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## History of forestry and forest management

BY G. D. HOLMES

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Britain possesses a forest area which is one of the smallest in Europe in relation to its population and land area. In the past, forests have been felled to make way for farming and to supply timber for ships, houses, fuel and metal smelting. Timber was a key to sea power, and repeatedly the availability of home timber supplies has proved crucial in time of war.

The nation's dwindling reserves of timber have been a source of anxiety since Tudor times and periodic surges of planting for timber production by private landowners took place, until about 1850. Thereafter, interest faded with the advent of the iron ship, the Industrial Revolution and the availability of cheap timber imports. Government activity was minimal until a national forest authority was formed in 1919 to create a strategic timber reserve. Since 1958 there have been frequent policy reviews to assess the changing needs of the nation for timber and the new values associated with the social and environmental benefits of forests.

This paper is designed to set the scene for those that follow. It contains very little that is original but an attempt is made to summarize some of the key features in the history of forest destruction and renewal in Britain from mediaeval to modern times. The attitudes and actions of Government and people to forests and their management have changed markedly throughout this period and some explanation of these changes and the reasons for them is helpful to better understanding of some of the issues of today.

### THE DWINDLING FOREST

Until the end of the seventeenth century the history of Britain's woodlands was largely one of destruction – sometimes rapid, sometimes gradual. At their greatest extent forests occupied at least 60 % of the land surface; they now occupy less than 8 %. It is extremely difficult to estimate the rate at which forests disappeared, but one can surmise that by Norman times only some 20 % of the country was wooded. It is possible to identify some distinct phases in the process of woodland destruction.

Until the early middle ages woodland was cleared almost solely for subsistence farming, usually open-field tillage or free-range grazing, to meet the needs of an expanding population. By the late middle ages clearance for farming and the increasing need to harvest wood for fuel, for metal smelting and for house and ship building, destroyed much of the woodland remaining in the more populated lowland areas of the country. One of the few factors restraining the clearance of woodland at these times was the existence of Royal Forests and 'afforested' areas preserved under strict forest laws protecting deer and game to provide sport and hunting for the king and nobles. These forests never occupied more than a fraction of English woodland, but they had important significance as a woodland preserve and as the first State forests.

In the early sixteenth century the rapid development of overseas trade and the expanding population led to sharply increased demands for timber for ships, houses and iron smelting.

This coincided with the dissolution of the monasteries and there were heavy fellings of timber throughout the period of break-up of these large estates. The extent of the destruction is hard to gauge, but as early as 1503 an Act of Parliament referring to the situation in England stated quite simply that the forests of the country had been 'utterly destroyed'.

Both James I and Charles I regarded the Royal Forests as valuable sources of revenue independent of Parliament, and secured ready cash both from sale of licences to cut timber and by extensive selling off of the actual woodland areas. The 1640 'Act for Limitation of Forests' was the signal for really widespread destruction of forests and their conversion to arable or grazing land or into barren moorland and heath. Further heavy depredations followed the Civil War, when confiscation and the fines imposed on the estates of Royalist landowners led to sales of large areas of forest land and to felling of timber to raise money. It is estimated that by the year 1700 the total forest area had fallen to 12% of the total land surface.

Throughout the seventeenth and eighteenth centuries the question of supply of timber for shipbuilding was crucial, especially English oak for the hulls and softwoods for masts and spars, notably pine imported from the Baltic States or from North America. Official concern about the dwindling forest and the need to secure these strategic supplies of ships timbers provide the keys not only to Government attitudes to forestry, but also to much of Britain's foreign policy in the period. Throughout the period mid-sixteenth to mid-nineteenth century English Government policy was directed almost entirely to controlling and reducing the rate of felling of oak for purposes other than supply of timber to H. M. Dockyards for the Navy. This proved a difficult problem because of the heavy and competing demand for oak for a variety of purposes and the ever present temptation to woodland owners to turn their woods into cash, even when the trees were half grown. The rival economic demand included the merchant marine, which on average required three times as much timber per annum as the Navy (e.g. in 1790 the Navy had 300 ships aggregating 391 000 tons, compared with 15 000 merchantmen in British registry aggregating 1 461 000 tons). Iron and corn were even greater rivals to naval timber. There was a continuing and heavy demand for oak for manufacture of charcoal for iron smelting, as well as the pressing demands of agriculture on the best oak-forest land. The immediate returns realizable by clearance and sale of the timber with the prospect of a succession of profitable corn crops were very attractive to owners.

