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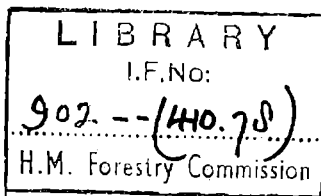
**HISTORY**  
OF  
**BRECHFA**

**FOREST**  
SCW CONSERVANCY

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HISTORY

of

FOREST OF BRECHFA

1926 - 1951

SOUTH (WALES) CONSERVANCY

# History of Forest of Brechfa

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## HISTORY OF FOREST OF BRECHFA

### CHAIRMAN'S COMMENTS

I have not been able to make an undisturbed inspection of the forest since 1947 and I had hoped to make a final one before commenting on the history. Unfortunately it has reached me so late that it is not now possible for me to pay a final visit of inspection.

The history has been carefully prepared and is a most useful document. The map is excellent, showing as it does not only the compartment numbers and boundaries but also species.

I have notes on two early inspections (March 6th, 1927 and early September 1930) which are not noted in the history. I append my note on that of 1927 as it describes my first impressions of the land and the planting. The experimental planting referred to was followed up in some detail, though the scale was smaller than I had had in mind.

At the 1930 inspection the choice of species on the plateau land was the main topic. The following extracts from Mr. Ryle's report may be of interest:

#### "Glangwili II

On the top exposed ground of Trawsgoed, Edwinsford, Cwmdubach etc. the choice of species was discussed. It was thought that the use of Scots pine in admixture with spruce was justified only where the existence of much Calluna indicated a hard type of soil. Here the comparatively quick early growth of the pine would have a good nursing effect on the spruce. Elsewhere (i.e. on the fine grass land where soil is free) pure spruce should not check severely and a nurse crop should not be required. The shallow T-notch method of planting spruce should be developed.

Sitka should be given preference on the most exposed tops, but the use of Norway spruce should not be entirely abandoned.

Experimental plots of shallow turf mounds on the fine grass upper slopes are to be formed and planted with seedlings of Sitka spruce and Norway spruce .....

The Acquisition Officers should be informed that the Commission would be prepared to consider the purchase of thrifty standing

coppice areas in this district .....

Glangwili I

Any large scale planting operations on the exposed flat top and Scirpus-peat ground of Cwm-yr-onen-uchaf (parts of Compartments 26-35) is to be postponed until the Technical Commissioner has had further opportunity of investigating this type of terrain both in relation to species and method of planting.

With reference to choice of species on the remainder of the high ground and exposed hilltops, pine would only be required in heathery ground as a spruce nurse; elsewhere pure spruce crops (shallow notch planting or turf planting) would get away evenly without the necessity of a nurse crop of a doubtfully marketable species."

My inspection of 1933 was more detailed and the chief point emerging was an instruction with regard to ploughing.

R.

July 26th, 1952.

(Note on inspection with Mr. W. L. Taylor, March 6th 1927).

---

The inspection was very hurried and the following observations are put forward for discussion :-

The slopes are excellent planting land covered for the most part with excellent coppice. The plateau land is variable in character, but apparently the soil is inclined to be shallow and a layer of peat is fairly common. Part of the plateau land will be difficult to deal with and it is urgent that experimental planting should be made so that we may be gaining experience of this type of land while the slopes are being planted. I would be glad if some trial holes could be dug on some of the worst land on the plateau and the results reported to me.

The following points struck me with regard to this year's planting -

- (1) The higher land is being planted uniformly with a mixture of spruce and Scots pine, 50% of each. The Scots pine are necessary on the heather ground, but over a considerable area of the land which I saw the heather was merely scattered and the pure spruce would be a better crop. Further, I am of opinion that Sitka spruce would do better than the common spruce and might at least have been tried in some of the places.
- (2) A tendency to plant both Scots pine and larch too shallow and not to firm securely.
- (3) Planting distance somewhat irregular and inclined to be too close.
- (4) Sitka spruce planted on two small very wet patches in screefs and without draining.
- (5) Planting carried right up to the edge of the road.
- (6) I was unable to ascertain what roads and rides have been left, but apparently the main road up the valley has not been continued through the planting. I would be glad to know whether the roads had been definitely laid out before planting had begun.

The forester whom I saw for a few minutes informed me that 135 acres out of the 180 acre programme had already been finished and that his larch plantings would be done within the next few days.

On the whole for a first year's operation the work appears reasonably well done, but in this type of country special attention must be paid to the lay-out of plantations and well graded roads.

(initialled) R.L.R.

9/3/27

## HISTORY OF THE FOREST OF BRECHFFA

### GENERAL DESCRIPTION OF THE FOREST

#### Situation

The forest lies wholly within the County of Carmarthen, some six miles north of the County town and east of the Carmarthen/Lampeter main road (A485). This region is the water-shed of the Teifi and Cothi rivers. The major part of the forest is on the gently sloping high level plateaux and on the eastern slopes draining to the Afon Cothi. The latter is an important tributary of the River Towy and is fed by numerous small rivers and streams flowing from the water-shed through short steep valleys.

Four separate blocks lie on the east or left bank of the Afon Cothi and further extensions are proposed in a north eastwards direction towards Edwingsford and Talley.

Within the perimeter of the forest lie the villages of Brechfa, Llansawel and Abergorlech as well as a number of smaller villages or hamlets

The township of Llanybyther is situated within two miles of the present northerly tip of the forest. Further approved extensions will shortly bring this town within the actual bounds of the forest.

The earlier acquisitions made in 1926/27 were mainly from the Glangwili Estate and gave the forest its first name of Glangwili Forest. Subsequently extensions in a north easterly direction towards Llansawel and later towards Llanybyther changed the emphasis and made the village of Brechfa the focal point bringing about in 1931 the adoption of the name Forest of Brechfa.

#### Area and Utilization

Altogether 36 separate acquisitions make up the forest and are given in detail in Table I, Appendix III.

The forest is entirely freehold property and has been largely built up by the acquisition of numerous relatively small properties, often owner occupied sheep farms, or tenanted farms owned by absentee landlords. Of the larger properties much of the land was tenanted on annual agricultural tenancies at the time of acquisition. Resumptions of land for planting have at times occasioned a certain amount of friction with agricultural interests. Since 1939 considerable criticism has been levelled at the Commission's



policy of converting derelict land to forest, forgetting all about the inter war economic position and the influence on sheep rearing of the war time and post war sheep subsidies and the general improvement in the economics of farming. More recently, the general housing shortage and the development of the Commission's post war housing programme have deflected the organised criticism to the manner in which the expansion of forestry has resulted in the abandonment of dwelling houses within the forest.

In the course of the public inquiry into the Upper Towy Valley Afforestation Scheme and in the public press, opposers of that scheme have quoted the Forest of Brechfa in support of their view that the Commission's policy has resulted in the deliberate dereliction or abandonment of farmhouses. The number of these originally quoted was 18 but this was subsequently raised to 26, and in response to request, they were specified by name. Of this list one was unknown, one was actually occupied and one was in good order but temporarily unlet and is now occupied. Of the remaining 23, 9 were vacant at acquisition and in various stages of dereliction. Old age, remoteness and a very poor standard of accommodation account for the rest. In one recent case in particular, Dolgader, one of the 26 houses, was deliberately closed owing to its extremely poor accommodation (1 room and a boxroom), layout (room separated from cowshed by matchboarding), remoteness, dampness, etc. It was a hovel of the worst kind but its closing was given publicity in the Press as evidence of the Commission's general policy of closing down farmhouses. The truth is, of course, that the 23 derelict houses indicate a general tendency of workers to refuse to live in remote, inaccessible substandard and worn-out accommodation. This tendency is observable in all parts of Wales, irrespective of the activities of the Forestry Commission.

In practice, Commission policy has always been to keep farmhouses let for as long as tenants could be found to occupy them and deal with whatever good agricultural land had been set aside. To this end considerable sums have been spent in repairs over the years. Gilfachyrhiw, Gilfach Meredith, Cwmillydan Isaf are good examples of smallholdings preserved from sheep farms. They include the better land of the original farm and the buildings. These and many others have been recently repaired and reconditioned by the Forestry Commission in an endeavour to bring them more nearly to an

acceptable post war standard.

Linked with the accusation of deliberate abandonment of dwelling houses is the charge that forestry by replacing sheep farming has intensified depopulation of the countryside. If an acceptable criterion is the number of families supported by the same area of land this accusation also is erroneous. Accurate statistics in respect of the earlier acquisitions are difficult to obtain at this late date but it is reasonably certain some 70 to 80 workers derived a livelihood from the land. The same area today gives employment to about 160 workers, of whom 123 are Commission staff and employees, the remainder being farm tenants self employed and their employees

Many of the original sheep farms included areas of old woodland or oak coppice. In fact a feature of this country-side is coppice oak woods on the stream sides and valley slopes. Right from the beginning efforts were made to place the best and most thrifty of these coppice areas under systematic management aiming at storing the coppice to form high forest or underplanting heavily thinned stands with a mixed wood in view. Other areas of coppice and scrub had derived from woodlands felled during the 1914/18 war and at the time of acquisition carried a thin coppice of oak, hazel, birch and alder over a carpet of fine grasses, bracken, brambles and fern.

Some of the acquired properties carried with them rights of grazing on commons adjoining the forest. In one instance, appurtenant grazing rights on the Ceulanau Duon area within the forest were successfully extinguished in 1940 and the area made available for planting.

Other properties, tenanted as sheep farms or grazings were held for their sporting value as rough shootings. The sporting rights, in the main, are becoming unlettable as the plantations become established. Good fishing abounds in the local rivers and streams and most often has been retained by the original owners.

For administrative purposes the forest is divided into six separate working sections or beats which are in effect separate accounting units in charge of a forester. This is the broad pattern which has been followed since the inception. In more recent years the six beat foresters have been responsible to a Head Forester.

