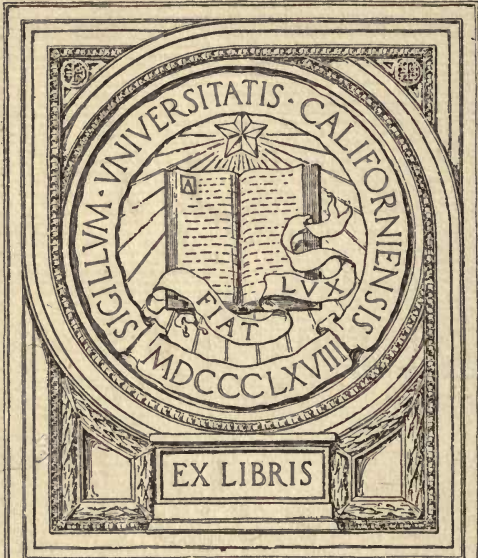


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BRITISH FORESTRY

PAST AND FUTURE

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BY

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BRITISH FORESTRY

PAST AND FUTURE

BRITISH landowners have always taken much interest in tree planting, but it has been the tree (arboriculture) rather than the wood (silviculture) that has been the object of their attention. Enthusiasm reached a high pitch in the second quarter of last century, when it found expression in the form of organized expeditions, chiefly to North America, though partly also to China and Japan, for the purpose of introducing species whose merits had attracted the attention of travellers. Almost continuously from 1823 to 1834 David Douglas was engaged in collecting seeds for the Horticultural Society, to be followed, under the same auspices, by Theodor Hertweg and Robert Fortune. The latter worked in China, a country which has recently received much attention from Wilson, Ward, and Farrer. In 1850 an association dispatched John Jeffrey to collect in the region west of the Rocky Mountains, and the minutes of this body, preserved at the Royal Botanic Garden in Edinburgh, are eloquent of the interest with which the results of the expedition were awaited.

These definitely organized expeditions, supplemented by the work of private collectors, resulted in the introduction to this country of most of the exotic trees, chiefly conifers, which now adorn our parks and woodlands. Many species have no more than a botanical and aesthetic interest, but some are of great commercial value, notably the Douglas fir, which, although it has some limitations, is capable of yielding results in this country much beyond those of any other single species.

In the laying out of ornamental plantations, and in the management of individual trees, British landlords and foresters are unsurpassed. But it is not too much to say that until the closing decade of last century they had only

2. BRITISH FORESTRY, PAST AND FUTURE

the most elementary acquaintance with the methods of rational systematic forestry, whose object is the production from a given area of the maximum amount of timber of the highest quality, due regard being had to a consistent relationship between the cost of production and the value of the produce. The main defect of British management has taken the form of having the woods too open, that is to say the growing stock has been so low as to be incapable of furnishing a normal return of timber, and therefore a full soil rental. A full return can no more be looked for from an under-stocked forest than from an under-stocked farm. Various causes have been at work to produce this result. The oak has played an important part in British forestry in the past, and the timber that was wanted for the ribs and knees of ships could best be furnished by trees that had been allotted ample room to develop large outstretching limbs. In the west and north of England, and in Scotland, larch is the tree which has been the chief object of the forester's attention. This species is intolerant of shade and crowding, and fine clean stems are produced in comparatively open woods. The ash is another tree with precisely similar requirements, and English ash timber has no equal for many important purposes. It has been alleged, and with the allegation I entirely agree, that, valuable as these trees are, they have had a detrimental effect on British silviculture. It is they—and especially oak and larch—that have set the standard of the management of our woodlands. It has been argued that what has been good for oak and larch cannot be bad for beech, spruce, silver fir, and other species of inferior value, with the consequence that a rule-of-thumb system of silviculture has prevailed which has resulted in the production of good timber from light-demanding species, and bad timber from the opposite group.

