ploughing was done in 1947.

#### Interploughing and hand cultivation.

In F.Y. 35 some interploughing was done on Whiteway Moor in Compartments 46, 47, 50 and 51 and on Harcombe Moor in Compartments 60 and 61. The idea was to try to disturb the packed soil between the lines of trees and aerate it. In 1936, for the same purpose, some hand cultivation was done in Compartment 19.

Neither the hand cultivation nor the ploughing seem to have had much effect on the growth of the trees, but though the crop is still poor, it may be that the crop would have been a complete failure had not some ploughing been done.

#### Beating Up

After the complete failure of the European larch, Silver fir and beech on the uplands after the planting of 1921, the beating up was done entirely with Scots pine; it was in fact almost a replanting. The failure of the Silver fir and beech was due to drought during the first year, and though the larch survived this, it is reported to have died completely by 1924.

The Scots pine was not altogether successful as a beat-up species, nor was it successful when planted as a main crop, and later plantings were beaten up with Corsican pine. This first started in 1934. The Corsican pine although it tends to lose all but its last two years' needles, and therefore looks rather unhealthy, does grow on the flint and sand of the uplands. It should form fair plantations, though the quality class will never be high.

The beat-up plants were all transplants, and all had had two years in

the seed beds. Scots pine, Corsican pine and Sitka spruce were mainly 2+1 or 2+2. Amongst the Douglas fir beat-ups some 2+3 and 2+4 plants were used, and also some of the Norway spruce were 2+3. These were apparently successful, for no further<sup>note</sup>/is made of beating up for these species and P. years.

There were many areas of bog where Norway spruce and Sitka spruce had been planted direct during the early years, and partly due to the drainage conditions and partly to the smother effect of the Molinia, these were still in check and very poorly stocked.

In 1937, in Compartments 15 and 17, where Norway spruce had originally been planted, turf drains were dug, and Norway spruce was planted on the turfs. The beat up plants grew reasonably well if somewhat slowly and some of the original plants partly recovered also.

#### Weeding.

Weeding was thorough and continued until it was certain that no further damage could be done to the crop. There are certain exceptions, the most important being coppice growth and rhododendron. Both of these were so strong that when the 1939-1945 war started there were still areas where the trees had not got the upper hand. The result has been that the trees have in some places been suppressed, as in parts of Deadman's Combe, or they have survived but without having been able to grow much due to root and crown competition.

An example of the thoroughness of the ground weeding is given by the 1921 planting records. This planting was entirely weeded once a year until 1924. Thereafter 45 acres were weeded in 1927, and 14 acres in 1928.

The most troublesome weed species, other than the coppice, was Molinia. The early notes mention several times that it smothered the Sitka spruce and Norway spruce planted in the wetter places.

Bracken does not seem to have been much trouble, on the contrary it is mentioned as helping both Douglas fir and Sitka spruce. Both these did well when sheltered under the bracken for the first year or two. This may be because the shade from the bracken prevented too great a loss of soil moisture.

If the ground is ploughed it does not seem to be necessary to weed on the uplands at all, provided that the crop comes away reasonably quickly and the heather and gorse are burned before ploughing. On the lowlands, however, it is most essential to weed thoroughly until the young trees are clear of competition.

#### Nurse species

There is no record of nurse species having been used at Haldon. The only underplanting that has been done is that done by the Research Branch in Compartment 3.

#### Brashing

Some thinning was attempted in the first years without brashing at all, but this was found to be impossible, and so a policy of one row in three was adopted. This continued until 1946 when a change was made to 90% brashing. In fact everything was brashed except dead, dying or diseased trees which would be taken out anyway.

#### Pruning

A considerable amount of pruning has been done in the best stands of Sitka spruce and Douglas fir and a little in Corsican pine. This was done up to 15 ft. at a piece-work rate of 3d per tree. Up to 200 stems per acre were pruned.

Pruning was done in Compartments 5 (Douglas fir), 11 (Corsican pine), 22, 27, 29, 32, 33, 34, 36, 37, 38 (Douglas fir and Sitka spruce). Whole compartments were done where this was feasible.

#### Thinning

Thinning of acquired plantations was carried out from the time when the Forestry Commission first took them over; but the first thinning to be done in Forestry Commission planted woods was in 1940. This was in Douglas fir, Sitka spruce mixture, (P.21 Compartment 37). Only three acres were thinned in that year. A further three acres of the same plantation were thinned in the following year.

From 1946 onwards thinning has proceeded steadily, and has gradually increased.

1943	-	40 acres
1944	-	79 acres
1945	-	75 acres.