The Royal Forests, of which 68 existed at the time of the Restoration in 1660, failed as potential sources of naval timber – largely due to incompetence and corruption and a division of authority between the Treasury and the Navy. The situation led the Commission of Land Revenue in 1788 to denounce the whole system as a 'perpetual struggle of jarring interests'. Eventually, the Royal Forests supplied less than one-tenth of the Navy's oak needs, the rest being supplied from private woodlands and parkland.

A further wave of heavy fellings in the Seven Years War of 1756–63 left England stripped of oak suitable for naval timber. Many English counties had only a quarter or less of the woods they had possessed 40 years before. At the same time, in Scotland the aftermath of the Stuart rising of 1745 led to large-scale clearance of the few remaining areas of unexploited pine and broadleaved forests in Britain – cleared to create sheep walks and to supply timber.

Up to the middle of the nineteenth century, Britain's timber needs were met largely from home sources. The centuries-old trading in English wool for timber from the Baltic and Northern Europe covered only a small proportion of needs and was mainly for special and strategic items, notably sawn softwood and softwoods for ships masts and spars, which were not available in

southern Britain. The Industrial Revolution changed this situation completely. On the one hand, the rise in population and the development of industry vastly increased demand for softwoods, while the advent of the iron ship and of coalmining dramatically reduced the need for oak for shipbuilding and for manufacture of charcoal. On the other hand, industrial wealth and the easy transport provided by the industrial infra-structure of shipping, canals, railways and roads, made it possible to import timber from all parts of the world – particularly softwood timber from the Baltic and North America. Timber of high quality and great variety could be bought in the markets of the world more cheaply than it could be grown at home. These dramatic shifts in the supply–demand situation away from the traditional demand for home-grown hardwood for fuel, smelting and shipbuilding to a new and fast rising demand for softwood for industrial use greatly reduced interest in home timber throughout the remainder of the nineteenth century. At this point the country's forest growing stock was at its lowest level of 870 000 ha (approximately 2¼ million acres), or less than 5 % of the land surface, lower than any other European country.

By the beginning of the twentieth century, 90 % of the country's needs of timber were met by imports – softwoods from the Baltic States, Russia and North America, and hardwoods mainly from tropical areas. The extent of this dependence on wood imports and the dangers that accompany it were brought home in the 1914–18 war when the German submarine campaign necessitated felling of over 180 000 ha (450 000 acres) home woodlands, almost all privately owned. The second world war in 1939, from the forestry standpoint, was almost a repetition of the first, and further devastating fellings were needed to reduce reliance on imports throughout the war. As before, felling was concentrated in the better, more productive woodland and this time 150 000 ha (375 000 acres) were cut. The supplies were crucial and the cost was great damage to the nation's private woodlands.

#### THE RENEWABLE FOREST

This history of dwindling forest resources has been punctuated by periods of alarm and of activity by private individuals and sometimes by Government to try to check the trend by reduced fellings and increased programmes of planting and replanting.

The motive has varied with the times. Most commonly it has been strategic, based on a realization of Britain's dependence on timber, especially naval timber, or more recently, industrial wood. At other times the motivation has been patriotism, fashion, aesthetic, sporting or investment considerations. For convenience and at the risk of over-simplification, the main phases of activity or stagnation concerning the renewal and management of forests from the seventeenth century to the present time can be grouped into the following periods:

- 1660–1700*: plantings of the Restoration period,
- 1700–1750*: a period of lack of interest,
- 1750–1850*: plantings of the Enclosure period,
- 1850–1914*: the period of plant collectors and committees,
- 1914–1939*: the World War I afforestation period,
- 1939–1958*: the World War II afforestation period,
- 1958–1973*: a period of re-appraisal.