The utilisation of the 15,190 acres as at the end of the Forest Year 1951 is set out below:-

Table II

(a) Plantations	Acres	Acres
Acquired	32	
Formed by F.C.	<u>11,180</u>	11,212
 (b) Land to be Planted		
For afforestation		
In hand awaiting planting	174	
Tenanted pending planting	15	
 For re-afforestation		
In hand awaiting planting	<u>155</u>	344
 (c) Nurseries		
		2
 (d) Agriculture		
Held by F.C.		
No. of tenancies	31	898
 Transferred to M.A.F.		
No. of properties	30	<u>2,238</u>
No. of properties		3,136
 (e) F.W.H. No. of tenancies		
No. of tenancies	24	466
 (f) Unplantable		
		7
 (g) Other land: Quarries, dumps and waste		
		<u>23</u>
		<u>15,190</u>

### Physiography

The several tributary streams of the River Cothi serve to break up the area into irregular valleys and rounded hills leading to gentle sloping moorland plateaux. Shelter is thus afforded to the lower ground and a high proportion of the middle slopes. Little shelter is given to the upper ground by the surrounding countryside. Elevations vary from 200 ft. above sea level, in Brechfa Village, to 1,200 ft. on the Highmead area (Beat VI). Slopes are generally not severe, except in the stream valleys where age-old erosion has scoured out steep slopes and exposed rocky outcrops.

### Geology and Soils

The forest lies over the Silurian Shales of the Llandoverly and Llandilo Series which weather down to a somewhat stiff clayey loam of varying but generally, moderate depth. The subsoil of semi-weathered shale is penetrated to some extent by tree-roots but growth is limited by lack of natural aeration and a tendency towards moisture retention. Peat, of shallow depth, is only met with in comparatively few areas on the higher,

flatter ground, where some factor has impeded the natural drainage. Only in very few areas is there any leaching of the upper soil layers. Throughout the abandoned agricultural land on the uplands and valley slopes generations of very shallow cultivation have resulted in a certain amount of clayey plough-pan. The lower lands and valley bottoms are generally fertile good quality agricultural land, but in the wider valleys are to be found narrow flats of rather wet but fertile alluvial soil.

### Vegetation

Over the greater part of the forest the natural vegetation of the uplands is the grass-heath type consisting of fine grasses such as Festuca and Agrostis species with Aira flexuosa, bracken and Erica cinerea in varying degree. These communities give way on the upper slopes and plateaux, where there is a certain amount of leaching of the soils, to Erica-Calluna-Molinia associations with cotton grass and Juncus species present in company with occasional Vaccinium. Peat is limited to small areas of higher land where configuration or interference with natural drainage has resulted in waterlogging and increased soil acidity to the encouragement of Molinia and Juncus. The peat is generally of no great depth, seldom exceeding six inches.

A long history of agricultural use tending, in the years immediately preceding acquisition, towards light grazing by small flocks of sheep has greatly affected the natural vegetation. As a result much of the acquired land was under rough pasture at the time of planting, with many of the natural species intruding and considerable areas, particularly on the lower slopes, entirely reverted to bracken.

As is typical of the Silurian hill formations in Wales, many of the sheltered valleys and dingles supported a crop of oak. At higher elevations where wind influence was strong the oak was little better than scrub. But in the valleys many areas of coppice oak had been worked on a regular rotation for the production of tanbark and charcoal. These local industries had died out before the First World War and at the time of the first acquisitions practically all the most accessible coppice woods had been felled for firewood etc. In the less accessible valleys the coppice oak woods were untended and overgrown. Similarly, with acquisitions made in more recent years where unthrifty and overgrown coppice woods have left

no alternative but to clear fell them and afforest the land afresh.

Prior to acquisition virtually no planting had been carried out on the uplands of the locality, but the following note, contributed in 1933 by G. B. Ryle to the "Journal of the Forestry Commission" is of interest in the light of subsequent developments.

"Banc Disgwylfa - A triangular plantation of hardly one acre in extent forms a conspicuous landmark at an elevation of 1,030 ft. and is fully exposed from all directions. Situated on the highest part of a gentle "saddle", the gradual falling off in height to all its margins is noticeable, and it is certain that even in the centre of the plantation the stunting effect of blast is felt. The soil is a typical hard loam on weathered shale and little more than 10 in. deep. The crop is a random mixture of European larch, Scots pine and Norway spruce, with a marginal belt of beech. The growth of this last is interesting in that it has formed a strong screen to full crop height. In the centre of the plantation the maximum height of all species at an age of 30 years is about 35 ft. (i.e. 50 ft. Quality Class for larch and Scots pine and 60 ft. Quality Class for spruce). Taking the mixture as a whole, it is obvious that the spruce is the dominant tree both in actual growth and in form; Scots pine comes second, though it is considerably rougher. The larch is extremely rough, and a large percentage of the originally planted trees have become suppressed and killed."

#### Meteorology

Rainfall averages between fifty inches and seventy inches annually, Heavy snowfalls are not common and snow seldom lies long nor greatly interferes with winter work except possibly on the 1,200 ft. high Highmead block.

There are no high, protecting land masses to the west or south west between the forest and the west coast of Wales. Most of the land above the 900 ft. level is, therefore, exposed somewhat to wind, although there is little evidence of salt damage. Some blasting of young growth in pines and spruce occurs at the higher exposed altitudes and windway is



not unknown.

Frost has not been a serious factor but has exerted a limited influence on the growth of Sitka spruce in the plantations formed during the early 1930s in the valley bottoms.

### Risks

The Forest of Brechfa is relatively free from fire danger and its fire history is one of the best in the Conservancy. In part this is due to the complete absence of railways or heavily travelled main roads.

Sheep trespass has at times been troublesome; not unexpectedly in a forest built up very largely from sheep runs. There are few commons contiguous to the forest so that sheep trespass has never reached the heights customary in the forests of the industrial zone.

In the earlier years the rabbit population was easily kept in control but during and since the war it has increased enormously. Any set of circumstances national or local which restricts the killing of rabbits by the local farming community results in a fresh influx to the forest, particularly in the large areas of older plantations which are no longer adequately rabbit-fenced. Rabbit trapping on an increased scale is now normal routine.

Grey squirrels have now reached as far west as Carmarthenshire and have been reported from the forest. They may in time become a serious pest, particularly to the young ash and beech plantations.

Fungus and insect pests have not figured prominently except possibly larch canker and resultant "die back" on European larch. Honey fungus is present in the oak coppice woods and takes its toll of the planted conifers but damage is sporadic. There is evidence that Chermes cooleyi has, at times, been rife on Douglas fir but the effect is not long lasting. Neomyzaphis has, and does, attack Sitka spruce but no serious infestations have been recorded.

### Roads

Basically, the forest is accessible and fairly well served by several second class public roads. Throughout the woods are numerous public high ways of "green lane" standard indifferently maintained by the local authorities. The various farms and small holdings are usually served by

accommodation tracks or sunken lanes with here and there roads suitable for use by motor lorries.

The making of additional internal roads to serve forest and farms was first carried out during the period 1934 - 1939 by trainee labour from the Ministry of Labour Rehabilitation Camp at Treglog. All work was done by hand and about  $2\frac{3}{4}$  miles of road were constructed giving improved access at about four separate points. It is interesting to note that during this period a road was projected through the valley of the Afon Gorlech, from Abergorlech to Rhydownmerrau and instructions issued to acquire the necessary land from the Edwindsford Estate to give access to the Council road at the former point. The obvious and direct route could not be acquired and although various less satisfactory alternatives were explored the war broke out and the Ministry of Labour Camp was disbanded without anything being done.

With the creation of the Department's Road Branch in 1947 the projected road alongside the Afon Gorlech was fully surveyed and the inevitable conclusion reached that the natural exit must be acquired and, if necessary, by compulsory purchase. Negotiations to this end were started while road construction was begun at the northern end of the four miles long valley. Road construction reached the southern boundary of the forest well before the opening of compulsory purchase procedure brought about a change of heart in the owner and resulted in voluntary (sic) sale of the required land. This long awaited exit from the forest was completed in F.Y. 51. with a saving in forest/station pitwood haulage of fully seven miles.

In all over ten miles of all-weather and four miles of fair-weather roads have been constructed since 1947. Many are short lengths giving access to plantations in the thinning stage and altogether some 2,000 acres of plantations are now well served. A comprehensive road system has been surveyed and planned and work is proceeding on the construction of a further fifteen miles, which if completed within three years should meet the immediate needs for extraction of forest produce and general administration.

Costs have averaged about £1, 200 per mile and, other things being equal, should not be exceeded as nearly all the most difficult sites have been tackled.

## Labour and Housing

In this agricultural area the type of labour recruited has been generally satisfactory but numbers have never quite kept pace with requirements. The bulk of the labour has been drawn from the forest itself including the hamlets and villages within the perimeter and for this purpose Llanybyther, some two miles from the present nearest point, is regarded as being within the perimeter and has been a fruitful source of labour for a number of years.

The present labour force employed in the forest is 104 men, including 12 mainly engaged in making forest roads. In addition there is a direct labour gang of 9 men under the supervision of the Clerk of Works (Estates). There are also one mobile mechanist and two workshop fitters staffing the machinery workshop at Treglog.

Some 20 additional forest workers are required to bring the labour force to the required strength for current and projected work. It is thought that a labour force of some 124 forest workers should suffice for the next eight or ten years, but it is very doubtful if this number will be reached until additional houses are available within the forest.

Out of the 104 forest workers at present employed 18 have already to be transported daily from the Llandyssul district which is outside the boundary of the forest. The remaining 86 forest workers, the 9 men of the building repair gang, the mobile mechanist and his 2 fitters all reside within the boundaries of the forest, but only 23 live in Forestry Commission houses.

In the years before the 1939 - 45 war ten houses or bungalows were built as part of the Forest Workers' Holding Scheme.

The post war building programme is fairly considerable and provides for the erection of foresters' as well as forest workers' dwellings. At the time of writing one forester's house has been completed near Abergorlech and is occupied by the forester in charge of Beat II, a further 21 houses are in course of erection in Brechfa village and 3 more at Treglog. In addition, the huts of the Ministry of Labour Rehabilitation Camp at Treglog have been undergoing reconstruction to provide a total of 8 dwelling houses of full modern standard, some of which are already completed and occupied. Since the war one more or less derelict, but conveniently situated, house has been reconstructed and is occupied by the forester in charge of Beat IV.

This makes a total of 34 dwelling houses actually constructed or in course of construction since the end of the war. At least 6 more houses are planned to be built within the next five years or so.

### SILVICULTURE

(Note: The prefix A, B etc. before a compartment number denotes the Beat as defined at 30.9.51, viz:-

Brechfa	I	-	A	Brechfa	IV	-	D
"	II	-	B	"	V	-	E
"	III	-	C	"	VI	-	F

See attached map for boundaries of Beats).