In this year the Douglas fir P.26 Compartment 7 first thinned 1943 was thinned again.



1946.	First	-	34	Second	-	2 acres
1947			86			0 "
1948			347			28 "
1949			203			136 "
1950			180			173 "

The thinning programmes for 1951 and 1952 were 278 and 348 acres respectively.

The fastest grown species at Haldon has been Japanese larch. In Compartment 85 on the Exeter Lavas, it was thinned for the first time at the age of 12, and in Compartment 92 on the Red Marl, at the age of 10. This produced 250 cu.ft. per acre. That thinning was in F.Y.50, but so fast is the growth that it will have to be thinned again in 1952.

The average heights at which first thinnings were done for the main species are:-

Japanese larch	28 ft. - 30 ft.
Douglas fir	26 ft. - 40 ft.
Corsican pine	34 ft.
Scots pine	29 ft.
Sitka spruce	36 ft.
Norway spruce	37 ft.

The thinnings have been of moderate intensity, being around 200 trees per acre for all species at the first thinnings. This has yielded for the various species:-

Scots pine	150 cu.ft./ acre.
Douglas fir	200 " "
Japanese larch	250 " "
Norway spruce	200 " "
Corsican pine	200 " "
Sitka spruce	200 " "

These are average figures.

The thinning rotation for Scots pine and Corsican pine is now five years, and for all other species three years, except for Japanese larch which on the best sites seems to require to be thinned rather more frequently than this.

Certain of the best stands of Douglas fir and Sitka spruce have been thinned for the third time. The volumes obtained have been:-

Douglas fir	2nd thinning up to 250 cu.ft/acre.
3rd	" " " " 400 cu.ft/acre
Sitka spruce	2nd thinning up to 400 cu.ft/acre
3rd	" " " " 800 cu.ft/acre

#### Out Turn

The chief produce consists of unpeeled pitwood sold by weight to Somerset and South Wales collieries. This consists of props and laggings.

An average of ten tons a month of pitwood go to the South Devon Clay Mines, who take large butt length logs in multiples of 5 ft. 6 in.

Also produced are proctors poles, harvest poles, firewood and stakes for creosoting. These latter are sent to Plymouth where they are pressure creosoted, and 10,000 are to be produced from Haldon during F.Y. 52.

It is estimated that the total produce from Haldon in 1952 will be 2330 tons, or 69,900 cu.ft. of softwood timber. It is expected that as some thinnings are approaching mill timber size, it will soon be possible to start interesting timber merchants in this more lucrative class of produce.

### Rates of Growth

In considering the rates of growth at Haldon Forest examples have been taken from all those plantations which have reached the thinning stage. This, although it does not embrace all the compartments in the forest does give a good idea of the rate of growth of various species on various types of soil.

The one section which is poorly represented is the plateau planted with Scots pine on the Bagshot Beds of sand and flint. Here the growth has been very slow and although largely planted in 1921-24 very few trees have reached more than 20 ft. Many patches are completely checked at 4 ft. 6 in. and the current annual increment of these is almost negligible. One of the few Scots pine plantations which has reached its first thinning on this upland soil is that of Compartment 4. This had to be thinned for the good of the remaining trees although the yield was only about 160 cu.ft. per acre.

Another interesting point is that <sup>in</sup> Japanese larch and ash mixture in Compartment 30, the figures indicate that at the age of 30 and a top height of 45 ft. the current annual increment is already shown to be less than the mean annual increment. It is perhaps not fair to judge the larch on this performance in mixture with ash, but it may indicate that on the poorer soil there is no possibility of growing Japanese larch for other than a pitwood rotation.