*The plantings of the Restoration period (1660–1700)*

The first real alarm about the nation's timber supplies was in Elizabeth's reign when the danger of depletion of the navy's wood supplies was recognized. Because of this, the administration of the Royal Forests was centralized in 1542 under a Master of the Woods, later to become the Surveyor General of H.M. Woods and Forests in 1550, an office that was to persist for nearly three centuries with little change. The office came under the Court of Exchequer and the forests became part of Treasury jurisdiction. Management was weak, inefficient and often corrupt, and in practical terms this so-called centralized administration achieved little. The earliest effective effort to renew the forest resources by planting came in the late seventeenth century and involved this Royal Society. The heavy fellings of Stuart and Commonwealth times and anxiety about naval timber following the naval war with Holland (1652–4) prompted the Navy Board to appeal to the Royal Society for advice on possible methods of relieving the shortage. The Society assigned the task to the diarist John Evelyn, who as a result wrote his celebrated 'Sylva: a discourse on forest trees and the propagation of timber in His Majesty's Dominions'. This massive work was published in 1664 and was effectively an appeal to the landed gentry to plant oaks to relieve 'the impolitic diminution of our timber' arising from the increasing demands of shipping and iron works. Its publication coincided with the beginning of a major surge of private planting in the Restoration period. Disraeli, after the Napoleonic wars, wrote: 'Inquire at the Admiralty how the fleets of Nelson have been constructed and they can tell you it was with the oaks which the genius of Evelyn planted.' This assessment may be exaggerated, but there seems little doubt that Evelyn's enterprise was influential in inspiring landowners to plant trees for patriotic reasons. These private plantings were extensive, consisting mainly of broadleaved species, notably oak, much of it planted in parkland around the great houses. Apart from such parkland oak, coppice-with-standards was a common system – large oak being grown to 80–120 years as widely spaced standard trees with an underwood of oak coppice cut every 20 years or so for fuelwood and tanbark.

Government followed the landowners lead and in 1668 Parliament passed an 'Act for the increase and preservation of timber in the Forest of Dean'. This was a historic event, as the Act provided not only for protection of the existing forest but also for the enclosure and planting with oak of 4450 ha (11 000 acres) wasteland. In 1698 a similar Act was passed for the New Forest. The plantings were completed but by 1725 the enclosures were neglected through lack of organization in the Royal Forests and lack of a sustained interest by Government. This exemplified a pattern which was to be repeated time and again because of the inability of Government to sustain interest in a long-term project such as forestry for more than a few years after each emergency.

*A period of lack of interest (1700–1750)*

This was a time of general indifference in forest management. There were no naval wars to spur activity and the Restoration plantings had provided for the immediate future, and so there was some complacency about timber supplies.

*The plantings of the Enclosure period (1750–1850)*

The fellings of the Seven-Years War (1756–63) brought the timber shortage back to the 1660 level. The response to this situation coincident with the agricultural Enclosure movement led to events of great significance both for forest management and to shaping the rural landscape.

The enclosure 'movement' covered a period of Acts of Parliament for the enclosure of manorial open fields and commons, during which these lands were parcelled out among freeholders and tenant farmers. This process accelerated rapidly from 1750 to 1850 and opened the way to improved agriculture on compact holdings in place of the former scattered strips in the open village field. It also totally changed the landscape from open fields and woods with few permanent fences to the present familiar chess-board pattern made up of innumerable fields enclosed by hedges or stone walls. It was also responsible for much of what is present on the woodland scene today. Much of the original natural forest had been obliterated by free-range grazing and open-field tillage before the enclosures. When the manorial lands were divided, tenants were not interested in renting woodlands with their intermittent and delayed yields. Hence, at each partition the woodlands were nearly always retained by the landowners, who alone had the resources to manage them.