### Preparation of Ground

Since planting first began in F.Y.27, land of almost every vegetative type has had to be tackled and methods of preparing ground prior to planting have varied with the type and density of cover as well as with the current technique.

During the first few years, much of the land treated was old woodland. Following the end of the 1914-18 war, and until about 1925, private operators clear-felled extensive areas of the old oak coppice woods and much of this land was subsequently acquired by the Forestry Commission. Replanting of these comparatively open sites called for little preparatory work other than cutting and burning the regrowth. Adjoining afforestation areas, when bracken or heather covered, were generally burned over but old agricultural land, particularly where recently sheep grazed, called for little or no preliminary clearing.

Somewhat older coppice, costly to clear and burn, was frequently cleared in strips and planted with Douglas fir or other partial shade-bearing species. The following report, made in 1939, describes treatment of this sort carried out in Compartment A18:-

"On the cap of the hill the oak coppice was too poor to be felled at the same time as the main crop on the lower slopes and hence was left. In P.32 a number of  $\frac{1}{4}$  acre groups were opened up in this area which was then 10 ft - 20 ft. high. These groups were planted individually with Abies nobilis, Abies grandis, Tsuga, Thuja, and Norway spruce. The intention was to enlarge each group about 5 years later and so to continue till the

whole had been cleared of oak and replanted. Subsequently, however, it was decided to fill up between the groups by planting beneath the scrub after a moderate thinning and later to give more light to these underplantings by further thinning out of the oak or by girdling. This thinning and underplanting was done in P.38 and P.39 mainly with Abies grandis and with a little Tsuga and Lawson's cypress. The Abies grandis and Tsuga of P.39 were too small.

The original groups were beaten up with Abies grandis and are now well stocked.

Abies nobilis has formed a very sturdy but slow-growing crop but is now making better growth. It is now from 2 ft. to 6 ft. high.

Abies grandis is faster and almost equally strong. Its present height is now 4 ft. to 9 ft.

Thuja suffered heavy failures and is not free from Keithia.

Tsuga is irregular in growth but, in the best group, is forming a good crop with a maximum height of 12 ft.

Norway spruce has a good form and compares favourably with the adjacent Sitka spruce in Compartment 19. It is slower, of course, but cleaner and quite free from Honey fungus."

During 1944 the remaining oak coppice stems in the  $\frac{1}{4}$  acre plots were reduced by 50% with very little damage to the flourishing conifers.

District Officer Wilkins thoroughly inspected this Compartment early in F.Y.52, and below is given his report of the present condition and proposed treatment:-

"Ground Flora Calluna with some bracken and a little bramble.

Matrix In F.Y.48 all oak remaining between the  $\frac{1}{4}$  acre groups was felled and trimmed up between the rows. The matrix consists principally of Abies grandis, now averaging 14 ft. in height. Current height increment is 18 in.; no damage from blast was noted. Brash about F.Y.60.

Groups There is considerable variation within each species, depending on exposure.

Abies grandis. The best group averages 30 ft. high, with a current height increment of 2 ft. and a quarter girth breast height of 5 in. Brash F.Y.52 and thin F.Y.54 and F.Y.58. At the other end of the height scale the groups average 16 ft. high and should be brashed with the matrix in F.Y.60.



Abies nobilis shows more uniformity. A generally strong, sturdy species averaging 18 ft. high with a current height increment of 18 in. Shows good diameter/height ratio, but has a tendency to loose leaders. Most of these groups could be brashed and cleaned in F.Y.52 and thinned in F.Y.54 and F.Y.58. The less advanced groups will be treated with the matrix.

Tsuga is on the whole a sturdy, well formed crop showing little signs of damage by blast. One group averages 18 ft. high, whereas two others have reached 28 ft. in height with a quarter girth breast height of  $4\frac{1}{2}$  in. and a current height increment of 18 in. to 24 in. Brash advanced blocks in F.Y.52 and thin in F.Y.54 and F.Y.58.

Lawson's cypress. This species has not grown well. Most groups average 14 ft. and will be treated with the matrix.

Thuja. Thuja has fared very much better than Lawsons, there being several groups which, although gappy, contain many well shaped trees 26 ft. high. Brash most groups in F.Y.56 and thin in F.Y.58.

Norway spruce Somewhat affected by blast and soil conditions under loamy Calluna. Average height is 24 ft. and the current height increment 12 in. to 15 in. Brash F.Y.56 and thin F.Y.58.

Over the whole of the sub-compartment I would place the group species in the following order of success:-

Abies grandis

Abies nobilis (close second)

Tsuga

Thuja

Norway spruce

Lawson's cypress

Although the working of this area will be difficult, I propose brashing and thinning as prescribed above, extracting produce along cut tracks."

Pole stage coppice woods were cleared and burned only when of poor quality and obviously lacking in future value. Many areas of coppice were

thinned and cleaned up as a preliminary to conversion to high forest; others were heavily thinned and underplanted with beech, Abies grandis and Douglas fir. Examples of the latter, carried out from P.31 to P.33 and again in P.37, are to be found in Compartments A16, A41, and B2, B5, and B6.

In the first six years about 120 acres of oak coppice from 15 to 40 years of age were brought under these types of treatment.

In Compartments B97 and B98 the variable mixed hardwood cover was cleaned up in F.Y.39 and groups of beech were introduced into the more open areas of an otherwise tolerable matrix. Very open stands of rough oak standards in Compartments B15 and B88 and F63 and F64 were girdled and underplanted with beech, Abies grandis or Tsuga in F.Ys. 37, 38 and 39.

As a result of the scarcity of pitwood during World War II, a considerable acreage of dense oak coppice in Compartments E14 and E53 was clear felled between 1939 and 1944 and replanted with Douglas fir and Japanese larch.

With the end of the war and a tightening up of the South Wales pitwood specification it was no longer found profitable to fell such material, even as a silvicultural operation to free the underplanted crop. During F.Ys.45, 46 and 47, therefore, wholesale girdling was resorted to in Compartments C80, C81, E58, F93 and F94, but this operation, in addition to attracting unwelcome publicity, was considered silviculturally undesirable and was stopped. When necessary to free the understorey, the coppice stems were felled and any unusable/<sup>or unsaleable</sup> poles placed between the rows of underplanted trees and left to rot. At the same time, preparatory work in "new" coppice woods was changed from girdling of unwanted stems to heavy thinning and during late F.Y.47 and F.Y.48 plantations in Compartments E54, E55, E90 and E.97 and F.96 and F97 were established under young 20 ft. high oak and birch coppice, the canopy of which had been severely opened up by selective fellings.

The present policy in dealing with the majority of the remaining woodland sites consists of this drastic breaking up of the canopy and underplanting principally with beech, Norway spruce or Douglas fir. Subsequently, thinning will be carried out as necessary in the remaining overwood, the stems being felled between the rows of the understorey.

Examples of this latest development are to be found in the F.Y.50 and 51 plantings in Compartments A107, A84, C91 and C92. This method has the advantages of producing saleable material from the original preparation, providing nursing shelter by retaining the woodland conditions and preserving the amenities of the district. It is opening up the forest by the new roads that has made this type of produce again saleable and, in some instances, the receipts from sales equal, and even exceed, the total cost of preparation of ground, examples are Compartments C91 and 92.

In many parts of the forest gorse has been a troublesome weed, necessitating cutting and burning prior to planting, with subsequent periodic heavy cutting as a weeding operation. On some of the higher tops where Calluna was fairly thick earlier treatment consisted only of burning, but with the advent of ploughing all Calluna and Calluna/Molinia areas were ploughed.

Bracken and bracken/grass slopes have been burned over prior to planting and before the application of turf draining or ploughing technique many of the grass/heathland sites were treated in the same way. In this same period, old agricultural land or the heavily grazed Molinia plateaux were generally planted with no prior treatment other than draining.

The grazing of sheep on unplanted land, let on short period tenancies coupled with their presence on much of the adjoining farm land, plus the existence of rabbits, has made it essential to enclose all planting areas with stock and rabbit proof fences.

#### Choice of Species

Up to F.Y.33 the fertile, sheltered slopes and old woodland sites which formed the bulk of the planting areas were planted with European larch and Douglas fir, the latter being confined mainly to felled coppice areas at lower elevations. Although Douglas fir is still in favour, extensive use of European larch was discontinued in F.Y.34 with the introduction of Japanese larch.

Most of the P.27 to P.33 plantations of European larch were formed in the Cwm-yr-onen-uchaf, Cwm Dafydd and Ty-llwyd blocks of Brechfa I, on the Byrgwm bach and Esgair-onen-fawr blocks of Brechfa II, and on the Dolgafros block in what is now Brechfa IV. Generally, old woodland sites were selected and these were normally sheltered and apparently fertile.

Some criticism was levelled at European larch having been carried too high up the slopes and this was given as a contributory reason for checked growth and unthrifty appearance. No accurate information can be obtained on the provenance of the seed, but it is not unlikely much of it originated from Switzerland (Vintschgau). The original "take" was usually quite good, although necessitating beating up with European larch in the first or second year following planting, generally at the rate of from 10% - 15% replacements. Competition from coppice shoots was obviously very strong and weeding not always adequate, so that after about ten years instructions were being issued to let the plantations go on until they could be cleaned and treated from under the canopy. By this time, it had become clear that European larch was not particularly successful and was suffering from larch canker and "die-back". By about P.34 all beating up in European larch plantations was being done with Japanese larch or other species and many of these stands are now mainly Japanese larch. Of the remaining European larch stands, none are good and most have been treated for many years on the principle of accepting the best hardwood stems and are thus mixed stands, with some of low quality, and containing few good larch trees. "Die-back" is still continuing, but is less prevalent in the better quality stands where reasonably active height and crown growth in both conifers and hardwoods has permitted heavier thinning.

Japanese larch has been planted fairly steadily since about F.Y. 34 on all types of sites from old agricultural land to old woodland, and from 300 ft. to over 1000 ft. above sea level. It has proved very successful on the harder, less sheltered slopes and on bracken banks with a tendency towards extreme dryness in the growing season. Its range has been constantly extended, both for "flat" and for plough planting until today exposure, rather than elevation, is the chief limiting factor to its use at Brechfa. Even on relatively exposed sites above the 1100 ft. contour it is being planted on ploughing to form fire belts, examples are the P.50 boundary belts on Mynydd Rhoswen (Beat V) and the P.51 belt along the highest ridge of the Llwyn-ap-Walter block of Beat I. Where this species has been used to beat up or rehabilitate older European larch it has, within a matter of a few years, overtaken and surpassed the European larch in height growth.