Compt.	Species	P.Yr.	Geology and Soil	Altitude Aspect Slope Exposure	Mean Ht. of Domts (ft.)	M. A. I. (ft.)	C. A. I. (ft.)
4	S.P.	23	Haldon Beds of Sand and flint. Podsolised, drainage excessive.	750 ft. N.E. Slight Exposed.	29	1.0	1.0
5	D.F.	23	Medium clay on Red Marl. Free drainage.	650 ft. E. Medium- steep. Sheltered	50	1.8	2.4
11	C.P.	24	Sand and Flint. Excessive drainage Podsolised.	750 ft. S.E. Level-gentle Moderately exposed.	29	1.2	1.5
13	S.P.	22	Flint and sand Excessive drainage Podsolised. Lower slopes on Greensand	700 ft. W-N.W. Moderate Moderate exposure.	47	1.7	2.0
21	S.P.	21	Sand and Flint on Greensand. Free drainage. Podsolised.	700 ft. S.W. Moderate to steep Exposed.	38	1.35	1.5
22	S.S.	21	Sand and Flint Free drainage. Slightly podsolised.	650 ft. W. Moderate Exposed.	54	1.9	2.4
28	NS & SS	21	Light clay loam on broken shillot Free drainage.	500 ft. S. Moderate Fairly sheltered.	43	1.4	1.5
29	D.F.	22	Light clay loam on shillot. Free drainage	500 ft. W. Moderate Fairly sheltered	49	1.75	2.1
30	J.L. + Ash	22	Light clay loam on shillot Free drainage	5-600 ft. S. SW. Moderate Fairly exposed.	45	1.5	1.25
34	S.S.	22	Light clay loam on broken shillot Free drainage.	400 ft. S.E. Gentle Sheltered	61	2.03	2.75
36	S.S.	24	<u>Molinia</u> Peat on Culm clays Poor drainage	350 ft. S. Gentle Sheltered.	59	2.3	2.8

Compt.	Species	P.Yr.	Geology and Soil	Altitude Aspect Slope Exposure	Mean Ht. of Doms. (ft.)	M. A. I. (ft.)	C. A. I. (ft.)
38	N. S.	21	Medium clay loam with shallow peat on shillot. Impeded drainage.	450 ft. SW. Level-Gentle Sheltered	40	1.43	1.6
40	J.L.	37	Light loam on shillot. Drainage free	300 ft. W. Fairly steep Moderate exposed.	38	2.7	≡ 4.0
41	J.L.	36	Light loam on shillot. Drainage less free than C.40.	350 ft. W. Moderate. Moderate Exp.	33	2.2	≡ 2.5
41	D.F.	36	" " "	300 W. Moderate Moderate sheltered	35	2.33	≡ 4.0
43	J.L.	34	Light clay loam on shillot. Free drainage.	400-500 ft W. Moderate exposed at top.	33	1.8	2.3
49	C.P.	26	Flint and sand Impacted Excessive drainage	650-750 ft. S. E. Steep Exposed at top.	36	1.5	1.7
52	D.F.	32	Med. heavy clay loam on Red Marl Poor drainage.	500 ft. S. V. Steep Fairly sheltered.	40	2.2	2.5
52	S.P.	32	Sand Flint Excessively drained.	600-700 S. Steep Exposed	29	1.3	1.4
53	C.P.	26	Sand and Flint Excessively drained.	650-750 ft. S-S.E. Moderately steep Exposed.	24	1.36	1.7
64	D.F.	28	Flint and sand Freely drained.	650 ft. N. W. Gentle Fairly Exposed	39	1.8	2.2

≡ Average for last two years' growth

Compt.	Species	P. Yr.	Geology and Soil	Altitude Aspect Slope Exposure	Mean Ht. of Domts. (ft.)	M. A. I. (ft.)	C. A. I. (ft.)
86	D.F.	33	Med Red Clay on Purple Basalt.	500-600 ft. S. W. V. Steep Exposed at Top.	31	1.8	2.5
94	J.L.	40	Med. heavy clay on Red Marl.	650 ft. S. E. Steep Sheltered	27	2.7	3.8

## RESEARCH

### Experiment 1. P.34-35-36

This experiment compares the following provenances of Scots pine.

- A. England (East)
- B. Haddo (Scotland)
- C. Darnaway (general collection) Scotland
- D. East Prussia
- E. Belgium
- F. Darnaway (160 year old trees at 125 ft. elevation)
- G. Achnashellach (Scotland)
- H. Strathoykell (Scotland)
- J. Vasteras (Sweden)
- K. Hedmark (Norway)
- L. Altyre (Scotland)

Owing to variation in ground type and to lack of replication of several origins fair comparison cannot be made between all the provenances but a number of points stand out quite clearly. The Hedmark plants are the poorest - only averaging 2 ft.- 3 ft. high after 15 years. Those from Vasteras are little better.

The best lot are those from Belgium averaging approximately 9 ft. in 15 years Haddo and Darnaway (general collection) being almost as good. It may be noted that the relatively slow growth of even the best races is a true reflection of the difficulties on this very exposed and flinty site.

The degree of variability of the ground may be judged by the fact that after 10 years race A. only averaged 2 ft. on the poorest sites but 5.4 ft. on the better type.

### Experiment 2. P.37.

Originally a sample plot (No.E. 32) this European larch stand was thinned to 289 stems per acre in 1936 and the next planting season, when the larch was 38 years old, underplanting was carried out in pure strips of the following species:- Nothofagus procera, Tsuga heterophylla, Thuja plicata, Douglas fir, and beech.