Two broad categories of woodland emerged from this process, i.e. land permanently enclosed as woodland and land left outside the farm enclosures as unsuited for agriculture. The first included the parks (or policies in Scotland) usually retained as the landowners' personal share of manorial lands, and in the south areas traditionally managed as coppice with standards were permanently enclosed. The second included most of the land to be developed for forestry, i.e. often land considered too steep, exposed, dry, wet or infertile for farming.

In 1759 fears about future shortages of naval timber led the Royal Society of Arts to encourage landowners to plant timber trees by offering awards of Gold and Silver medals for the largest plantations of each species each year. The first Gold Medal went to the Duke of Beaufort for an oak plantation in Gloucestershire. These awards continued until 1821 and many millions of trees were planted with their encouragement.

Throughout this period oak with its accompanying coppice formed the most profitable as well as the most patriotic crop. Thus, over the greater part of the Midlands, southern England and Wales, oak over coppice became the predominant crop; this system producing the massive and curved timbers required in ship building. In the upland areas, especially in Scotland where conditions were unsuitable for oak, conifers and a mixture of broadleaved species, commonly ash or sycamore, were grown. The great estate planters in England were matched or outdone by those in Scotland, the foremost pioneer being John, 4th Duke of Atholl, who created 4000 ha (10000 acres) of new forest, mostly European larch, in the Highlands of Perthshire between 1764 and 1826. In the same period, new forests of native Scots pine were planted in the valleys of the Spey, the Don, the Dee and elsewhere. In all, over 200000 ha (500000 acres) were planted in Scotland by private owners between 1750 and 1850. By contrast, little was done in Wales where there were few large landowners.

The planting achievements of the private landowners were not matched by Government. Nevertheless, an important review of national forest policy was undertaken following the appointment in 1787 of the Commissioners of Land Revenue headed by Sir Charles Middleton to investigate the management of Royal Forests and Crown Lands. This survey was able and thorough and they published no less than 17 reports over the period 1787–93 (reference (1)).

One of their main recommendations was that 28 000 ha (70 000 acres) should be enclosed and planted in the Royal Forests. They also commended European larch as a fast-growing, strong, durable timber suitable for masts and spars and suggested it be planted where oak could not be grown. The recommendations were finally adopted in 1808 stimulated by fears engendered by the Napoleonic wars. By 1823, 16 000 ha (40 000 acres) of Royal Forests had been enclosed and planted, but thereafter interest waned with the passing of the wartime emergency.

The period was undoubtedly one of great planting achievements in private forestry and the woodlands created at that time proved important sources of timber during the world war emergencies of the twentieth century. A combination of circumstances made the achievements possible. Thus, the *land* was available from unwanted 'waste' ground left over from enclosure of the new farms; the *money* for planting came from the rents of the new tenant farmers; the *labour* to do the work came from redundancies created by improved farming methods; the *motivation* came from the combination of patriotism and the prospect of a sound long-term financial investment. The climate of opinion was also favourable as this was the period of the 'improving landlords' who studied and practised scientific agriculture, making rapid progress in arable farming methods and stock-breeding as well as in forestry.

*The period of plant collectors and committees (1850–1914)*

This was a time of unusual stability and rapid growth in technology, in industry and in development of a large trading empire overseas – all of which served to reduce interest in growing timber at home. In private forestry, the greatest factor was the availability of a new and attractive range of investment opportunities in industry and overseas trade, all promising earlier and better returns than forestry. Also, the commercial and military value of hardwoods, notably oak, fell sharply due to the advent of the iron ship in 1860 and due to inroads by bricks and steel and softwood timber for traditional building uses. At the same time, industrial development required increasing amounts of timber, mainly as softwoods rather than traditional hardwoods, and these could be imported cheaply from the newly exploited virgin forests in North America and the Baltic States. Between 1843 and 1882 the volume imported trebled from  $2.5$  to  $8.25 \times 10^6$  m<sup>3</sup> (90 to  $290 \times 10^6$  ft<sup>3</sup>).