Other causes have been at work to keep our woods too thin. With very few exceptions landlords in the past have had their woods managed with an eye to sport. The situation of the plantation, the species of trees, the extent and

time of thinning and felling, have all been regulated more or less in the interests of game. All kinds of wild animals prefer an open type of woodland, where the trees have low-reaching branches, and where sunny spots are frequent. Moreover, they prefer a hundred acres in ten patches rather than in one, and none knows better than the game-keeper how this kind of subdivision helps to fill the bag, and therefore to please his master. But open woods are quite incompatible with the production of either quantity or quality in timber. Moreover, game, and especially ground game, does not need to be very abundant to make natural regeneration impossible, and this method of renewal of a woodland plays an important part in rational forest management. Apart, however, from this aspect of the case, rabbits and hares are most destructive to young trees, and will soon upset the best-laid schemes, or, alternatively, render necessary a heavy outlay on protective measures, and it is not to be forgotten that £2 per acre spent on netting means, at 4 per cent., a charge against the woods at the end of eighty years of £46.

British silviculture has also suffered in the past from a desire to add interest and variety to woodlands by mixing together a large number of species. Within limits, but these limits are very narrow, it is often desirable to plant two or more species on a given area, but whenever one gets beyond two, or at most three species, one adds greatly to the difficulties and cost of management. In any case, to be successful a mixture must be composed on definite principles—one species, deep-rooted, to protect the other against gales, or one, a shade-bearer, to conserve the factors of fertility for the benefit of its light-crowned associate—but the only principle that can be traced in the mixtures of last century is the principle of variety.

Other factors tending to make British forestry unprofitable in the past were the smallness and irregularity of the supplies of timber, which thus drove even local builders to imported material, till home-grown wood ceased to count

4 BRITISH FORESTRY, PAST AND FUTURE

even for the commonest kind of country structures. Timber has been felled, and the market supplied, as much at the whim or from the financial necessities of the owner, as from considerations of sound forestry, with the result that much timber has been left standing till it was decayed, and long past the time when the increment of the woodlands could furnish a reasonable return on the capital represented by the growing stock.

The market for home-grown timber has also suffered from the absence of any considerable areas of State forests in this country. Where they exist abroad they are found to have a steadying effect on markets, as their supplies of timber can be depended on to come forward with regularity. Moreover the State is in a superior position, as compared with the individual, to feed the market with heavy timber, a class of material essential to certain industries, but one which is less profitable than smaller dimensions.

Lastly, there falls to be mentioned a factor which, in its broad aspects, has had more to do with retarding British forestry than any, namely lack of facilities for education. The Indian Forest School was started at Cooper's Hill in 1885, and in 1889 the University of Edinburgh inaugurated the first Lectureship in Forestry which was primarily designed to meet British conditions. More recently additional centres of forestry instruction have been established, while other forms of education, in its wider sense, have taken the shape of the *Quarterly Journal of Forestry*, and of organized excursions to Continental countries.

The neglect of sound silvicultural principles, brought about by the causes enumerated, resulted in the production of timber of inferior quality. The stems lacked height and had too much taper, while the wood was open in the grain, contained too much inferior spring wood, lacked durability, and was full of knots. While there are exceptions to this indictment—notably oak, ash, and larch, to a lesser extent also Scots pine—there is no doubt that the low esteem in which British timber has been held has been justified. But

the soil and climate have had nothing to do with this result, which would have occurred in any country under similar conditions of management.

In the last quarter of the nineteenth century it was recognized that all was not well with British forestry, and in 1885 a Select Committee of the House of Commons was appointed to ascertain 'Whether by the establishment of a Forest School, or otherwise, our woodlands could be made more remunerative.' This Committee, after being twice re-appointed, reported in 1887, recommending (*a*) the establishment of forest schools in England, Scotland, and (probably) Ireland, (*b*) the creation of a Board to organize instruction, (*c*) the holding of examinations, and (*d*) the publication of an official syllabus and text book. No immediate action was taken on the Report, though more recently effect has been given to the first two recommendations.

In 1902 a Board of Agriculture Departmental Committee was set up 'To inquire into and report as to the present position and future prospects of forestry, and the planting and management of woodlands in Great Britain, and to consider whether any measures might with advantage be taken, either by the provision of further educational facilities, or otherwise, for their promotion and encouragement.' This Committee reported in the same year and recommended the establishment of demonstration areas in England and Scotland, Forestry Lectureships in Oxford and Cambridge, example plots near these centres and Edinburgh, provision of instruction in forestry at agricultural colleges, short courses and local lectures for foresters, technical advice for woodland owners, modification of the estate duty on timber, repetition by the Board of Agriculture of their inquiry as to the area and character of woodlands, and the planting of municipal water-catchment areas. Most of these recommendations have been given effect to.