The outstanding feature of this experiment has been the excellent growth of the Nothofagus which now averages approximately 27 ft. with occasional dominants up to 40 ft. It would appear from this very

promising growth that this species deserves further trial.

Both the Tsuga and the Thuja have done very well and average about 23 ft.

Beech has been slower than expected but is in canopy now and is doing better with an average height of 20 ft.

The Douglas fir is disappointing being very uneven with an average height of about 18 ft. It has been rather heavily attacked by Adelges.

### Conclusions

(a) On the sand and flint uplands the only species which ought to be planted is Corsican pine. This is borne out by experience in the New Forest where the same geological type occurs. There the failure of the Scots pine is not quite so marked, but it is generally recognised that on the sand and flint lands Corsican pine is the only species to give a satisfactory crop.

The cause of the failure of Scots pine at Haldon is probably twofold. The first is that Haldon ridge is considerably windswept; and the second is that the wind is probably salt-laden. Experience in the Isle of Wight shows that Corsican pine is more resistant than Scots pine to salt-laden winds.

(b) The upland soil ought to be deep ploughed before planting is attempted. It seems that for many years the sand has lain undisturbed, and covered with a thin layer of peat. Occasionally fires have burned off the peat, but the lower sand has never been disturbed; and the result is that almost all nutrient materials have been leached out and the upper layers of soil are very poor.

Ploughing would bring some of the lower layers up to the surface; but more important than the nutrients thus made immediately available for the young trees, would be the effect of bringing up the less weathered material. This as it slowly broke down would introduce nutrient materials gradually to the tree crop. At the same time the ploughing would improve the surface drainage, and the "turned-in" heather and peat would decay into humus.

It will probably take several generations of trees before this poor soil can be brought to a state even of reasonable fertility, but there is little doubt that the more trees can be made to grow on it, the better the soil will become for future forest use.

(c) It is now recognised that in the early days of the Forestry Commission, there were many occasions when land suitable for hardwoods was planted with conifers. This was done in order to produce the greatest possible volume of timber in the shortest possible time, and because the home stock of hardwoods was much greater in proportion to requirements than the home stock of conifers.

Silviculturally there is little doubt that there is much land, principally in the Kiddens and Whiteway parts of the forest, which would grow good hardwoods, and which is at present planted with Douglas fir, Japanese larch and Norway spruce. It is reported that there was ash of excellent quality growing in Compartment 31 before it was felled in the 1914-18 war. Probably the most suitable and economic species for much of this area would be beech. Judging from local specimens it is thought that oak would generally not prove suitable.



# HISTORY OF HALDON FOREST

## APPENDIX I

### Notes from Inspection Reports

#### Mr. Robinson's visit to Haldon 3/8/30

Kenton Hill to be planted in P. 31 should be at least half Corsican pine.

In Compartments 27, 28, 29 and 30 planted chiefly with Norway spruce and Sitka spruce there is considerable natural ash, some hazel, and other hardwoods. These are to be encouraged to form a mixture, and no weeding is to take place at present. It is to grow on and would be adjusted in the first thinnings.

The plantations generally were considered to be in good order and with patience, a good forest should eventually be obtained.

#### Chairman's visit 30.8.32

##### Compartments 13, 14, 15, etc.

In the bracken ground complete the stocking by using good 18 in. beech on mounds. Start preparing the beech this year.

On the heather ground use Pinus contorta on mounds to complete the old beech rows and also to beat up the obvious blanks in the Scots pine rows.

The above instructions also apply to all other areas originally planted in the same way.

#### Forestry Commissioners' Tour, 6-11.8.34.

##### Compartment 10.

In the adjoining compartment P. 24 and P. 25 sown Corsican pine were inspected. "Singling" of groups by topping all but the selected plants has recently been done. Approval of the method employed was expressed.

The general opinion of the plantations, particularly Scots pine, on the hard, stony ridge was that they were looking much better than when seen last and that a fairly good crop might eventually be obtained. At the same time it was felt that much better results would have been obtained had the areas been ploughed prior to planting.