This was also a time of prosperity for landowners, many of whom had profited from industry and urban development. There was a great appreciation of the value of land for leisure pursuits, both on open land for deer stalking and grouse and in woodlands as game coverts and as attractive amenities on a country estate. A combination of wealth, interest in science and the environment, and a period of overseas exploration led to the creation of many of the famous arboreta and plant collections of today, such as Westonbirt, Sheffield Park, Crarae, Benmore and Borde Hill. In the mid-nineteenth century no fewer than 800 species of exotic trees and shrubs were imported by botanists and foresters. Those of forestry interest came mainly from North America, notably Douglas fir, Sitka spruce, Grand fir, Western hemlock and Western Red Cedar. At first, trees were planted as specimens in parks, arboreta and gardens and only rarely in forests. However, decades later these plantings were to prove of immense value in displaying the growth potential of new species in Britain.

Among the Asiatic species introduced was Japanese larch brought in by J. H. Veitch, and the first trees were planted by the Duke of Atholl at Dunkeld in 1883, within a short distance of the original European larch introductions planted 150 years before.

In the 1870s when the forest area was down to less than 5%, imported wood was cheap and

plentiful and there seemed no need for a positive national forest policy aimed at growing wood at home for industrial use. The attitude of Government was that, like farming, forestry is best left to private enterprise. However, by the turn of the century there was growing concern about the strategic dangers in relying entirely on timber imports. As a result, in the period 1885–1914, there were no less than ten major committees of inquiry and each to varying degrees declared itself in favour of a national programme of afforestation. At the same time the Forestry Societies (Royal Scottish Forestry Society 1854, and the Royal Forestry Society of England and Wales 1881) were pressing Government to adopt a positive policy. The most optimistic of these enquiries was the Royal Commission on Coast Erosion and Afforestation of 1909, which recommended new planting by the State of  $3.6 \times 10^6$  ha ( $9 \times 10^6$  acres) over a 60-year period. If this had been done, the area of managed woodland in the 1970s might have been  $5 \times 10^6$  ha and not  $1.5 \times 10^6$  ha as is the case. In 1910 a group of Scottish landowners headed by Lord Lovat made representations to Government to develop afforestation in the Highlands both for strategic and social reasons to try to reduce the rate of depopulation of the Highlands.

In the event, none of these major recommendations was accepted. As on earlier occasions, the time scale to achievement of benefits was too long to interest Government and there were no major and urgent military or economic pressures to stimulate decisions. Nevertheless, the Crown Office of Woods, Forests and Land Revenues began some State afforestation in a small way in this period 1899–1907. This provided a pointer to the mounting official concern and was also of some historic significance as the first instance of State planting outside the old Royal Forests.

#### *The World War I afforestation period (1914–1939)*

The acute timber supply problems of the Great War shocked Government into realization of the strategic importance and need for a sizeable reserve of growing timber at home. Not since the time of John Evelyn 250 years earlier was there such enthusiasm among politicians for forestry, only this time the concern was supply of softwoods for industry rather than oak for shipbuilding. Restoration and expansion of Britain's reserves of growing timber became an obvious need and in 1916 a Committee was appointed under Sir Francis Acland, M.P., to examine means of developing the nation's forest resources (2). This Committee recommended a long-term national forest policy aimed at creation of a strategic reserve of growing timber sufficient to meet the nation's needs for up to three years in a future emergency. The main thought was, of course, fear of another major war, but the policy was also concerned to insure against world scarcity of wood and to reduce the drift of population from the countryside. Its report also introduced a new idea, namely the need for an established national forest authority adequately funded and organized and charged with a dual task: first, to create new forests by acquiring, planting and managing land for forestry in the interests of the nation; secondly, to provide financial help and advice to private forestry to renew and extend their woodlands. The essentials of these proposals were accepted in the Forestry Act of 1919, which established the Forestry Commission as the Forest Authority for Great Britain, with a parallel authority in the Ministry of Agriculture for Northern Ireland. Based as it was on long-term objectives extending to 50 years and more and including finance to cover the first 10 years of operation, this was a remarkably bold and decisive move and it marked the beginning of a long-term national forest policy, albeit conceived during a period of acute emergency. The vulnerability of long-term plans to short-term crises was shown in 1922, when the newly formed Forestry Commission narrowly escaped destruction under the post-war crises economies advised by the