In 1907 a Committee was appointed by the Vice-President of the Department of Agriculture and Tech-

6 BRITISH FORESTRY, PAST AND FUTURE

nical Instruction for Ireland to report on the condition of forestry, the preservation and extension of existing woodlands, and the financial and other provisions necessary to secure a comprehensive scheme of afforestation in Ireland. The Report recommended the afforestation of 700,000 acres, and a start has been made, but the rate of progress is very slow—little more than 1,000 acres of fresh land having been planted in the past ten years, which is much less than the area deforested during the period.

In 1908 the problem of unemployment was pressing, and the Government decided to enlarge the terms of reference to the Royal Commission on Coast Erosion, charging them to report 'Whether in connection with reclaimed lands or otherwise, it is desirable to make an experiment in afforestation as a means of increasing employment during periods of depression in the labour market, and if so by what authority and under what conditions such experiment should be conducted.' The Commission reported in January 1909, and recommended the afforestation of 150,000 acres annually up to an aggregate of 9,000,000 acres. The recommendations have not been given effect to.

In 1911 the Secretary for Scotland nominated a Departmental Committee 'to report on the selection of a suitable location for a Demonstration Forest Area in Scotland . . . and on any further steps . . . which . . . should be taken with a view to promoting silviculture in Scotland.' The Committee reported in the same year, recommending (1) a demonstration forest of at least 4,000 acres situated in a district suitable for afforestation, (2) one university centre providing the highest form of forestry education, with local instruction for working foresters, (3) a limited number of trial State forests, (4) a survey to determine the extent of afforestable land, (5) the appointment of advising forest officers, (6) State loans to private land-owners, the interest to accumulate until the crop is realized,

(7) amendment of the law affecting the taxation of woodlands to estate and succession duties. Some action has been taken only in respect of Nos. 2, 5, and 7.

In 1912 the President of the Board of Agriculture and Fisheries appointed an Advisory Committee in regard to (1) a forest survey, (2) experiments in silviculture and forestal demonstration areas, and (3) the instruction of woodmen. The Committee reported in the autumn of the same year, recommending a survey of seven selected districts of England, the creation of experimental forests of not less than 5,000 acres each in these seven districts, the creation of a demonstration forest, the inauguration of laboratory research and forestry experiments, and provision for the training of skilled woodmen. As a result the demonstration forest (Forest of Dean) has been started, laboratory research has been set a-going at certain centres, and a beginning has been made with the limited survey.

These many official inquiries, the outcome of outside pressure, show unmistakably that there exists in this country a strong body of public opinion in favour of the improvement of existing woodlands, and the extension of afforestation. Those who have been in close touch with the subject during the past twenty-five years gladly admit that in certain quarters a considerable improvement has been effected in the management of private woodlands. Certain owners of extensive woodlands have fully realized the unsatisfactory conditions that have hitherto prevailed and have set themselves with intelligent enthusiasm to reform their systems of management. Foresters have learned much from the authoritative manuals that have appeared of recent years, from lectures and meetings, from articles in technical transactions and periodicals, and, perhaps not least, from organized excursions to the Continent.

But there has been practically no afforestation of fresh land, and what little has taken place has been more than cancelled by the curtailment of the area of previously

8 BRITISH FORESTRY, PAST AND FUTURE

existing woodlands, a curtailment which, as the accompanying table shows, has been general in the three main divisions of the kingdom between 1905 and 1913 (1914 for Scotland).

	<i>Wooded Area (acres).</i>		<i>Decrease.</i>	<i>Percentage of Woodland.</i>
	1905.	1913.		1913.
England and Wales	1,899,834	1,884,068	15,766	5.07
Scotland . . .	868,409	852,120	16,289	4.46
Ireland . . .	302,933	297,809	5,124	1.46
Total . . .	3,071,176	3,033,997	37,179	3.96

The proportion of woodland in the United Kingdom, under 4 per cent., is lower than that of any European country. Denmark and Holland come nearest with 7 to 8 per cent., then follow Belgium, France, and Spain with 17 to 18 per cent., Germany and Hungary with 25 to 27 per cent., Austria with 32 per cent., and Russia and Sweden with 40 to 45 per cent.