Douglas fir, at Forest of Brechfa as elsewhere, has not had quite the smothering effect expected when planted into young coppice growth, but fairly substantial areas have been planted, for this species has grown relatively well. Inadequate weeding in earlier years has undoubtedly contributed to patchy results and inferior growth. Many of the earlier Douglas fir plantations now contain a fair proportion of oak, but are well into the thinning stage.

In the early thirties, Sitka spruce was frequently planted on good, but low lying, sites where frost has had a retarding effect. In the past both Norway spruce and Sitka spruce have been planted on wetter, low lying sites and generally the former has grown very well. In more recent years, Sitka spruce has been planted on ploughing on high-lying Molinia-Vaccinium sites with good results. At lower levels Norway spruce mixed with Scots pine has given variable results, but generally satisfactory if one is prepared to accept a mixed plantation. Sitka spruce in mixture with Pinus contorta has, in recent years, called for fairly careful management if suppression of Sitka spruce is to be avoided. In fact, some of the Pinus contorta growth on poor exposed sites has been very promising and suggests greater use of this species as a pioneer crop.

Pure Scots pine, Corsican pine and Pinus contorta have been used in limited amounts with Corsican pine normally showing greater volume development than Scots pine.

Only very small quantities of Abies grandis, Abies nobilis, Tsuga, Thuja, Lawson cypress and Pinus insignis have been planted, but results suggest extended use on suitable sites. Under certain conditions the silver firs are particularly promising and the use of Abies nobilis on high, dry sites might be encouraged.

Apart from making use of natural oak, hardwoods have not figured prominently at Brechfa. There are altogether about 120 acres of beech, but this species could, perhaps, have been more extensively used in restocking the old woodland sites.

### Planting

(a) Spacing. Spruces and pines were originally planted at 4½ ft. but this was later increased to 5 ft. Japanese larch and Douglas fir have been planted at 5½ ft. and lately 6 ft. Beech and European larch were planted at



5 ft. spacing. All recent ploughing has been based on 5 ft. x 5 ft. spacing.

(b) Types of Plants Used

Spruces usually 2+2

Pines " 2+1

European and Japanese larch, Douglas fir usually 1+1 otherwise 2+1.

Beech usually 2+1 otherwise 1+1

In F.Y. 39, 2 year seedling Pinus insignis were planted on open pasture in Compartment B98. In the same year 2 yr. seedling Douglas fir 12 in. high were introduced on to old woodland in Compartment B97. In F.Y. 49 10,000 2+0 Sitka spruce 12 in.- 15 in. high ex Giedd were planted on furrows in Compartment E6. In F.Y. 50 1+0 beech 9 in. high ex Micheldever were used in Compartment E102 and 1 yr. and 2 yr. Japanese larch seedlings planted both direct and on furrows in Compartments E103 to 107 and F27, 32, 33, 35, 37 and 38. In F.Y. 51 the direct planted Japanese larch was beaten up with seedlings. Generally the seedlings were too small for the weed and other conditions and results were not up to expectations.

(c) Methods of Planting Until F.Y. 37 direct mattock planting was almost universal. This then gave way to semi-pit planting with Schlich spades and then to the use of Mansfield spades and L-notching on furrows with ordinary garden spades.

(d) The Annual Rate of Planting has varied enormously from 1,000 to 100 acres depending on the area available.

(e) Manuring In Compartment A32 a very small area of P. 35 Sitka spruce was manured with basic slag and ground limestone. The application has had little visible effect. In F.Y. 50 the seedling Japanese larch planted in Compartment F27 was manured at the rate of 2oz. per tree of Fison's No. 7. In this instance a marked difference in heights of up to 6in. was observed in F.Y. 51. The site was not, however, unusual for Japanese larch and it is doubtful whether the manuring will affect any of the future operations.

(f) Success of Establishment As far as the percentage mortality is concerned, the seedling plantations have established themselves reasonably successfully. The weeding period has, however, often had to be extended

by one, two or even three years.

Besides being smothered with oak and birch coppice, European larch everywhere suffered badly from die-back and canker. Only a few small stands of any apparent worth exist today.

Douglas fir and Japanese larch have grown excellently on sheltered sites, but are, in places, being held back by the effects of exposure and gorse. Douglas fir on old woodland sites has suffered very little from Honey fungus. The small areas of pure Scots pine, Corsican pine, Pinus contorta, Abies grandis, Lawsons and Tsuga are reasonably healthy. Except where planted on pure heather, Norway spruce and Sitka spruce have progressed satisfactorily, and on sheltered Molinia and moist bracken slopes excellent growth is being maintained.

### Ploughing

As the result of an experiment in horse ploughing conducted in Compartments C14 and 17 in F.Y.32, extensive tractor ploughing was commenced in F.Y.33 in Compartments A57 to A61. Flat mountain tops and moderately steep slopes bearing Calluna, Molinia, gorse, bracken or fine grasses have since been ploughed to depths varying from four to twelve inches depending on the type of ground. Water content, presence or absence of a pan, and depth of peat have governed the depth of ploughing but, in general, it can be said that deeper ploughing was carried out on the wetter sites requiring drainage. On old pasture and some of the less compact heathland it was seldom thought necessary to cultivate to more than seven inches. The present tendency is towards 6 in. - 8 in. ploughing on all areas with deeper drainage channels at intervals as required. Very little preparatory work prior to ploughing has been necessary.

In all cases, plants have been L-notched from the top of the furrow. The roots of spruces and other surface feeding species have been laid out below the upturned vegetational layer of the ridge whereas those of the pines and Japanese larch in particular have been inserted into the undisturbed soil beneath the ridge. All grades from 6 in. to 24 in. of the types of plant listed under "Planting - Types of Plants Used (b)" above have been used.

Plough spacing for all species has been 5 ft. except for one instance

of 7 ft. spacing for Japanese larch in Compartment A71. In this case, the larch was planted at intervals of 3 ft. along the furrow and, where 5 ft. ploughing for Japanese larch has otherwise been employed, spacing along the furrow has been 7 ft.

Although ploughing has met with considerable success at Brechfa, instances can be quoted in which it seems that not every silvicultural aspect of the operation was fully appreciated. For example, vigorous species such as Japanese larch and Douglas fir are often "swung" in the butt where planted on the more exposed ploughed sites. Furthermore, intensive cultivation has sometimes initiated edaphic changes which have since rendered the soil unsuitable for the growth of the species originally planted. This has happened mainly on areas ecologically transitional - where for instance the vegetation before ploughing consisted of Molinia with a smattering of dwarf heath or Calluna. Pure Sitka spruce was usually planted, but as the soil has dried, heather has taken such predominance that it can be seen today that a pine, or at least a mixture of pine and spruce, would have been a better choice of species.

#### Beating up

On ploughed ground it has been the normal practice to connect at least a proportion of the furrows to planned catch drains ploughed or hand dug over the area. Owing to shortage of time, this operation has not infrequently had to be delayed until after planting. As far as possible, however, all major drainage systems are established before planting and thereafter maintained at intervals as necessary. Although there is not, as yet, any fixed plan to ensure adequate upkeep of drains after the thicket stage, such will have to be provided for in the general Working Plan for the forest.

Beating up is carried out as soon as possible after the original planting, it seldom being necessary to continue the operation for more than two seasons. Large plants are used and, in thrifty plantations, the original species retained. On some of the less promising areas of Sitka spruce it is becoming common practice to beat up with Scots pine.

Abnormal treatment has been given to some of the extremely backward plantations. In Compartments A36 and A37, for instance, Sitka spruce mattock planted on heather in F.Y.29 was still in complete check in F.Y.35. The area was ploughed, replanted to the same species in F.Y.36, and beat up

with Scots pine in F.Y.47.

P.29 European larch in Compartments A37 and A38 was again so obviously unsuitable for retention that in F.Ys. 37 and 38 it was interplanted with Japanese larch at approximately 10 ft. x 5 ft. spacing. The latter species has now ousted the European larch.

#### Weeding

The duration and intensity of weeding has naturally varied with the type and density of the ground flora and the rate of growth of the species planted. On ploughed pasture land, heather and Molinia weeding is usually unnecessary, whereas on bracken areas it usually extends over two seasons. On unploughed bracken and old woodland sites, weeding may be necessary up to 5 years, and over uneven crops, especially of pines and spruces, patch weeding of the more backward groups is carried out for even longer periods.

#### Mixture of Species

Both the group and the strip system of mixing species have been tried. In the former case, regularly spaced groups of beech, comprising one ninth, eighth, sixth or quarter of the total crop, have been established in a matrix of Japanese larch in several compartments of Brechfa II. Most plantations of this type are scheduled for thinning in F.Y.54, and during this and subsequent workings every endeavour will be made to favour thrifty hardwoods. It is thus hoped to be able to nurse at least one beech in each group into the final crop.

Some mixtures of spruces and pines have been established on many of the harder, drier sites in the forest. The pine was originally intended as a nurse species, gradually to be removed as the spruce established itself. The relative growths of the two species has, however, been so variable on the different sites, that it is now apparent that many mixed crops will have to be accepted, and this does not appear to be at all unsound silviculturally. Examples of unexpected variation in rates of growth occur in Compartments A24 and A25 where the Sitka spruce in line mixture with Pinus contorta was in danger of becoming almost completely smothered, and where every third row of the pine had to be removed and the remaining rows selectively thinned to benefit the healthy spruce. In Compartments A4 and A5, on the other hand, the Scots pine nurse species is

only slightly in advance of the Norway spruce, but since this P.27 crop is due for thinning in F.Y.53 a mixed stand must be accepted. In these more advanced mixtures, preference will be given in each successive thinning to the more shade bearing spruces so that the final crop will, in any case, probably contain a preponderance of the main species.

In every case, both species have been planted contemporaneously. There has been no underplanting of advanced stands except as noted in the section "Preparation of Ground".