Geddes Committee on National Expenditure. Financial crises and fluctuating programmes were a feature of forestry in the inter-war years. Indeed, these problems inspired the Forestry Commission in its early days, under the Chairmanship of the late Lord Robinson, to press ahead as rapidly as possible to establish new forests so that their existence and the benefits derived from them would help ensure continuing interest in a long-term forest policy. By 1939 the Commission had acquired some 263 000 ha (650 000 acres) of land and had actually planted 150 000 ha (370 000 acres) in 230 new forests. In the same period 51 000 ha (125 000 acres) were planted and replanted in private forests with the aid of grants. A development of special interest in view of recent events was the Commission's foundation of several National Forest Parks. The first two – the Argyll and the Forest of Dean National Forest Parks – were opened just before the war to provide recreational facilities in some of the best scenic surroundings in Britain.

During the 20-year period from 1919 to 1939 the area of productive forests increased at an average rate of 10 000 hectares per annum, most of the new forests being created on bare land, notably low-grade upland grazing areas. Most of these sites were infertile and exposed and establishment of productive forests required a great deal of pioneer work in developing afforestation methods, including the extensive use of new conifer species which are capable of vigorous growth under these conditions.

*The World War II afforestation period (1939–1958)*

This was a continuation of the policies of the previous period, only with renewed emphasis and on a bigger scale. The new forests created since 1919 were too young to help in the 1939–45 war and the damage to the remaining private woods as a result of war-time fellings was highlighted in the 1947 Census of Woodlands Report. This survey revealed that out of a total woodland area of 1 400 000 ha (3 448 000 acres) only about 50 % or 708 000 ha (1 750 000 acres) were productive. The plans for post-war forest policy were conceived during the war and published as White Papers in 1943 and 1944 (3, 4). The policy was dominated by considerations of defence strategy and the prime aim was creation of a sufficient reserve of growing timber to make the country self-sufficient for up to three years in emergency. It was estimated that the required  $2 \times 10^6$  ha ( $5 \times 10^6$  acres) of productive forest would come from 800 000 ha for existing woodland and 1 200 000 ha from creation of new forests. This bold long-term aim was capable of achievement only by sustained efforts over a long period in both State and private sectors. It was recognized that private woodlands could not be restored without financial aid and an important landmark was the introduction of the 'Dedication Scheme' in 1947 which enabled an owner to dedicate his woodlands to forestry in return for a grant of money from Government. There was a considerable expansion of planting after the war. The dedication scheme was a success, private investment in forestry increased and by 1958, 280 000 ha (690 000 acres) of private forests were managed under Dedication and other grant schemes. In the same period, the Forestry Commission planted 263 000 ha (650 000 acres) new forests.

*A period of re-appraisal (1958–1973)*

The last 15 years has been a period of extremely rapid change in technology and in attitudes and values associated with forests and the environment. It is hardly surprising therefore that it has also been a period of frequent appraisals and reviews of forest policy, aimed at clearer definition of the changing functions and values of forests both in social and economic terms.

The first major shift in policy stemmed from the Zuckerman Report of 1957 (5), which concluded that with the advent of nuclear weapons expansion of forestry for reasons of defence strategy could no longer be justified. Shortly afterwards in 1958 there was a Ministerial statement (6) which reduced the emphasis on creating reserves of standing timber and gave greater weight to economic considerations and to social benefits of tree planting through diversification of employment, particularly in upland areas of Scotland and Wales. At the same time, a regular 5-yearly policy review was introduced to try and ensure that policy was kept attuned to the nation's needs. On each occasion the Commission's new planting programme would be defined for 10 years ahead to permit continuity and long-term planning. The review of 1963 (7) set a programme of 18 000 ha (45 000 acres) per annum for the period 1964–73. At the same time, further shifts of emphasis in national policy emerged. It was confirmed that the Commission's primary function should remain the production of timber to help meet the increasing demands of industry. Provision of rural employment remained a major factor in the case for continuing new planting, but for the first time landscape improvement and provision of public access and recreation opportunities were recognized as forest benefits. In 1964, Dame Sylvia Crowe was appointed as the Forestry Commission's first landscape consultant.

