Field Studies **6** (1984), 117–148

NETTLECOMBE PARK—ITS HISTORY AND ITS EPIPHYTIC LICHENS: AN ATTEMPT AT CORRELATION

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ABSTRACT

Documentary records about the Nettlecombe Estate, Somerset, are available from the time of Domesday. Several surveys survive from the sixteenth century onwards and it is possible to follow the general history of the landscape through time. It is not, however, very easy to relate all the references to a deer park (or parks) to the present landscape and this paper describes how the distribution of epiphytic lichen communities was used to recognise former parkland and ancient woodland areas on the ground. Lichens characteristic of woodland may persist on individual trees for many years, even though the rest of the wood has been felled. A Revised Index of Ecological Continuity value of 75 confirms that Nettlecombe is not an intact medieval park (which would have given a value of 100 or more) but that significant remnants of the former woodland and parkland remain. As these relict lichen communities have survived for over 150 years it is hoped that they may be encouraged to persist into the future.

INTRODUCTION

Nettlecombe Court, Somerset, is situated at Grid Reference STO56377 in the northern lee of the Exmoor and Brendon Hills plateau. It has been occupied by the Field Studies Council since 1967, but the historical records of Nettlecombe begin nine hundred years earlier when it is mentioned in the Domesday Book as being held by the King. The grant of Nettlecombe to Hugh de Ralegh was made c. 1160 (document undated), and since this time the descendants of his family have kept records of their management of the estate and household, with letters, diaries and detailed accounts. Most of the surviving records are now on permanent loan to the Somerset Records Office (S.R.O.). From these we learn that a Park was an early feature of the Nettlecombe Manor, how the lord of the manor stocked his Park in the sixteenth century, and how subsequent enlargements and alterations to the Parks were made. On the ground, the presence of numerous ancient trees (as pollards or standards) testifies to the former parkland area.

Although much evidence for the extent of the medieval park can be obtained from the distribution and habit of the oldest native trees, further evidence can be obtained from the distribution of epiphytic lichen communities. Certain communities are characteristic of ancient parkland and forest and these may be used to reconstruct park and forest boundaries on the ground (see Rose, 1976).

This paper attempts to correlate environmental and documentary evidence for the extent of the Park, or parks, at Nettlecombe, using a simple lichen indicator community recording technique devised and used during a course at the Leonard Wills Field Centre in March 1981. The results are discussed and compared with other sites in the South West.

Today, Nettlecombe Court is surrounded on its southern, eastern and western sides by what appears to be eighteenth century parkland, with a rolling landscape of pastures and

valleys outlined with clumps of native and exotic trees. This, together with the more recently imposed field pattern, obscures the distribution of the comparatively ancient sessile oaks that were a feature of medieval wood pasture. Hedges are restricted to the region around Chidgley, the fields around Nettlecombe Court being divided by iron rails or wire fences. The upper part of the valley rises in a southerly direction to a steep wooded scarp at about 270 m O.D. Some of the changes in the boundaries and the overall extent of these woods may be seen from Figs. 1, 2, 3 and 4. To the north of the Court, the gardens and nineteenth century pleasure grounds give way to an area of arable land that extends to the Nettlecombe Home Farm and Huish Barton—the earlier home farm to Nettlecombe Court. To the east, the present approach road follows the valley from where the Nettlecombe stream joins the Monksilver stream at about 75 m O.D. in the small hamlet of Woodford. The approach to Nettlecombe follows the Parish Boundary at this point. It runs along a sunken lane, characteristic of this part of Somerset, with banks topped with ancient oak trees of great girth.

The location and management of fields, parks, woods and settlements form a complex mosaic of old and new which, with the aid of documents and field work, we shall attempt to place in a sequence.