Under the Census of Production Act, 1906, a return was called for of the production of timber in Great Britain, for the 12 months ending June 1908. This showed sales, or fellings for sale, of 14,845,000 cubic feet, of a value of £598,000, to which is to be added other classes of wood (pit props, small thinnings, cord wood, &c.) sold or used at home, bringing the estimated total up to £800,000. For the same period 904,667 trees weighing 261,855 tons, were returned as being felled in Ireland. Taking 30 cubic feet, quarter-girth measure, to the ton, it would appear that the normal annual timber output of the United Kingdom is about a million tons, of a pre-war value of a million sterling.

Since 1883, in decennial periods, our imports of 'Wood and Timber' have been as follows :

	1883.		1893.		1903.		1913.	
	Loads.	Value. £	Loads.	Value. £	Loads.	Value. £	Loads.	Value. £
Russia	1,356,064	3,021,697	1,637,134	3,204,159	2,255,962	5,722,376	3,760,250	10,726,382
Sweden and Norway	2,347,113	4,843,344	2,566,268	4,792,843	2,342,998	5,793,764	1,733,389	5,066,162
Germany	350,243	896,125	215,911	524,594	185,029	548,368	106,257	440,671
United States	111,285	433,763	451,733	1,438,779	892,045	3,330,038	756,623	3,869,014
British East Indies	41,531	587,710	32,783	338,378	54,117	705,273	37,122	700,313
British N. America	1,517,790	4,613,291	1,255,773	3,147,088	1,574,089	4,711,419	1,001,195	3,690,263
Other Countries	732,212	1,611,355	731,041	872,816	352,732	1,220,478	170,294	940,675
Pitwood	6,456,238	16,007,285	6,890,643	14,318,657	7,656,967	22,031,716	7,565,130	25,433,480
Staves	141,189	640,321	131,708	512,567	2,321,655	2,534,950	3,451,328	4,445,066
Mahogany, &c.	49,784	490,689	64,719	559,670	129,942	570,859	182,131	1,000,073
Total	6,647,211	17,138,295	7,087,070	15,390,894	10,373,226	27,118,124	11,589,811	33,789,356

NOTE.—Pitwood not separately distinguished in 1883 or 1893.
 Furniture wood, hardwoods, and veneers lumped with mahogany in 1903 and 1913.
 The total may be regarded as loads, although the mahogany, &c. is returned as tons.

10 BRITISH FORESTRY, PAST AND FUTURE

The value of our imports of timber in 1913 was nearly £34,000,000, without reckoning wood pulp, bark and other tanning material, rosin, willow rods, &c., of which wood pulp alone had a declared value of over four and a half millions. Of this huge total we are safe to say that at least ten million loads is represented by wood from European countries and Canada for which our climate is equally suited. It is evident therefore that we grow no more than 10 per cent. of what we consume of a product that might potentially be produced at home. Thus, our position with regard to timber is even less satisfactory than it is with regard to wheat, of which our home production represents about 18 per cent. of our requirements.

The war has emphasized many facts, and these, amongst others, that timber is essential to military operations, that, when it is most required, ships cannot be spared to import it, that the maritime activities of the enemy make its transport uncertain, that neutral countries may decide to limit exports, and that the supplies even of allies like Russia cannot be depended on to come to hand. The movement for increased afforestation has undoubtedly gained greatly in force since the outbreak of war, and although the advocates of extension have experienced little but disappointment in the past, it is difficult to believe that the future will continue to show the same inaction.

An extended scheme of afforestation is bound up with many important considerations. One cannot put land under trees without withdrawing it from some other purpose, for there is but little land in this country that is 'waste' in the strict sense of the term, and what little does exist is often situated at such an altitude as to be out of the question for silviculture. But there are wide areas of pastoral land that figure in the returns for Great Britain as 'Mountain and Heath Land used for Grazing', and in the Irish returns as 'Mountain Land', which is of low productive capacity from the point of view of meat, but

BRITISH FORESTRY, PAST AND FUTURE 11

much of which is well qualified to grow timber. There are also the deer forests and land reserved for game, some of which lies above the limits of tree growth, but much of which is plantable. The following figures are extracted from the returns of 1913, except as regards deer forests, which are from two House of Commons returns of 1908 :