#### Rates of Growth

Typical information on the rates of growth observed over a wide range of sites is given in the following table:

Compt.	Species	P. Yr	Age	Geology and Soil	(a) Altitude (b) Aspect (c) Slope (d) Exposure	Mean Ht. of Dominants	Mean Av. Height Increment	Current Annual Ht. Increment in last 5 yrs.
A. 25	S.S.	34	17	Yellow loam on shale Well drained.	(a) 700 ft. (b) West (c) Steep (d) Nil	10 ft	7 in.	8½ in.
A26	J.L.	34	17	Yellow loam on shale Well drained.	(a) 800 ft. (b) East (c) Steep (d) Nil	25 ft.	1½ ft.	1 ft. 3 in.
A17	D.F.	28	23	Yellow loam on shale Well drained.	(a) 600 ft. (b) East (c) Steep (d) S.W. slight	38 ft.	1 ft. 7in.	1 ft. 2 in.
A37	S.S.	29	22	6" peat on yellow loam on shale. Average drainage.	(a) 900 ft. (b) West (c) Mod. slope. (d) Severe W exposure	10 ft.	5½ in.	8 in.
A39	Be.	32	19	Yellow loam on shale. Well drained and sheltered.	(a) 600 ft. (b) West (c) Mod. (d) Not ex- posed.	10 ft.	6 in.	10 in.
A90	J.L.	43	8	Yellow loam on shale. Well drained.	(a) 500 ft. (b) North (c) Steep (d) Nil	15 ft.	2 ft	2 ft. 6 in.
B84	J.L.	38	13	Shallow layer of light loam overlying shale rubble over blue shale rock.	(a) 850 ft. (b) Open (c) V. Gentle (d) N.E. sheltered	28 ft.	2 ft. 2 in.	1 ft. 9 in.
B88	J.L.	39	12	Moderately light sandy loam over gravel. Well drained.	(a) 600 ft. (b) S.E. (c) Steep (d) Sheltered from N. & W.	32 ft.	2 ft. 9 in	3 ft.
B4	D.F.	29	22	Light clayey loam over Silurian shale.	(a) 500 ft. (b) S.E. (c) Steep (d) Sheltered from W.	40 ft.	1 ft. 10 in.	1 ft. 10 in.
B25	S.S.	32	19	Light loam over gravel and Silurian shale.	(a) 900 ft. (b) S/E (c) Gentle (d) Exposed	25 ft.	1 ft 4 in.	1 ft. 9 in.
B82	D.F.	39	12	Heavy clayey loam over Silurian shale.	(a) 500 ft. (b) S.E. (c) Steep (d) Exposed to S.W.	24 ft.	2 ft.	2 ft. 4 in.
B41	J.L.	37	14	Light loam over Silurian shale.	(a) 600 ft. (b) S (c) Mod. steep (d) Sheltered	40 ft.	2 ft. 10in.	2 ft. 3 in.
C3	J.L.	31	20	Well drained loam over Silurian shale.	(a) 550 ft. (b) W. (c) Mod. (d) Exposed	40 ft.	2 ft.	1 ft. 6 in.

Compt.	Species	P. Yr.	Age	Geology and Soil	(a) Altitude (b) Aspect (c) Slope (d) Exposure	Mean Ht. of Dominants	Mean Av. Height Increment	Current Annual Ht. Increment in last 5 yrs.
C8	N.S.	31	20	Loam overlying peat and shale	(a) 800 ft. (b) S.W. (c) Mod. (d) Fairly sheltered	20 ft.	1 ft	1 ft. 6 in.
C22	N.S.	36	15	Wet with Molinia and heather peat.	(a) 900 ft. (b) S.W. (c) Gentle (d) Exposed	10 ft	9 in.	9 in.
C25	N.S.	35	16	Well drained loam over Silurian shale.	(a) 400 ft. (b) W. (c) Mod. (d) Sheltered	15 ft.	1 ft.	1 ft. 4 in.
C27	D.F.	35	16	Well drained loam over Silurian shale.	(a) 600 ft. (b) W. (c) Mod. (d) Sheltered	25 ft.	1 ft. 9in.	1 ft. 6 in.
C55	J.L.	39	12	Clayey loam over Silurian shale.	(a) 900 ft. (b) S.W. (c) Mod. (d) Exposed	30 ft.	2 ft. 6 in.	1 ft. 3 in.
D54	S.P.	30	21	Light loam with shale outcrop.	(a) 700 ft. (b) N.W. (c) 50° (d) N.W.	20 ft.	11 in.	1 ft. 2 in.
D45	D.F.	30	21	Light loam	(a) 500 ft. (b) W. (c) 30° (d) S.W. gales	40 ft.	23 in.	29 in.
D50	S.S.	30	21	Morainic sandstone in clay loam.	(a) 500 ft. (b) S. (c) Flat (d) Nil	45 ft.	25.5 in.	33 in.
D86	S.S.	42	9	Loamy shale	(a) 800 ft. (b) E. (c) Flat. (d) Exposed.	7 ft.	9 in.	6 in.
D79	J.L.	41	10	Light loam	(a) 720 ft. (b) W. (c) 15° (d) W. & N.W. gales.	20 ft.	24 in.	25 in.
D50	S.P.	30	21	Shale outcrop covering loam.	(a) 700 ft. (b) S. (c) 45° dip to south. (d) Exposed.	25 ft.	14 in.	12 in.
E14	J.L.	41	11	3 in. vegetable loam on 18/24 in. gravelly loam on shale.	(a) 500/700 ft (b) S.W. (c) Steep (d) Sheltered at bottom mod. at top.	25 ft.	2 ft. 3 in.	3 ft. -
E10	S.S.	41	11	6/10 in. peat, 4 in. peaty loam, 12 in. gravelly loam over shale.	(a) 1,000 ft. (b) S.E. (c) V. gentle (d) V. exposed.	7 ft.	8½ in.	14 in.
E21	S.S.	42	10	3/6 in. peat over 3 in. peaty loam over 12 in. shaley loam over shale.	(a) 900 ft. (b) S. & S.E. (c) Almost flat. (d) Exposed N.E. & S.	9 ft.	10 in.	13 in.

Compt.	Species	P Yr.	Age	Geology and Soil	(a) Altitude (b) Aspect (c) Slope (d) Exposure	Mean Ht. of Dominants	Mean Av. Height Increment	Current Annual Ht. Increment in last 5 yrs.
E32	SS/SP	43	9	6/12 in. peat, 4 in. peaty loam, 12/15 in. gravelly loam over shale.	(a) 1100/1190 ft (b) E. & S.E. (c) Flat at top sloping sharply to S.E. (d) V. exposed	7 ft. 5 ft. 6in.	9½ in. 7 in.	12 in. S.S. 7 in. S.P.
E43	SS/SP	44	8	3 in. peat over 24 in. loam over shale.	(a) 1000 ft. (b) Flat. (c) Flat. (d) Mod.	8 ft. 5 ft.	12 in. 7½ in.	14 in. S.S. 9 in. S.P.
E51	N.S.	46	6	4 in. vegetable soil over 24/36 in. sandy loam over shale.	(a) 300/500 ft. (b) N. (c) Steep (d) Sheltered	6 ft.	12 in.	15 in.
F64	A.G.	39	12	Light loam on shale.	(a) 600/800 ft. (b) N. (c) Steep slope (d) Sheltered	20 ft.	1 ft. 8in.	1 ft. 6 in.
F47	J.L.	38	13	Light loam on shale.	(a) 850/900 ft. (b) N.E. (c) Steep slope (d) Sheltered to W.	30 ft.	2 ft. 3in.	2 ft. 3 in.
F62	N.S.	39	12	Heavy loam on clay.	(a) 700 ft. (b) N. (c) Flat (d) Sheltered	24 ft.	2 ft.	2 ft. 3 in.
F61	N.S.	42	9	Peat and heavy loam on clay.	(a) 700 ft. (b) N. (c) Flat (d) Sheltered	9 ft.	1 ft.	7 in.
F89	N.S.	43	8	Heavy loam on clay	(a) 650 ft. (b) S.E. (c) Gentle (d) Sheltered	14 ft.	1 ft. 9 in.	2 ft.
F89	J.L.	43	8	Light loam on shale	(a) 700 ft. (b) S.E. (c) Gentle (d) Sheltered	26 ft.	3 ft. 3in.	3 ft. 2 in.



### Past Treatment of Established Plantations

Selective brashing of only those trees likely to remain after the first thinning and line brashing of 50% or 60% of the crop have been carried out in the past, but have now given way to complete brashing coupled with felling of all small, suppressed stems. Green pruning is not usually practiced.

Cleaning was necessary in European larch and Douglas fir planted in coppice but was unfortunately delayed for various reasons, and in the post war period considerable delayed cleaning has had to be done in conjunction with the first thinning.

Certain stands of Douglas fir for example those in Compartments C6, 7, 8, 13 and 14 were so neglected during the war as to be in danger of becoming overgrown with hardwood coppice. These have recently been taken in hand and can be expected to improve considerably within the next five years. Cleaning in plantations of all ages is now up to date.

Moderate grade thinnings are being conducted on a three to five year cycle according to species. Approximately 65% of all felled material is converted into pitwood and lagging down to a top diameter of 2 in. There is a considerable local demand for softwood fencing material of all sizes and during the last two years all otherwise unsaleable material has been profitably converted into firewood blocks. The acreages thinned year by year are tabulated as follows:-

Forest Year	CONIFERS		HARDWOODS		Total
	1st Thinning	2nd Thinning	1st Thinning	2nd Thinning	
1938	6			2	8
1939			16	5	21
1940	-				-
1941				18	18
1942				45	45
1943	-				-
1944	-				-
1945	1				1
1946	20				20
1947	-				-
1948	90				90
1949	118	10		33	161
1950	157	26	7	-	190
1951	227	30	14	-	271
Totals	619	66	37	103	825

RESEARCH - Note by Research Branch

Six sample plots were established at Brechfa Forest, Carmarthenshire, in October 1948 with the object of providing data for the construction of Conifer Yield Tables and to supply general information on rate of growth and response to different thinning treatments.

Three plots, forming a series, were established in Douglas fir in Compartment No.4. of Brechfa II Forest together with a similar series, again three plots, in Japanese larch in Compartment No.41 in Brechfa VI Forest.