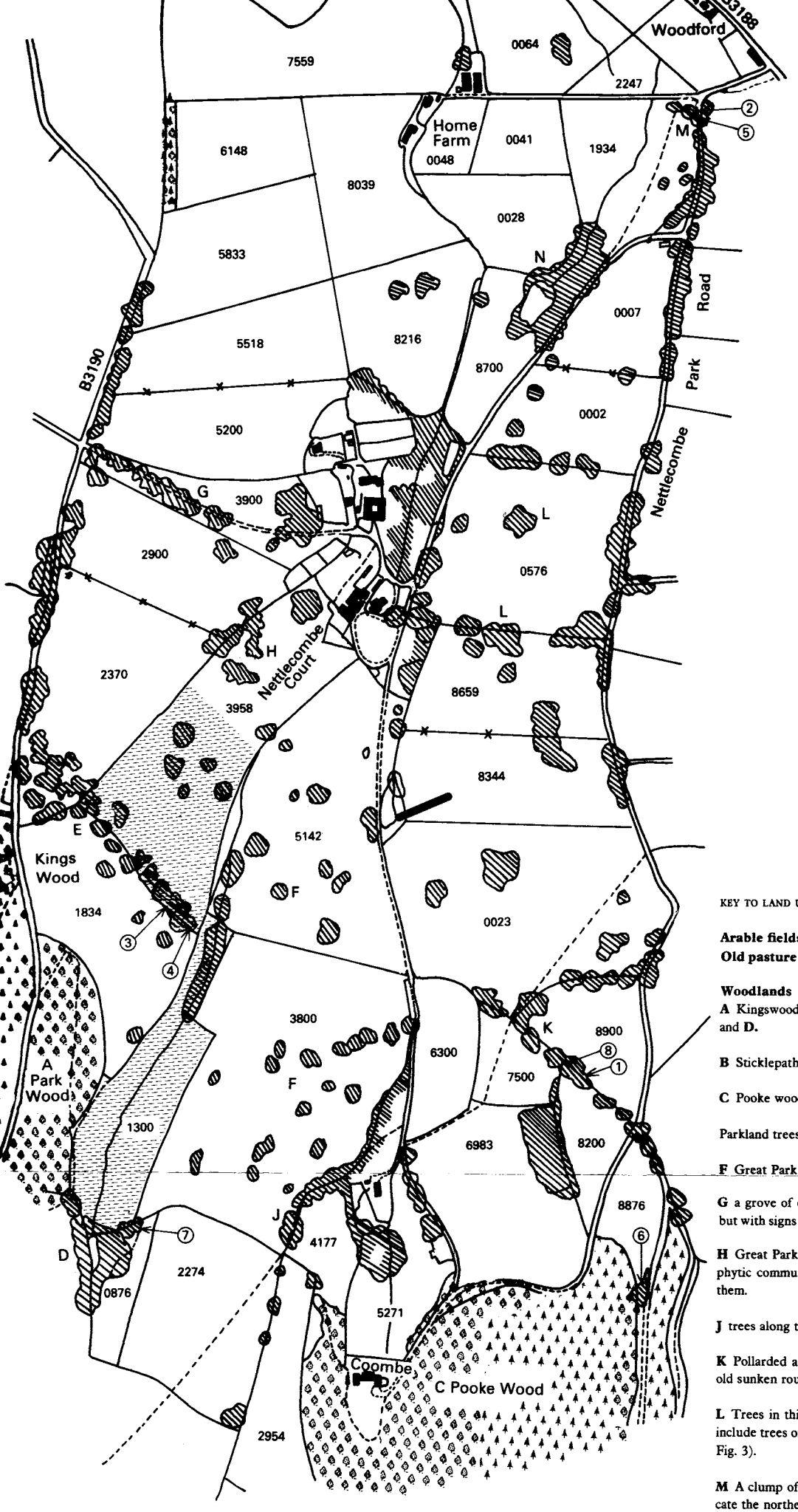
PRESENT AND RECENT LANDUSE

Arable Land— Most of the 70 acres (28 hectares) of arable land at Nettlecombe is situated on the lower land to the north of the Court. Other fields have been used as arable within the last decade. These include field O.S. numbers 0007, 2370, 2900 and 6983. None of the present Home Farm land was described as arable on the 1838 tithe map. Fig. 1 shows the distribution of oaks in this region.

The land to the north and east of Nettlecombe has been under intensive arable management for over 20 years. Winds from that direction account for some 30% of the wind rose in Ratsey (1973) and the growth of algae as a result of bark enrichment is widespread on the epiphytes in nearby pasture areas, for example on the bark of the oaks in the Grove ('G' on Fig. 1)—see Fig. 11. Arable land at Nettlecombe is regularly dressed with 500 cwt to the acre (10 tonnes to the hectare) of lime/muck/red slag.