		<i>Acres.</i>	
England	. . . .	2,467,000	‘ Mountain and Heath Land used for grazing’
Wales	. . . .	1,388,266	
Scotland	. . . .	9,117,906	” ”
Ireland	. . . .	3,050,266	‘ Mountain land’
Deer Forests and Land devoted to sport in Scotland	. . . .	3,519,678	
Total	. . . .	19,493,116	

While trees grow successfully above 1,500 feet in some parts of the country it is generally agreed that any land above this limit may, for practical purposes, be ruled out of a scheme of extended afforestation. Nor, indeed, is it contended that trees can always grow at points below this altitude. At the request of the Royal Commission on Coast Erosion the Board of Agriculture and Fisheries prepared an estimate of the area of land in Great Britain above the 1,500 feet contour line, with the following result :

In England	. . . .	549,335 acres
In Wales	. . . .	345,308 ”
In Scotland	. . . .	2,642,529 ”
Total	. . . .	3,537,172 ”

No estimate was made for Ireland, but as this is a country of low elevation we are certainly estimating liberally if we assume a total of four million acres for the United Kingdom. This therefore leaves us with about fifteen and a half million acres of rough hill and mountain pasture below 1,500 feet. At the initiation of a scheme of national afforestation it is of comparatively little importance to attempt to estimate what percentage of this area is adapted for the growth of trees. The Royal Commission on Coast Erosion came to the

12 BRITISH FORESTRY, PAST AND FUTURE

conclusion that nine million acres could, with advantage, be afforested, while Sir John Stirling Maxwell thinks that six million acres more fitly represents the case.¹ Of this, at least, there can be no doubt that our wooded area of some three million acres could with advantage be doubled, which would bring our percentage of forest land up to 8 per cent., and place us on a level with Denmark and Holland, though still leaving us far behind other European countries. With improved management an aggregate of six million acres should give us an annual increment of about six million tons of timber, which, although far short of our requirements, is a great advance on the million tons or so that we at present annually produce. When that stage has been reached it will be time enough to consider the question of further extension.

A question that at once occurs, in considering suggestions for extended afforestation, is the effect it would have on the food supply. While, in a sense, food is more vital than timber, the experiences of the past two years have shown that much is gained by limiting imports to concentrated substances, such as meat, and producing bulky materials, like timber, at home. The land which it is suggested should be afforested contributes only meat to the food supplies of the nation. It is grazed by mountain breeds of sheep, of which the best pastoral farms never carry more than one to the acre, and most of them much less. Much of it is rented at 3*d.* and 4*d.* per acre, and it is only in rare instances that the rent exceeds 2*s.* Many experiments have been carried out in England and Scotland during the past twenty years, which had for their object the determination of the amount of meat that sheep, grazing poor pasture, can produce in the course of a year. It would appear from these experiments that 15 lb. per acre per annum of mutton may be taken as a fair estimate for this class of land, to which has to be added 3 or 4 lb. of wool. Where the land is under deer the meat produced is practically negligible. The afforesta-

¹ *The Times*, June 20 and 26, 1916.

tion of three million acres would therefore displace, at most, 20,000 tons of meat, equal to less than one per cent. of our annual consumption. Four ships of 5,000 tons each would bring this meat to our shores in a single voyage, whereas the conveyance of the equivalent in timber, namely three million tons, would entail the requisitioning of one hundred and fifty times as much freight.

It is one of the advantages of the afforestation of pastoral land that it provides employment for an increased rural population. Under sheep, one thousand acres may be taken as the area which, on the average, provides employment for a shepherd, whereas under wood the same area would require a permanent staff of ten persons. Therefore, without taking account of wood-working industries, forestry can offer remunerative employment to a population ten times as great as finds occupation in pastoral farming. Moreover, the operations of forestry are conducted, for the most part, in winter, at a time, namely, when agricultural operations are least pressing. Small agricultural and pastoral holdings are therefore almost a necessary complement of forestry, and it is on this combination that a comparatively dense rural population is maintained in many districts of the Continent, and even in some parts of the north-east of Scotland. Not only is this the case, but one may go so far as to say that forestry is the only industry that can with success be introduced into pastoral districts, and on it alone will depend the success of any attempts to restore population to our Highland glens.