A. Douglas fir - Series of Three Plots

Plot W.59	D	Grade of thinning	(heavy low thinning)
" W.60	B	" "	(dead, dying and diseased removed)
" W.61	C	" "	(light, low thinning)

This series of plots is situated about a half mile north of the village of Pont nant-y-ffin, which is two miles from Brechfa on the main Abergorlech road (National Grid Reference: 22/556326). The site was originally old oak coppice, and lies on the lower south eastern slopes forming the southern fringe of the Silurian mass in Wales.

The plots stand some 500 ft. above sea level, the slope throughout the series varying from  $20^{\circ}$  -  $22^{\circ}$  and being concave regular.

The mean annual rainfall for the area approximates to 65 in. per year, but the slope and make up of the soil together give a good free drainage, and although the soil is moist there is no indication of waterlogged conditions.

The parent rock material consists of blue shale of the Llandovery and Taranon Series of Silurian Rocks of the Lower Palaeozoic System, which yields a soil covering of  $1\frac{1}{2}$  ft. - 2 ft. throughout the plots. The three soil profiles examined in October 1948 were all similar (one soil profile was examined in each plot), having  $\frac{1}{2}$  in. of undecomposed needles, twigs and dead coppice, followed by 3 in. of dark brown humus stained silty loam containing numerous fine roots, over-lying 10 in. - 14 in. of orange brown silty loam containing roots of up to  $\frac{1}{2}$  in. diameter. Below this was 6 in. - 9 in. of a grey decomposed rock and silty loam mixture, lying immediately above the parent material.

Soil vegetation on establishment of the series was similar throughout

the plots, consisting of Digitalis purpurea, Rubus fruticosus, Hedera helix, Lonicera and mosses of the Dicranum, Catherinea, Hylocomium, Hypnum, Mnium and Polytrichum species. On remeasurement in September 1951 ground vegetation varied from sparse (.2) in the B grade to fairly frequent (.4) in the D grade.

The series has a south easterly aspect and is exposed to valley winds from the south-west and north-east.

#### Plot W.59. Douglas fir - D Grade of Thinning

This plot is in Quality Class III having at 23 years a top height of 44 ft. The thinning carried out here is a heavy low one, 479 trees per acre being removed on establishment in 1948, followed by 236 trees per acre removed three years later in 1951, leaving 333 trees per acre main crop.

The average under bark volume per tree removed in 1951 was 1.7 hoppus ft. Due to this grade of thinning the crowns of the dominant trees are long and well developed, although not heavy. Stem form on the whole is good to moderate with no seriously deformed stems.

#### Plot W.60. Douglas fir - B grade of Thinning

At the age of 23 years this plot has a top height of  $45\frac{1}{2}$  ft. putting the plot in Quality Class III.

In the B Grade of thinning only the dead, dying and diseased trees are removed; this amounted to 256 trees per acre in 1951. There are now 709 trees per acre standing as maincrop, more than twice the number of standing trees per acre as in the D grade. The dominants show little effect of the intense competition, but the crowns of the lower canopy classes, the sub-dominant and suppressed trees, being denied sufficient light to form deep well proportioned crowns, are instead, being drawn up into whips with light, short, weak crowns. Due to the proximity of the trees, stem form is good, though the majority of the trees lack the necessary girth to give them stability in the canopy.

#### Plot W.61. Douglas fir - C Grade of Thinning

The grade of thinning applied in this plot is intermediate between B and D and compares more with the normal silvicultural thinning practice, i.e. a moderately light low thinning.

At 23 years of age this plot had a top height of  $44\frac{1}{2}$  ft. thus placing it in Quality Class III. The distribution of trees in this plot is irregular and tending to form groups in which crowns are asymmetrical and laterally flattened. Stem form in this plot is moderate to good with a small percentage of poorly formed trees. The average under bark volume per tree removed in thinning in 1951 was 1.5 hoppus ft.

The following table gives comparative data on the series as a whole:-

Date	Age	MAIN CROP										THINNINGS						Total Crop B.A. sq. ft.	Total Crop Vol. cu. ft. Hoppus
		Stems per Acre	Top Ht.	Mean Ht.	F.F.	Av. Girth (True girth)	B.A. sq. ft.	Vol. cu. ft. Hoppus	Stems per Acre	Mean Ht.	Av. Girth (True girth)	B.A. sq. ft.	Vol. cu. ft. Hoppus						
Plot W. 59 D Grade (.288 acres)	20 ( ( (	10/1948	7	Trees	Under	8½"	7½	.2	-	-	111	-	7	2.4	-	-	1093	92.8	
		9/1951	563	37	33	.388	16	63.1	803	368	28½	13	27.3	290	27.7	409	111.3		
			333	44	41	-	19½	53.9	-	236	36½	16½							
Plot W. 60 B Grade (.296 acres)	20 ( ( (	10/1948	3	Trees	Under	8½"	8	.1	-	-	128	-	7	2.7	-	-	1235	93.4	
		9/1951	794	39½	34	.419	15½	84.6	1200	128	23½	10½	6.0	35	4.9	53	112		
			709	45½	39	-	18	98.4	-	88	31	11½							
Plot W. 61 C Grade (.286 acres)	20 ( ( (	10/1948	7	Trees	Under	8½"	8	.2	-	-	87	-	7	1.8	-	-	1246	95.8	
		9/1951	661	37½	33	.426	16	73.9	1043	280	29½	13	19.9	203	21.7	306	115.6		
			465	44½	40½	-	19	72.2	-	203	38	15½							

This series has, since establishment, had only one remeasurement, and it is as yet too early to show any striking effects of the different grades of thinning.

#### B. Japanese larch - Series of three plots

The Japanese larch series of three sample plots (National Grid Reference: 22/549361) lie about a half mile south of the farm of Hafodrwynnos, which itself is a mile south-east of the tiny village of Llidiad Nenog. Llidiad Nenog, four miles to the north of Brechfa, stands over a thousand feet above sea level on the edge of the high upland plateau which rises to the north behind Brechfa. The site was originally old grassland standing at 800 ft. above sea level and lies on the steep, though short, side of a small valley cut by one of the many fast flowing streams to be found along the edge of this upland plateau. The valley quickly deepens to become a gorge. The series has a south westerly aspect and is moderately sheltered by the brow of the hill to the north and the valley slope opposite, both of which are wooded. The slope throughout the series varies from  $18^{\circ}$  -  $21^{\circ}$  and is concave regular. The mean annual rainfall approximates to 65 in. per year at Abergorlech  $3\frac{1}{2}$  miles to the south-east at 300 ft. above sea level. Drainage throughout the plots is satisfactory.

The parent rock material consists of blue shale of the upper layers of the Llandovery and Tarannon series of Silurian rocks of the Lower Palaeozoic System, which yields a soil covering of 20-24 in. throughout the series.

In October 1948 three soil profiles were examined (one in each plot), and all were found to be similar, being  $\frac{1}{2}$  in. of undecomposed Japanese larch needles, followed by  $\frac{1}{2}$  in. of decomposed needles and twigs. Below was  $\frac{1}{2}$  in. of dark brown humus, followed by 9 in. -  $11\frac{1}{2}$  in. of light brown silty loam, containing numerous tree roots of up to  $\frac{1}{2}$  in. in diameter. This overlay 10 in to 12 in. of grey orange brown silty loam in which were found finer roots of the crop. Immediately below this was 8 in. - 10 in. of grey decomposed rock and silt mixture, beneath which lay the parent rock.

Vegetation on establishment of the series was similar throughout being Viola canina and mosses of the Thuidium, Catharinaea, Mnium, Hypnum and Hylocomium species. On remeasurement in September 1951 ground vegetation varied from fairly abundant (.7) in the E grade to very sparse (.1) in the B grade.

The plots comprising the series are:-

W.62 D Grade of Thinning - (heavy low thinning)

W.63 B " " " - (dead, dying and diseased only removed)

W.64 E " " " - (very heavy low thinning)

W.62. Japanese larch - D grade of thinning

This plot having a mean height of  $39\frac{1}{2}$  ft. at 15 years of age is well into Quality Class Super I. that is one quality class above Quality Class I according to the F.C. yield tables.

The thinning carried out is a heavy low thinning, 577 trees per acre being removed in 1948 and 327 per acre removed at remeasurement in 1951, leaving 436 trees in the main crop. The average under bark volume per tree removed in 1951 was 1.5 hoppus ft.

The crowns of the dominant trees of the main crop are deep and well developed with slight effect of flattening. Trees not dominant, show more serious effect of flattening. Most trees show waviness in stem form which seems a characteristic of fast grown Japanese larch.

Plot W.63. Japanese larch - B grade of thinning

This plot also falls into Quality Class <sup>Super</sup>/I having a mean height of  $39\frac{1}{2}$  ft. at 15 years of age. The thinning carried out here is a very light one, only dead, dying and diseased trees being removed. In 1948 on establishment of the plot 385 thinnings per acre were removed (97 of them being below  $8\frac{1}{2}$  true girth at breast height) and in 1951, 55 thinnings per acre, leaving 997 stems per acre in the main crop. The average under bark volume per tree removed in 1951 was 0.7 hoppus ft. Stem form on the whole is fairly good though wavy stems are much in evidence.

Crowns of all canopy classes are suffering from the intense competition which a B grade of thinning produces. Short and narrow or one sided crowns are to be found on the majority of the trees.

Plot W.64. Japanese larch - E grade of thinning

The mean height of  $39\frac{1}{2}$  ft. at the age of 15 years also puts this plot into Quality Class Super I. This grade of thinning is a very heavy low thinning, calculated to leave about  $\frac{2}{3}$  of the stocking left after a D grade. On establishment in 1948, 841 thinnings per acre were removed

(81 of them being below  $8\frac{1}{2}$  in. true girth at breast height). In 1951 a further 213 thinnings per acre were taken out leaving a main crop of 287 stems per acre. The average under bark volume per tree removed in 1951 was 1.8 hoppus ft.

Most of the crowns are free from competition on all sides and are both deep and symmetrical though there is an occasional crown flattened through previous competition. As most of the badly curved stems have been cut out, stem form is good, though some of the trees are slightly curved. Green branching is persistent down to about 15 ft. above ground level.