##### Compartments 25-29, 20 and 21

The cleaning of the older plantations is becoming a matter of some

urgency and while it is generally agreed that no hard and fast rule can be laid down, some general considerations were discussed. In well stocked coniferous plantations where an admixture of hardwoods has come up with the conifers, there is no point in retaining sweet chestnut and this species should be removed. A certain amount of ash could be left, not with a view of getting timber from it but because of its cleaning value to the conifers. This particularly applies to plantations of Douglas fir, such as that examined in Compartment 29. A small area should be cleaned thoroughly of all hardwoods and the effect studied. Comparisons should be made with an area in which ash has been allowed to remain. In the case of plantations where the naturally regenerated hardwoods have a definite place in the canopy and have been accepted as part of the crop greater care will be required in cleaning and in selecting the hardwood crop trees. Small areas under varying conditions should be cleaned experimentally and the effect examined.

#### Compartments 60 and 61.

The Pinus contorta beating-up plants are much less in check than the older Scots pine which led to the expression of the view that this species may prove useful in afforesting poor land of which parts of Haldon are typical.

#### Compartments 3 and 4. Acquired European larch plantations

These blocks were examined and the Chairman considered that, despite the two thinnings executed in the past four years, the trees were still deficient in crown development and that thinnings should still be carried out on a two-year cycle; that the final trees should be marked by paint, and the branches knocked off to a height of 16 ft. or as near as could be managed from the ground.

#### Compartments 70 and 71. Scots pine and Corsican pine, P.31.

These areas are typical of the better type of the hard top of Haldon. After planting they checked badly, and in F.Y.34, interline tractor ploughing was undertaken. Since then there has been an improvement more noticeable in the Scots pine than in the Corsican pine, and very few instances of damage to the crop by the tractor were noted.

Inspection by The Chairman and Mr. W.L. Taylor, 7.4.43.

Compartment 1, Scots pine, P.21

A part of the earliest planting was seen as a sample of the very poor and backward tops where the Scots pine is dying out in patches, though coming away in a moderate fashion in small groups on slight rises. The backward patches have no hope of making progress, and it is estimated that over the hard tops of Haldon these aggregate some 100-150 acres. A small portion had been interplanted with Sitka spruce on turves in F.Y.43; the Chairman did not consider this should be continued, and no decision as to future treatment was given.

General

Taken as a whole, the growth on Haldon is exceedingly irregular within the limits of most compartments, but over much of the area a good crop will be obtained if the forward portions are attended to in proper time and cleanings and thinnings judiciously carried out. It was explained that the present staff was below our requirements in quality and quantity, and the Chairman emphasized that the maintenance of existing plantations should be the first charge on our labour and that, if necessary, new planting should be suspended.

Inspection by Director General (Sir Roy Robinson), 21.7.46

Compartments 10-11 Corsican pine, P.25.

The pine were getting away very irregularly and had had a long struggle with the rhododendron which formed heavy clumps as undergrowth, patches had been thinned during the spring. Extraction had proved difficult owing to the rhododendron, but the crop had been considerably improved and should even up in the next few years; current growth was good but needles were somewhat thin. Brashing had been carried out on the best stems only and the Director General instructed that more should now be done when labour permitted to ease the fire danger.

Inspection on 17.5.49, by Mr. Dilley, Cultivations Officer

The purpose of this inspection was to see if a way could be found to increase the growth and development of the poor pine areas on the top of Haldon Hill.

The following suggestions were made:-

1. To cut out every second row entirely to allow the free passage of tractor and R.L.R. plough, and to beat up with Corsican pine in the bad patches.
2. To plough with R.L.R. plough as above, but in every fourth row only, felling such trees as impede the progress of the tractor. These will be approximately 33% of the stocking in each fourth row, i.e. 12% of the total crop. It should be noted that many of the trees are dead or dying and of small size, but the rows can still be clearly seen and the ground is level.
3. Treat the area with a subsoiler only running between each row. This machine would have twin mould boards and a very strong forward disc coulter. In this case a small tractor of the T.D. 6 type could be used. This treatment would preclude any beating up, and would necessitate lopping back of side branches of the taller trees on some 40% of the existing crop.

The Conservator comments on these proposals that he would like to see both methods (1) and (3) tried.

More urgent work of catching up with wartime neglect has prevented this work being done. It is considered, however, that a small plot ought to be done experimentally next time than an R.L.R. plough is being used at Haldon.

Inspection on 13.8.51 by Lord Robinson, Chairman.

Again the reason for the inspection was to see the condition of the Scots pine on the uplands.

The Chairman said that a certain proportion of the trees seemed to be making some progress now, for they had grown at the rate of 9 in. a year during the last ten years. He said that a transect ought to be taken across the compartment so that it could be found out how many of the better trees there were to the acre. If there were enough to form a final crop we should

be able to leave the plantation to work out its own salvation.