If it be conceded that a large extension of afforestation is desirable, the question next arises as to how such extension may be secured. One naturally thinks, in the first instance, of the afforestation of private lands, for at present privately owned woodlands constitute 98 per cent. of our total. As has already been pointed out, the tendency of late years has been towards a rather pronounced shrinkage of the private woodland area, and with the prospect of great financial stringency it is inconceivable that the tendency

14 BRITISH FORESTRY, PAST AND FUTURE

will be otherwise in the future. The returns from forestry, as gauged by interest on capital, are never attractive as compared with those secured in business or even in agriculture. Moreover, they accrue so slowly that the planter rarely lives to reap his crop. Then again, it is to be remembered that the extension of afforestation on a private estate affects the owner in two ways. In the first place he sacrifices the income that he has hitherto received for grazing; and in the second, he has to find capital, often greater than the freehold value of the land, which will be locked up for at least half a century.

These considerations are so self-evident that they have been universally recognized, and various proposals have been put forward to bridge the difficulties. A system of loans has been suggested, and, in fact, has long existed in this country in connexion with the Improvement of Land Acts, but so unattractive have they proved that in the sixty-eight years ending with 1914 the aggregate of the sums borrowed in Great Britain for planting only amounted to £109,475, and in the last three years no more than £928 was so borrowed.¹ In Ireland between 1866 and 1907 loans from the Board of Works for the same purpose totalled £33,600.² Most of this money was expended on planting for shelter, the rate of interest being about 3½ per cent., with an additional 1½ per cent. or thereby for repayment of the capital in thirty-five years. The effects of these loans on afforestation have been practically negligible. The experience of other countries has been precisely similar. Professor Schwappach reviewed the whole subject in a report to the Departmental Committee of 1902,³ where it is pointed out that State loans, associated as they necessarily are with official supervision, are rarely taken advantage of.

Loans in the past, in this and other countries, have always carried interest and an annual contribution to a

¹ Board of Agriculture Report (Cd. 7851), 1915, p. 217.

² Irish Forestry Committee Report, Appendix 11.

³ Appendix XXV.

sinking fund from the time that they are contracted. The Development Commissioners have now offered to lend a moderate amount of money to local authorities for the purpose of afforestation—chiefly of catchment areas of water supplies—the rate of interest to be 3 per cent., but this, with repayment of capital, to be chargeable only when the woods have reached a productive stage. Some work is proceeding under this scheme in the upper reaches of the Tweed and Clyde, and in North Wales, but as the arrangement is not available for private landowners the results cannot be great.

As regards private owners, the Commissioners propose that a Government Department should lease land on a proceeds-sharing basis, no rent to be paid till the woods are productive, when the proceeds would be divided 'according to the proportion which the rental-value of the land bears to the sum provided by the Government for afforestation and maintenance'. In their Report for 1915 the Scottish Board of Agriculture state that 'the response was been small, and the trend of negotiations already undertaken discloses some reluctance on the part of proprietors to co-operate with the Board on the terms prescribed'.

As an inducement to private afforestation some countries exempt new woods from rating and taxation for a period of twenty or thirty years. This aspect of the subject was considered by the British Committee of 1902,¹ by the Irish Committee of 1908,² and by the Scottish Committee of 1911,³ and vetoed by all.

In certain Continental countries considerable stimulus is given to the extension of private afforestation by the supply free of charge, or at a low price, of young trees. Schwappach reported in 1902⁴ that Prussia was then distributing annually about a hundred million trees for new plantations. The Departments of Agriculture in Ireland and Canada supply trees and shrubs free of charge for planting for

¹ p. 7.

² p. 46.

³ p. 16.

⁴ Report of British Committee, p. 211.

16 BRITISH FORESTRY, PAST AND FUTURE

shelter. Last year the former ¹ distributed about a million and a quarter, the latter ² about three and three-quarter million plants for this purpose. In Prussia and France the State may contribute up to two-thirds of the initial cost of private and communal afforestation if such work is considered to be specially desirable in the national interests. In other countries (Russia and Hungary) premiums are awarded for new plantations, a custom that was not unknown in this country in the eighteenth and early nineteenth centuries. In all cases the success of financial or material State assistance is greatly promoted by the provision of expert advice.