The following table gives comparative data for the series as a whole:-



	Date	Age	MAIN CROP						THINNINGS						Total Crop B.A. sq. ft.	
			Stems per Acre	Top Ht.	Mean Ht.	F.F.	Av. Girth (True girth)	B.A. sq. ft.	Vol. cu. ft. Hoppus	Stems per Acre	Mean Ht.	Av. Girth (True girth)	B.A. sq. ft.	Vol. cu. ft. Hoppus		
Plot W. 62 D Grade (.312 acre)	10/1948	12	-	Trees	Under	8½"	Girth	-	-	106	-	2.4	-	-	1230	112.3
	9/1951	15	763	34½	32½	.361	15	74.0	871	471	31½	35.9	359	512		
Plot W. 63 B grade (.309 acre)	10/1948	12	-	Trees	Under	8½"	Girth	-	-	97	-	2.1	-	-	1268	118.9
	9/1951	15	1052	35½	33	.345	15	101.2	1157	288	29½	15.6	111	38		
Plot W. 64 E Grade (.296 acre)	10/1948	12	-	Trees	Under	8½"	Girth	-	-	81	-	1.7	-	-	1199	111.7
	9/1951	15	287	41	39½	-	19½	46.7	(662)	213	37	26.1	383	-		

These plots make up one of several similar series now established in Wales to make available more information on Japanese larch. This particular series at Brechfa, however, is outstanding in that in 1951 it was the fastest growing of any of the Welsh plots.

The height growth of the hundred largest trees per acre (by girth) averages almost 3 ft. per year for each year of the crop's life, and an exceptionally fast rate of height growth is still being maintained. No main crop volume calculation was made in 1951, but an estimated volume using the 1948 form factor together with 1951 mean height and main crop basal area gave the volume figures shown in the table in brackets. The total crop production basal area increase over the three year period 1948-1951 was 22 square ft. per acre in the E grade, 23.7 square ft. per acre in the D grade and 23.3 square ft. per acre in the B grade.

Both the Douglas fir and Japanese larch series of plots are to be thinned and remeasured at three year intervals.

P. MOORE.

Mensuration Section,

March, 1952.

## Conclusions

The sharpest conclusion to be drawn from experience gained at Forest of Brechfa is the inevitable one that newly made plantations should never be neglected in the matter of weeding. Had the earlier plantations, particularly those in coppice, been adequately weeded, it is reasonable to say that coppice competition would neither have had such serious effects nor been so expensive to deal with in the later stages. Money spent in the first few years in getting at least 80% of the plants above the competing weed growth is money well spent. Removing weed species when the men have to work through a dense thicket cannot help but be an expensive operation, and if a policy of reducing weeding below the irreducible minimum had been followed the cleaned crop may be such as to scarcely justify the expense.

No doubt we have learned from these early errors, as we seem to have done in the matter of choice of species. Much better results are now obtained from the spruces, both by reason of better siting and improved technique in planting. It is very doubtful that the failure of European larch in South Wales could have been anticipated, and it has failed no less on the Silurian and Ordovician formations of Carmarthenshire as on the more intractable soils of the Coal Measures in Glamorgan. As in the coalfield forests very little of the Brechfa European larch shows promise of maturing, but the most promising remnants are now in mixture and it is not impossible that selected strains of this species could yet be grown in mixture with hardwoods on optimum sites.

War time and post war thinning activities have stressed the need for intelligent anticipation when laying out compartments so as to provide reasonable tushing tracks or suitable routes for roads. Furthermore, recent gale damage in proximity to road fellings has underlined the advantage of making extraction routes before plantations are in the thicket stage. In fact, recent experience confirms that road lines should be laid down before planting starts, even if no road making is done until thinning is due. However, the increasing tendency to acquire inaccessible land forces one to the conclusion that greater economy lies in cutting the road formation before any work begins on an area. With men's wages at their present level (£5.10.0d per week minimum) two or three hours spent daily by a gang in walking from the forest boundary to the job mounts to a formidable

total during the planting or weeding season.

The never ending criticism levelled at the Commission's planting activities in the Brechfa area, while in part based on local prejudice to change in any form, does give rise to the thought that, even today, insufficient efforts are being made to co-ordinate forestry and agricultural interests. The view is put forward that in the past the Commission has had no regard for the economic potentialities of the areas left in agriculture. Very often this opinion is based on present conditions, and without regard to the farming conditions existing when the decisions were taken. Not infrequently the strongest critics are tenant farmers or owner occupiers who have conveniently forgotten how glad they were to be released from their farms to find alternatives nearer to markets and civilisation. Even so, the thought does occur that in areas preponderantly sheep raising some help might be given to agriculture by developing a scheme of wide shelter woods rather than planning the creation of extensive contiguous blocks of woodlands. Such shelter woods, correctly sited, would go a long way towards improving mountain grazings and permit grass improvements with consequent increase in sheep stocking, but any such scheme would demand large scale planning, and a genuine attempt by both agricultural and forestry interests to understand the other side's point of view, and appreciate that both forms of husbandry are essential to the well being of a district, as well as to the country as a whole.

## History of Brechfa Forest

### APPENDIX I

#### NOTES FROM INSPECTION REPORTS

The Assistant Commissioner ruled, in 1931, that the Norway spruce/Scots pine mixture, planted in Compartments 4, 5 and 7, Brechfa I, should be treated as a spruce crop and beaten up with Sitka spruce on mounds between existing rows. Two years later this plantation showed some improvement in that Norway spruce was getting out of check and was suffering less blast damage than the Scots pine.

Various methods of treating oak coppice had been tried, but the general opinion was that successful conversion to high forest was doubtful and that underplanting, with beech and Douglas fir, should be sufficiently full to form a final crop if necessary.

In 1933, the Chairman, when inspecting P.31 Sitka spruce notch planted on the grass covered hilltops in Cwmdubach and Trawscoed, instructed that all further sites of this type be ploughed before planting. Ploughing carried out on Scirpus/Molinia/Calluna peat on Cwmyronen Uchaf mountain had greatly improved planting conditions but the Chairman thought ploughing should be deeper and should expose mineral soil.

"Die-back had already begun to appear in P.27 European larch both on grass/Calluna sites and on old woodland. Introduction of Japanese larch at the rate of about 500 plants per acre was ordered.

On a visit in 1934, Mr. W. L. Taylor, approved an approach to the Edwinsford Estate, with a view to purchasing land from Esgair Gorlech farm to provide access from Abergorlech up the valley to Trawscoed. Over the years, approaches to this Estate proved abortive and, in 1949, by which time the need for a route to extract thinnings had become acute, a compulsory purchase order had to be sought. Eventually, the owner agreed to voluntary negotiations. At the time of writing (1951) a most necessary extraction route is approaching completion and acquisition negotiations have been extended to give the Department full possession of the land traversed.

Divisional Officer F. Scott drew attention in 1934 to the need for improved drainage and the better linking up of plough furrows in the earlier

plantings of Sitka spruce on derelict fields and grass/Calluna moorlands in Brechfa I, where too high a proportion of plants were still in check.

Horse-ploughing for P.35, on the Sifigwm lands, was done by contract and it is recorded that on the shallower, harder soils, plough pan had not been pierced everywhere and, therefore, there was no "loosening of the compact soil" as recommended by the Chairman in 1933.

Sir Alexander Roger, Forestry Commissioner, carried out an extensive inspection of Brechfa in 1937 and, apparently, was favourably impressed by the silviculture and the general condition of the forest.

During a visit by the Assistant Commissioner in 1938, recent ploughing is reported as giving good results greatly superior to earlier plantings. Comment was made about the scarcity of suitable labour and the tendency of F.W.H. tenants to work on their holdings at times when forest work was pressing.

On an extensive tour of Brechfa I and II made by the Chairman at Easter 1938, some criticism was levelled at the quality of the road making carried out by the Ministry of Labour Camp. The Chairman urged the extension of plough planting at higher elevations than had yet been tackled and also commented favourably on the growth of Lawson's cypress on heather.

In 1939 the Assistant Commissioner (Mr. O. J. Sangar) criticised the lay out of certain rides having in mind impending extraction of thinnings and also gave instructions for additional draining on ploughed areas.

In 1940, the Chairman instructed that Norway spruce should no longer be planted above 1,000 ft. above sea level but Sitka spruce should be used instead, if necessary with the help of basic slag. P.37 slagged Sitka spruce in Compartment A.27 were found to be growing well. Instructions were given to extend the use of line about mixtures of Sitka spruce and Pinus contorta on certain sites. Ploughing by Solotrac and John Deere tractor was thought to be insufficiently deep and the Chairman instructed deepening by at least 2 in. Emphasis was placed on the importance of planting up felled coppice areas as soon after felling as possible to minimise cost of establishing the new crop.

Considerable time was devoted by the then Assistant Commissioner (Mr. A. P. Long), on a visit in 1942, to instruction on thinning (now fairly active) and to consideration of ways and means of getting out the

produce with the limited facilities then available to the Forestry Commission. He also commented on the inadequacy of many rides and Compartment boundaries. Recent ploughing was inspected and experiments carried out with various modifications of ploughs and other equipment.

On his next visit in 1944 the Assistant Commissioner instructed that owing to labour shortage the treatment of unthrifty plantations e.g. P.27 European larch should be left until after the War and all available labour concentrated on tending thriving plantations e.g. clearing coppice from Douglas fir, etc.

Adverse comment was made on the numbers of rabbits now in the plantations and this was said to be due to dearth of labour within the forest and apathy of neighbours.

Mr. W. L. Taylor, Forestry Commissioner, in 1945 conducted a number of Ministry of Agriculture and Fisheries' officials over the forest with the object of outlining forestry in relation to holdings and farms. He pointed out how the better agricultural land was left in holdings or farms and the higher unplantable land often left for grazing.

In the same year, Mr. Lloyd O. Owen, Forestry Commissioner, visited the forest for much the same purpose and, in addition, investigated the types of cottages and outbuildings on our land. Many of these old farms and holdings, because of their inaccessibility and lack of modern amenities, had proved unlettable in recent years.