Commenting later on the uses of ploughing, the Chairman said that the trees must be given a chance to form their root systems in the weathered parent material which was changing into soil. That was why ploughing was important, for it brought the parent material to the surface so that the weathering could take place.

History of Haldon Forest

APPENDIX II

Supervision

Date	Div. Officer	Dist. Off.	Forester	Remarks
acquired 1920	Mr. C.O. Hanson *	A.H. Popert	R. Fletcher	* Retd. 31.3.31
1921	" "	G.W. Lowe	G. Futer	
1925	" "	" "	Mr. Butter	
1926	" "		" "	
1928	" "	Mr. Russell	" "	Trans. 1930
1930	" "	" "	Mr. J. Williams	Trans. Brendon 1937
1931	Mr. F. Scott	" "	" "	
1934	" "	R.G. Broadwood from 8.10.34		
1937	" "	" "	Mr. R. Carnell	Mr. Scott trans. 1.4.38
1938	Mr. R.G. Broadwood	" "	" "	
1943	Mr. J.E. James	Mr. J.E. James	" "	
Conservancy				
1946	Mr. A.H. Popert from 1.3.46	D.N. Williams	Mr. G.H. Scott	

History of Haldon Forest

APPENDIX III

Type of plants used, spacing and annual rate of planting.

Planting 1921 Compartments 1, 19, 20, 21, 27, parts of 16, 17, 25, 26, 28, 29, 30...248 acres.

<u>Species</u>	<u>Thous.</u>	<u>Age</u>	<u>Spacing (ft.)</u>	<u>Received from</u>
Norway spruce	119	2+3	4½	Tintern
Scots pine	125	2+0	4	Killerton
Scots pine	158	2+1	4	New
Scots pine	22	2+2	4½	New
Douglas fir	41	2+2		
		& 2+3	6	Dean
European larch	24	2+2		
		& 2+1	6 & 6½	Windsor
Corsican pine	12	2+3	4½	"
Corsican pine	56	2+0	4½	Killerton
Beech	10	2+2	6	New
Silver fir	15	2+1	6	Windsor
Sitka spruce	15	2+1	6	Dean

There was a severe drought in the summer of 1921, the resulting deaths were:-

- Scots pine      50% except for the 2+1 plants which stood the drought well.
- Corsican pine   100% of the 2+3. The plants were much too large with poor roots which were dry on arrival.
- Corsican pine   100% of the 2+0. These were too small to handle easily, and were cropped by rabbits before the completion of fencing.

This loss of the Corsican pine due not at all to the species, but to the plants supplied and to the rabbits, was a great pity; because it probably caused Corsican pine to be regarded as unsuitable with a result that all beating up and much of the fresh planting was done with Scots pine. It has now been found that the Corsican pine would have been a much better choice for the flinty uplands.

- Norway spruce   40% Many were killed early by drought, and more were later smothered by grass.
- Sitka spruce     15% Good under bracken. The losses were mostly due to grass smothering.
- Douglas fir      50% Many died in drought. Those under bracken or other shelter did fairly well.
- Silver fir        80% Grew and formed roots until the middle of July when nearly all were burned up by drought.

European larch 50% Stood drought well on heath but were damaged by deer.

Beech 80% Stood drought well until July when nearly all died.

Complete beating up was done using the same species except that Corsican pine and beech were replaced by Scots pine. In 1924 the larch was abandoned as a total failure as was the heath planted Norway spruce and these were replaced with Scots pine. Presumably the silver fir was a failure though it is not mentioned. It is nowhere to be seen now except as scattered individuals.

Planting in 1922. Compartments 13, 14, 15, 22, 32, 35, parts of 16, 17, 20, 29, 30, 31. 238 acres.

<u>Species</u>	<u>Thous.</u>	<u>Age</u>	<u>Spacing (ft.)</u>	<u>Received from</u>
Scots pine	18	2+1	4 $\frac{1}{2}$	Haldon
Scots pine	42	2+2	4 $\frac{1}{2}$	New (Park Ground)
Scots pine	75	2+2	4 $\frac{1}{2}$	New (Stockley)
Scots pine	12	2+1	4 $\frac{1}{2}$	Alice Holt
Norway spruce	49	3+4	4 $\frac{1}{2}$	" "
Norway spruce	20	2+4	4 $\frac{1}{2}$	" "
Sitka spruce	24.5	2+1	6	" "
Japanese larch	18.5	1+2		New (Bere)
		& 2+0	6	Alice Holt
Douglas fir	8	2+1	6	New (Rhinefield)
Douglas fir	9	2+1	6	Haldon
Ash	16	2+1	6	New (Bere)
Beech	10	2+2	4 $\frac{1}{2}$	New (Rhinefield)
Beech	6	3+1	4 $\frac{1}{2}$	

During May, direct sowing of Norway spruce was tried in Compartment 34 on fully ploughed ground, and of Douglas fir in Compartment 5 on 18 in. squares 6 ft. apart which had been broken up. Both sowings failed.