While it is desirable to stimulate the extension of private afforestation by all reasonable means, it would appear probable that, at the best, the results will be quite insignificant as compared with the national necessities. A matter of more pressing immediate urgency is the maintenance of existing woodlands. These are at present being felled at an unprecedented rate, and it is quite certain that, unless legislative action intervenes, many denuded areas will never be replanted. Timber speculators have in some cases bought whole estates for the sake of the timber they carry, and, the woods having been stripped, the land will be re-sold for what it will fetch. Our wooded area is far too small for the State to tolerate any shrinkage, and a statutory enactment is called for to compel replanting except under quite exceptional circumstances. Bavaria, Würtemberg, Brunswick, Baden, Austria, Russia, and Switzerland already possess such a law, and no landowner can complain if he is called on to expend on replanting 5 to 10 per cent. of the sum he receives from a sale of timber.

All who have with an open mind approached the study of national afforestation have arrived at the conclusion that this is essentially a subject for direct State action. The first necessity is the creation of a strong central authority with

¹ 15th Annual Report, pp. 74-75.

² Report of the Director of Forestry, 1915, p. 34.

power to survey and schedule all land that is more suitable for afforestation than for other purposes. An upper limit of value of, say, 3s. per acre of rent, or £3 of capital value, might, in the first instance, be taken as a general guide, and this would certainly embrace several million acres. Experience in the past has unfortunately shown that the Government is apt to seize on any excuse for delaying action, and the country must see to it that directly the survey has revealed a single area, afforestation shall proceed. While it is not expected that private afforestation will do much to relieve the situation, the owners of scheduled areas should in all cases be given the opportunity of performing the work. Where the land defined as afforestable forms only a small proportion of an estate, and especially if it is completely surrounded by and intermixed with the estate, the owner will probably, in most instances, make an effort to comply with the conditions of statutable afforestation, and thereby retain possession of the land. In some cases he would find the necessary capital, while in others the capital would be provided by the Government in the form of a loan. In other instances it may be necessary for the State to secure the land on long lease, in which case the owner would have no control of the woods or interest in the area, except that of a rent-charger, unless, as has been suggested by some, a proportion of the timber receipts were reserved to him.

While individual effort should everywhere receive encouragement it is not to be expected that private action will do much to clothe with trees the wide stretches of poor pastoral land that constitute the bulk of our afforestable area. There, purchase outright by the State would appear to be the only practicable procedure. As an alternative, which is not materially different from purchase, the owner might be given the option of granting a perpetual lease to the Government, receiving an annuity in name of rent. In this way he would enjoy a secure income, while the State would be spared the necessity of finding a corresponding amount of capital.

18 BRITISH FORESTRY, PAST AND FUTURE

While most of the land would probably be obtainable by mutual agreement, the State must be provided with compulsory powers to be used where necessary. Such powers have already been obtained in connexion with the purchase of home-grown timber, hay, wool, and other material, and people now recognize, as they have never recognized before, that private rights cannot be allowed to impede national interests.

The war has shown that industries vital to national security may be paralyzed if deprived of supplies of timber. This applies particularly to coal mining, on which practically the whole of our industrial activities depend. It would appear that at the end of the present war this country will be practically cleared of trees that have reached usable dimensions. We shall be more dependent than ever on imported material, and it therefore behoves us—unless the safety of the seas can be absolutely guaranteed, which is impossible—to see to it that afforestation on a scale commensurate with our requirements shall proceed directly demobilization begins. This means important preliminary preparations, on the consideration of which it is understood that a Committee is at present engaged. Under normal circumstances a planting scheme would be arranged to provide a regularly graduated series of age-classes. For instance, if 1,000 acres were to be afforested on a fifty years' rotation, 20 acres would be planted annually, and the whole completed in the fiftieth year. The fifty-first year would yield a clear-felling on the first-planted 20 acres, and, with immediate replanting of the felled area, the 1,000 acres would furnish 20 acres of timber annually, besides thinnings, in perpetuity. But the national emergency demands another method of procedure, for circumstances are not normal, and considerations of time do not admit of any such orderly sequence of age-classes. The policy, therefore, ought to be to afforest as rapidly as land can be found, labour secured, and plants produced. It is unfortunate

BRITISH FORESTRY, PAST AND FUTURE 19

that the work must be performed at high pressure, and at a time when a depleted Treasury will be able to make out a strong case for delay. The situation supplies another illustration of the result of lack of foresight on the part of successive Governments. .

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