In April, 1947, the Chairman, touring the forest with the Conservator (Mr. G. B. Ryle) thought the final girdling of oak over underplanted Lawson's cypress, Abies and Tsuga was now necessary. He thought some recent brashing of P.34 Douglas fir was premature and that the Japanese larch near Cwm-yr-onen Uchaf had been taken too high. The Chairman's experimental plot in Compartment A.27 was inspected. This plot was laid down in P.28 by notching into the raw moorland although subsequent beating up had been on turves. Japanese larch and Sitka spruce were the main species planted but the former had been beaten up with the latter as had the Norway spruce/Scots pine mixture and, at the same period, Pinus contorta had been introduced. At the time of inspection the Japanese larch were rough but surprisingly good, the Sitka spruce in Pinus contorta/Sitka spruce mixture and in Norway spruce/Sitka spruce/Scots pine were promising and taking their place in the

canopy, the Norway spruce were at last making appreciable growth and the Scots pine were showing signs of blast. The Chairman advocated 2 rows mixture of Sitka spruce and Scots pine on similar sites and said line about mixtures should be avoided. Later, he said that on Calluna/Scirpus flats the available evidence indicated that Pinus contorta was more suitable as the nurse tree than Scots pine, but the latter must always be used on the drier conditions. In commenting subsequently on the tour notes the Chairman stated - "The Experimental Plot in Compartment 27 is very interesting and should be reported on by the Research Branch. It throws some light on the pine/spruce problem."

Mr. Lloyd Owen in March, 1949, inspected proposed housing sites with the Conservator and discussed the whole question of planned communities at this forest.

The Commissioners' Meeting of April, 1949, was held at Carmarthen and included a tour of Forest of Brechfa. Discussions took place on the poor results from planting European larch which were typical of results in many parts of the country in all climates. Interesting discussions took place on pine/spruce mixtures when inspecting P.49 Sitka spruce/Scots pine on Clynmawr. The Conservancy argument in favour of 3 rows of each species was based on the desirability of permanently retaining pine in the mixture and ease of management in subsequently adjusting the mixture. The general opinion appeared to favour 2 rows pine to 3 rows spruce. Interesting comparisons were made later of growth, under varying conditions, of spruce/pine mixtures of different types planted from P.35 to P.38 and the rapid growth of Pinus contorta at Brechfa was the subject of favourable comment. A rapid inspection of the northern part of the forest showed very satisfactory growth of spruce on the ploughed plateaux, of rideside beech and of beech/spruce mixtures near Clynmaerdy.



APPENDIX II

Supervision

Conservators

1946/1947 Mr. R. G. Broadwood (Acting)  
1947 Mr. W. A. Muir  
1947/1949 Mr. G. B. Ryle  
1949 to date Mr. W. D. Russell

Divisional Officers

1927/1931 Mr. C. O. Hanson  
1931/1938 Mr. F. Scott  
1938/1939 Mr. G. B. Ryle  
1939/1943 Mr. F. Cownie  
1943/1946 Mr. R. G. Broadwood  
1946/1947 Mr. N. Wylie  
1947/1949 Mr. W. D. Russell  
1949 to date Mr. J. T. L. Fitzherbert

District Officers

1927/1928 Mr. R. G. Forbes  
1928/1936 Mr. G. B. Ryle  
1936/1939 Mr. W. D. Haldane  
1940/1949 None  
1950 to date Mr. W. C. Wilkins

Foresters

1928/1932 Mr. A. Weir  
1932/1936 Mr. P.W.S. Wild  
1936/1939 Mr. L. T. Edwards  
1936/1943 Mr. S. J. C. West  
1933/1950 Mr. D. Ace (decd.)  
1940 Mr. F. H. Smith  
1940/1941 Mr. T. Morris  
1943/1947 Mr. H. C. Young  
1943/1949 Mr. B. Hughes  
1947/1949 Mr. T. E. Little  
1946/1947 Mr. C. Powell  
1941 to date Mr. D. M. Morgan  
1949 to date Mr. D. H. Farrance  
1949 to date Mr. P. J. Wheel

<u>Foresters</u>	1949/1951	Mr. J. R. Mounsey (resigned)
	1948 to date	Mr. W. Roderick
	1950 to date	Mr. G. I. Rudge

Following is given a tabular statement showing Foresters-in-Charge of the Forest and of each Beat since 1940.

Brechfa	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951
In Charge	West	West	West	West/ Young	Young	Young	Young	Young/ Edwards	Edwards H.F.	Edwards H.F.	Edwards H.F.	Edwards H.F.
I	"	"	"	"	"	"	Powell Fn.	Little	Little	Mounsey	Mounsey	Mounsey
II	Ace	Morgan	Morgan	Morgan	Morgan	Morgan	Morgan	Morgan	Morgan	Morgan	Morgan	Morgan
III	Ace	Ace	Ace	Ace	Ace	Ace	Ace	Ace	Ace	Ace	Ace/ Rudge	Rudge
IV	Ace	Morgan	Morgan	Morgan	Morgan	Morgan	Morgan	Morgan	Morgan	Morgan	Morgan	Wheel
V	Smith Fn.	Smith Fn.	Smith Fn.	Hughes Fn.	Hughes Fn.	Hughes Fn.	Hughes	Hughes	Hughes/ Farrance	Farrance	Farrance	Farrance
VI	-	-	-	-	-	-	-	-	Roderick Fn.	Roderick Fn.	Roderick Fn.	Roderick
VII	-	-	-	-	-	-	-	-	-	-	Wheel	-

H.F. = Head Forester

Fn. = Foreman

APPENDIX III (Table I)

From	By	Date	Plantations Acquired	Plantable (Excluding Col.4.)	Nurseries	Agricultural	F.W.H.	Unplantable (Excluding Col.4.)	OTHER LAND				Total
									Land permanently Transferred	Acreeage	Land temporarily Transferred	Acreeage	
(1)	(2)	(3)	(4) acres	(5) acres	(6) acres	(7) acres	(8) acres	(9) acres	(10) Description	(11) acres	(12) Description	(13) acres	(14) acres
J. Rhydderch & W.J. Walter-Jones	Conveyance	29/9/26	5	190	-	-	32	-	-	-	-	-	227
L. P. Lloyd Lloyd and Others	do	27/10/27	12	1,461	-	1	78	7	-	-	Cwmynnon Uchaf Pwll	83 58	1,700
E. Davies	do	21/12/27	-	57	-	-	42	-	-	-	-	-	99
G. Protheroe & W. Moses	do	26/3/28	-	149	-	28	-	-	-	-	-	-	177
- do -	do	do	-	17	-	-	-	-	-	-	-	-	17
M.L.W. Lloyd Price	do	27/8/28	10	591	-	-	44	-	-	-	Trawscoed Fields	11	656
Mrs. H. Emmanuel	do	23/2/29	-	-	-	-	24	-	-	-	-	-	24
do	do	do	-	-	-	-	1	-	-	-	-	-	1
Mrs. A. Davies	do	2/3/29	-	152	-	-	23	-	-	-	-	-	175
Lt-Col. D.W.C. Davies Evans.	do	17/3/30	-	347	-	-	-	-	-	-	-	-	347
J. Thomas	do	25/3/30	-	158	-	-	-	-	-	-	-	-	158
Sir J.H.W. Drummond, Bart., and Others.	do	26/3/30	-	586	-	38	132	-	-	-	Banc Lllewele Mawr Cilwenau Uchaf	100 104 359	1,319
Lt.Col. D.W.C. Davies Evans.	do	9/5/30	-	173	-	10	-	-	-	-	Acheth Isaf Acheth Uchaf Land Acheth Ganol Land	191 31 21	426
M.L.W. Lloyd Price	do	27/11/30	-	167	-	-	-	-	-	-	-	-	167
J. W. Nicholas	do	5/12/30	2	137	-	-	26	-	-	-	-	-	165
D.M. Williams & Others	do	30/1/31	-	231	-	-	-	-	-	-	-	-	231
M.W.L. Lloyd Price	do	3/3/31	-	643	-	64	64	-	-	-	-	-	771
D. Thomas	do	17/2/32	-	81	-	-	-	-	-	-	-	-	81
G.R. Thomas & H.P. Davies	do	24/6/36	-	102	-	27	-	-	-	-	-	-	129
Mrs. M. A. Davies	do	30/6/37	-	479	-	-	-	-	-	-	Disgwylfa Grazing	55	534
D. A. Thomas	do	7/12/37	-	103	-	-	-	-	-	-	-	-	103
S. Davies	do	9/3/38	-	91	-	-	-	-	-	-	Llwynteg	61	152

APPENDIX III (Table I) Contd.

From	By	Date	Plantations Acquired	Plantable (Excluding Col.4.)	Nurseries	Agricultural	F.W.H.	Unplantable (Excluding Col.4.)	OTHER LAND				Total
									Land permanently Transferred		Land temporarily Transferred		
(1)	(2)	(3)	(4) acres	(5) acres	(6) acres	(7) acres	(8) acres	(9) acres	(10) Description	(11) Acreage	(12) Description	(13) Acreage	(14) acres
Dame V.G.E. Phillips	Conveyance	3/6/38	3	2,805	-	466	-	-	-	-	Hendrefadog Gwmallt Fforest Farm Maesygroes Llystyn Ewlchgayn Llettyraderyn Taicyd	35 94 165 29 89 8 17 65	3,776
Rev. D. S. Jones	do	4/6/38	-	210	-	-	-	-	-	-	Foelglwnog Grazing Pantycubal	33 95	338
Midland Bank, Ltd.	do	29/9/38	-	225	-	-	-	-	-	-	Clynmawr	96	321
Miss C.A. Evans and Others.	do	25/10/38	-	51	-	30	-	-	-	-	-	-	81
J. & E. Jones	do	30/11/38	-	106	-	24	-	-	-	-	-	-	130
Mrs. A. Beynon	do	3/2/39	-	31	7	-	-	-	-	-	-	-	38
Dr. L.A. Acomb	do	15/2/39	-	142	-	87	-	-	-	-	-	-	229
L.P. Lloyd Lloyd & Others	do	28/2/39	-	511	-	27	-	-	-	-	Llewyncelyn Maesybwllch Danygraig Manal	50 42 49 30	709
D. Morgans & Others	do	13/10/39	-	299	-	-	-	-	-	-	Pwllcymbyd	62	361
Mrs. A.F.C. Davies Evans & G.P. Evans	do	20/10/42	-	869	-	103	-	-	-	-	-	-	972
D. Richards	do	18/2/46	-	163	-	-	-	-	-	-	Esgair	177	340
Mrs. L. A. Davies	do	4/7/47	-	20	-	14	-	-	-	-	-	-	34
J. Davies	do	8/3/50	-	80	-	26	-	-	-	-	-	-	106
J. Davies	do	6/7/51	-	92	-	4	-	-	-	-	-	-	96
Totals:			32	11,519	7	949	466	7	-	-	-	2,210	15,190