This failure may have been due to the drought in May and June which also killed many of the newly planted trees. The rest of the summer was wet, but there was again a heavy beating up programme.

Planting in 1923. Compartments 2, 3, 4, 5, 11, 12, 23, 31, 32, 120 acres.

<u>Species</u>	<u>Thous.</u>	<u>Age</u>	<u>Spacing (ft.)</u>	<u>Received from</u>
Scots pine	41	2+2	4 $\frac{1}{2}$	Bicton
Scots pine	25	2+2	4 $\frac{1}{2}$	Tintern
Scots pine	20	2+0	4 $\frac{1}{2}$	"
Scots pine	13	2+2	4 $\frac{1}{2}$	New
Scots pine	47.5	2+1	4 $\frac{1}{2}$	Haldon
Douglas fir	25.8	2+2	6	"
Douglas fir	21.	2+2	6	New
Douglas fir	7	2+2	6	Windsor
Sitka spruce	19.7	2+1	6	Haldon
Norway spruce	18	2+1	4 $\frac{1}{2}$	"
Norway spruce	12.7	2+1	6	"
European larch	16.5	2+1	6	Windsor
European larch	1.5	2+1	6	New
Japanese larch	2.	2+2	6	Quantocks
Beech	2.5	2+2	4 $\frac{1}{2}$	New
Sweet chestnut	.2	1+0	6	Haldon



The 'take' in 1923 was much better as it was a wetter year, and consequently beating up was not so heavy.

Planting in 1924. Parts of Compartments 10, 11, 35, 36, 37, 27, 9, 79½ acres

<u>Species</u>	<u>Thous.</u>	<u>Age</u>	<u>Spacing (ft.)</u>	<u>Received from</u>
Sitka spruce	35.4	2+2	5	Windsor
Corsican pine	32.6	1+1	4½	Haldon
Scots pine	1.5	2+2	4½	"
Douglas fir	5	2+2	6	Windsor

This year the uplands were mainly planted with Corsican pine. It was a wet summer, and the losses were very light.

In Compartments 9 and 10 about 10 acres of Corsican pine were sown where the peat had been burned very hard. The pits were made with an iron rake and a handful of soil thrown down before the seed was sown. Then the seed was covered with another handful of soil brought from the lower land for the purpose. The seed germinated well, but some of the pits were destroyed by slugs.

Planting in 1925. Parts of Compartments 10, 11, 12, 46, 47, 50, 51, 175 acres.

<u>Species</u>	<u>Thous.</u>	<u>Age</u>	<u>Spacing (ft.)</u>	<u>Received from</u>
Corsican pine	90	2+1	4½	New (Rhinefield)
Corsican pine	67	2+1	4½	Haldon
European larch	8	2+1	5	"
Japanese larch	1	2+1	5	"
Sitka spruce	4	2+3	5	"
Scots pine	42.2	1+1	4½	Quantocks
Scots pine	4.4	2+1	4½	"
Scots pine	13.7	2+2	4½	Exmoor
Scots pine	35.3	2+1	4½	"
Scots pine	43	2+1	4½	Haldon

There was another heat wave this year which lasted throughout June and July, but the plants stood it well. Losses were about:- 10% Scots pine and 30% Corsican pine. In 1926 the beating up was mainly in Compartments 10 and 11 where the Hylobius damage was considerable.

Planting in 1926. Parts of Compartments 47, 50, 51, 48, 49, 53, 52, 244 acres.

<u>Species</u>	<u>Thous.</u>	<u>Age</u>	<u>Spacing (ft.)</u>	<u>Received from</u>
Corsican pine	12	1+1	4½	Haldon
Corsican pine	49	2+1	4½	Haldon
Corsican pine	31	1+0	4½	Exmoor
Corsican pine	19	2+2	4½	Killerton
Corsican pine	30	2+1	4½	Seaton
Scots pine	21	1+1	4½	Haldon
Scots pine	61	2+1	4½	Haldon
Scots pine	14	2+2	4½	Haldon
Scots pine	11	2+2	4½	Rapley
Scots pine	106	2+1+1	4½	Quantocks
Scots pine	5	2+2 & 2+1	4½	Quantocks

<u>Species</u>	<u>Thous.</u>	<u>Age</u>	<u>Spacing (ft.)</u>	<u>Received from</u>
Douglas fir	32	2+2	5	Haldon
Sitka spruce	22	2+2	5	Haldon

Again the summer had a long dry spell, which ended in July; however, most of the trees survived though they could not grow at all. The trees which suffered most were the Corsican pine 1 yr. seedlings whose roots were not deep enough for them to survive the drought.