With the rejection of the defence strategy case in 1958, subsequent policy appraisals have centred around the question of whether forestry in Britain can be justified commercially, i.e. in terms of profitability and on commercial strategic grounds. There has also been increasing recognition of the value of forests in terms of landscape, wildlife conservation and recreation opportunities – the benefits of which are very difficult to measure. The central question to be answered now is whether the *total* contribution made by forestry to the welfare of the nation merits its share both of land resources and public investment.

Forestry is now a form of land management with a very diverse range of outputs. Timber remains the major product and output is rising rapidly as a result of increased planting programmes over the past fifty years and this has encouraged substantial investments in wood processing industries largely dependent on home-grown wood. The demand is high for all categories of produce for sawmilling, for pulp and paper, and for the particle-board industry. With home production at less than 9% of total consumption (see table 4, p. 79) there can be little doubt about the increasing worth and strategic-commercial value of home timber. The value of other products, notably landscape, wildlife protection and recreational activities of all kinds have also risen sharply in the last ten years. It seems almost certain that they will continue to do so as demand increases with rising population and income levels and increasing personal mobility and leisure.

In 1972 there was a major review of policy and for the first time this included an attempt to evaluate the social and environmental benefits of forestry. The study was conducted by a Treasury group of economists (8, 9). There were lengthy consultations with all interests concerned, and the response by private forestry included the commissioning and publication of an independent study (10). Thereafter, in 1973 (11) a Ministerial statement was issued setting out the principles governing forestry policy in future. The assessment was greatly influenced by the conclusion that when viewed purely as a financial investment, forestry is relatively low-yielding. In this respect Britain is no different to other parts of Europe; indeed, there appears to be no country in the Northern Hemisphere where investment in *new* planting can yield a return of more than about 3% on capital. For this reason, it was concluded that the case for new planting, whether in State forests or with financial aid in private forests, rests mainly on

social benefits, notably improved employment, landscape and recreational development and a declared policy that forestry should continue to form part of the pattern of rural land-use. The policy places a new emphasis on sound *land use* in which forestry is combined to the best possible advantage with agriculture and the environment.

Although the emphasis has changed, the production and supply of timber remains a major objective of management in State and private forests. In most cases this combines well with social objectives, but conflicts can arise. Forests designed and managed for one purpose, e.g. timber production, may not always be well suited to another, e.g. recreation. Taking the conflict to its extreme, efficient wood production requires simplicity and uniformity while the needs of amenity and recreation are best met by diversity of conditions. Reconciliation of these needs into a considered plan of action is the task of forest managers and in the great majority of circumstances it is possible to integrate management to achieve social, conservation and wood production benefits.

#### BRITAIN'S FORESTS TODAY

Today, at less than 8 % of the land surface, the forest area is below that of urban development (see table 1). This is one of the lowest proportions of forest in Europe and compares with 20 % for all E.E.C. countries and a world average of 32 %. Britain's forest area is less than 0.03 ha per head of population, which is one-tenth of the European average.

TABLE 1. LAND USE IN GREAT BRITAIN IN 1965 ( $10^6$  ha)

land category	England and Wales	Scotland	G.B. total	% total area
agricultural land	11.8	6.7	18.5	81.5
urban land	1.7	0.2	1.9	8.7
forests and woodlands	1.1	0.7	1.8	7.8
other land	0.4	0.1	0.5	2.0
total	15.0	7.7	22.7	

TABLE 2. WOODLAND TYPES AND OWNERSHIP IN GREAT BRITAIN IN 1973 ( $10^3$  ha)

woodland type	private woodlands	Forestry Commission	G.B. total	% total area
conifer high forest	425	710	1135	59
broadleaved high forest	285	40	325	17
coppice	30	—	30	2
scrub	395	25	420	22
total	1135	775	1910	
%	59 %	41 %		

The extent and ownership of the main types of woodland are a reflexion of their historical development (see table 2). Most, i.e. 59 %, of the woodlands are in private ownership. However, the area of productive high forest, which amounts to 1 460 000 ha, is about equally divided between private and State ownership.