Planting in 1927. Compartments 60, 61, 63, parts of 62, 59, 57, 49, 53.  
264 acres.

<u>Species</u>	<u>Thous.</u>	<u>Age</u>	<u>Received from</u>
Corsican pine	3	2+1	Haldon
Scots pine	55	2+1	Tintern Station
Scots pine	35	2+1	Beacons-Tintern
Scots pine	32	2+1	Lord Clinton
Scots pine	107	2+1	Exmoor
Scots pine	79	2+1	Haldon
Douglas fir	40	2+1	Eggesford
Douglas fir	5	2+1+1	Haldon
Sitka spruce	18	2+1	Haldon
Norway spruce	12	2+3	Haldon

There is no record of the success of this planting. The beat up figures are not heavy, though 38 acres of beating up was done in the direct sowing. This was done in Compartments 49, 53 and 62, and was 48 acres in all.

Planting in 1928. Compartments 64, 65, 66, 67, 56, parts of 62, 59, 58, 57, 55, 83, 84, 300 acres.

<u>Species</u>	<u>Thous.</u>	<u>Age</u>	<u>Received from</u>
Corsican pine	43	1+1	Haldon
Douglas fir	99	2+2	Haldon
Douglas fir	10	2+2	Eggesford
Norway spruce	20	2+3	Eggesford
Norway spruce	5	2+3+1	Haldon
Scots pine	132	2+1	Haldon
Scots pine	3	1+1	Haldon
Scots pine	60	1+1	Lynford
Scots pine	22	1+1	Lynford
Scots pine	32	1+1	Quantocks.

50 acres of direct sowing was done in Compartments 55, 83 and 84. Again there are no records of the success of this planting.

Planting in 1929. Parts of Compartments 7, 8, 9, 24, 78 and whole Compartments 84, 87, 88, 89, 90. 250 acres

<u>Species</u>	<u>Thous.</u>	<u>Age</u>	<u>Received from</u>
Scots pine	80	2+1	New (Ringwood)
Scots pine	160	2+1	Haldon
Douglas fir	31	2+3	Eggesford
Douglas fir	92	2+3	Halwill
Douglas fir	70	3+2	Fairoak

119 acres of this is moorland, and 131 acres is replanting of felled areas. The winter was very cold with hard frosts, and the spring, summer and autumn rather dry. The plants were not much damaged by the drought, but the Douglas fir which had been damaged by the frost, were prevented from recovering by the drought. The Scots pine survived both frost and drought but made very little growth.

Planting in 1930.      Compartments 77, 79, 80, 81, 45, parts of 78, 74, 75,  
55, 53, 49, 48, 54, 44, 46, 24, 87,  
218 acres.

<u>Species</u>	<u>Thous.</u>	<u>Age</u>	<u>Received from</u>
Scots pine	245	2+2	New (Ringwood)
Scots pine	18	2+2	Haldon
Corsican pine	50	2+1	Quantocks
Douglas fir	60	2+2	Fairoak
Douglas fir	5	2+3	Haldon
Ash	5	2+2	Fairoak

As mentioned before (in the section on preparation of ground) very little burning of gorse and heather was done on the uplands in order to avoid having to use rabbit netting. This lack of rabbit protection does not seem to have harmed the crop.

Planting acreages for years following 1930:-

1931.	178	
1932	123	
1933	96.	less 2 acres of fire which was replanted in 1947.
1934	74.	plus 22 acres of fire area replanted.
1935	55.3	" 2.75 " " " " "
1936	51.6	" 8.0 " " " " "
1937	38.75.	includes 3 acres of birch which was underplanted, also 1.5 acres standing timber felled and replanted.
1938	36.5	
1939	4.0	
1940	60.3	
1941	48.9	
1942	33.4	plus 11 acres fire area replanted and 7 acres felled and replanted.
1943	48.8	replanting fire areas.
1944	2.0	replanting fire areas.
1945	5.5	" " "
1946	40.	
1947	18.0	including 7 acres felled and replanted.
1948	64.6	replanting 'Blitz' fire.
1949)	Nil.	
1950)		
1951	3.0	part of nursery.

Haldon