Nearly 80 % of the high forest area consists of conifers and there is a marked contrast in the distribution of species by ownership. Nearly 90 % of broadleaved high forest is privately owned, while the Forestry Commission manages over 60 % of the conifers.

The age-class distribution of the high forest area is also historically revealing (see table 3).

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Half of the total forest area is less than 25 years old, which reflects the large afforestation and replanting programmes since the war and particularly since 1951. A high proportion of the young forests are conifers. At the other end of the age-scale, almost all the oldest forests are broadleaved; indeed, nearly 70 % of all the existing broadleaved high forest was planted before 1901.

TABLE 3. HIGH FOREST IN GREAT BRITAIN – AREA AND AGE-CLASS DISTRIBUTION IN 1972 ( $10^3$  ha)

year of planting	forest type		total
	conifer	broadleaved	
post-1970	129	5	134
1961–70	362	14	376
1951–60	325	25	350
1941–50	113	16	129
1931–40	100	15	115
1921–30	76	15	91
1911–20	11	17	28
1901–10	7	25	32
pre-1901	12	193	205
	1135	325	1460

TABLE 4. WOOD SUPPLIES FOR GREAT BRITAIN

year	under-bark volume/ $10^3$ m <sup>3</sup>		home grown as % of total supply
	net imports*	home grown	
1934–38 (annual average)	30667	1331	4.2
1939–45 (annual average)	10505	5890	35.9
1955	30979	2590	7.7
1965	38510	3511	8.3
(1975)	46500	4500	8.8
(2000)	73300	8700	10.6

\* Roundwood equivalent of all imported forest products.

The wood supply figures in table 4 illustrate some striking facts:

- (1) The very small contribution from home production before 1939.
- (2) The dramatic expansion of home production and the sharp drop in imports during the war, 1939–45.
- (3) The post-war increase in consumption and the rising contribution from home timber to nearly 9% of needs.
- (4) The trees that will contribute to home production by the year 2000 are already planted and at the expected rates of increase in supply and consumption the level of self-sufficiency is unlikely to rise above 11% at that time. The level of self sufficiency achieved thereafter will be determined by the programmes of new planting from now onwards.

Although the woodland area per capita is one of the lowest in Europe, the rate of consumption of industrial wood is the highest outside Scandinavia. This combination has meant that although timber is vital to the country's economy, the home timber industry has not been in a position to supply more than a small proportion of the nation's needs.

## LESSONS FOR THE FUTURE

(1) In most countries in Europe and North America forestry has developed on the basis of management of existing natural forests. In Britain this is not so and forests today are the result of conscious decisions to plant waste land or land excluded from agriculture. With a time scale as long as 100 years between decision to plant and the end product, *uncertainty* about the future has always been a major deterrent to action in forestry. In the past these long-term decisions have rarely been taken without the spur of a short-term crisis.

(2) Such uncertainty is inescapable and a periodic review of national policy every 5 years or so is necessary to check that this is kept in tune with changing social needs. On the other hand, forestry is a long-term business and there has to be a continuing long-term strategy that will create confidence if forestry is to flourish at all. Such strategy has to be based on acceptance of the idea that forestry must continue to have a place in our pattern of land use and must continue to make an increasing contribution to our economy and quality of life.

(3) This idea of periodic adjustment of objectives to meet changing needs requires a form of management that is sufficiently flexible to respond in this way. All I would say here is that *flexibility* is a need that must be kept in mind at all times and applied both to choice of species and treatment method in order to give a versatile product capable of a variety of end uses in industry – and to the forests themselves, which ideally should be capable of fulfilling a range of functions.

(4) All extrapolations from the past confirm that there is an assured and valuable future market for home-grown wood which, together with the increasing social and environmental benefits of forests, adds up to the fact that our existing forests are a large and appreciating national asset. I believe that our successors will take a similar view of the forests that arise from the planting being done today.

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