Pasture— 234 acres (93.6 hectares) of land is maintained as pasture for sheep, cattle and horses, or as hay meadows. The pasture is distributed in two blocks; one centred around Nettlecombe Court and the other to the north, around Island Pond and below the Home Farm. All the pasture has been reclaimed at some time, although three leys—1834, 3958 and 5142—in the former Park Wood and Great Park areas are now upwards of 15 years old. (Fig. 1). The 1947 aerial photograph, Fig. 2, shows the area of the 1796 Great Park under rough pasture with considerable bracken. This was reclaimed in 1960. Other areas of the South Park and upper middle Great Park have been ploughed and re-seeded since, the latter sown with a rye grass and clover ley in 1980, whilst South Park and other areas are on 5 year leys of cocksfoot, timothy and clover. These areas are regularly dressed with 200 cwt to the acre (4 tonnes to the hectare) of lime/muck and red slag.

Bracken— 12.8 acres (5.1 hectares) extending up the Chidgley valley and about 11 acres of Court Field (the southwestern end of 3958–Fig. 1), enclosed since 1971, are dominated by bracken (*Pteridium aquilinum*) with some invasion of sycamore (*Acer pseudoplatanus*), rowan (*Sorbus aucuparia*) and sessile oak (*Quercus petraea*). These 12.8 acres, together with the 14 acres (5.6 hectares) above (O.S. 1834), were formerly within Park Wood (see Figs. 3 and 6). The bracken extended well into the Great Park before the 1960 reclamation.



KEY

- Field boundaries removed by 1983
- Footpaths
- A–M Areas as described
- Mainly deciduous woodland
- Mainly conifer woodland
- Bracken areas
- Individual parkland trees, groups, or copses

KEY TO LAND USE OF FIG. 1.

Arable fields 0002, 0007, 2370, 2900, 5200, 5518, 6983.
Old pasture leys on 1834, 3958, 5142, 8876.

Woodlands

A Kingswood and Park Woods, with the old boundaries of Park wood shown at **E** and **D.**

B Sticklepath is not shown on this map, but is shown on Figs 3 and 4.

C Pooke wood and outlying oak trees on the margins of Nettlecombe Park Road.

Parkland trees as individuals or clumps are hatched.

F Great Park trees frequently pollarded.

G a grove of oaks with a few beech trees, these being trees of great girth and size, but with signs of nitrogenous pollution from surrounding arable land.

H Great Park trees above the Court including a large Turkey Oak with a rich epiphytic community and a clump of a variety of trees with ancient oak trees among them.

J trees along the boundary of Great Park with the Glebe.

K Pollarded and standard trees on the boundaries of former glebe land and of an old sunken route to Coombe Cottage and to Nettlecombe Court.

L Trees in this area were included within the eighteenth century landscaping, but include trees of much greater age, particularly on old field boundaries (compare with Fig. 3).

M A clump of standard trees with a rich lichen community; all that remains to indicate the northern park.

N standard trees surrounding the lower pond that do not support old forest or parkland species of epiphytes.

1–8 = relevés, see Table 5.

FIG. 1.

Nettlecombe Valley today, based on the 1973 Ordnance Survey Map, showing field boundaries and markers. Also showing the present distribution of woodlands and parkland trees. The letters A to N indicate individual and groups of trees referred to in the text.

FIG. 2.
Aerial photograph of Nettlecombe in 1947. Note the area of unimproved parkland to the south and west of the Court. Note also the felled areas of Kingswood, much of this area being recolonised by birch scrub. Crown Copyright Reserved.

Woodland— The 123.88 acres (49.5 hectares) of woodland are distributed in two main blocks on either side of the valley:-

Kingswood and the surviving area of **Park Wood** contain 47.48 acres (19 hectares) and are situated on a freely-draining southeast-facing slope. Native tree species include sessile oak (*Quercus petraea*), holly (*Ilex aquifolium*), rowan (*Sorbus aucuparia*) and brown or downy birch (*Betula pubescens*) with some ash (*Fraxinus excelsior*) and hazel (*Corylus avellana*) in more sheltered areas.

In 1959, these woods were included in a Dedication Scheme with the Forestry Commission. At the outset of the Scheme, 19 acres (7.6 hectares) were described as already felled, with 12 acres (48 hectares) of mature oak remaining. The felled areas were planted with Japanese larch (*Larix kaemferi*), douglas fir (*Pseudotsuga menziesii*), sitka spruce (*Picea sitchensis*), norway spruce (*P. abies*) and beech (*Fagus sylvatica*). The mature oaks are not of great age.

Sticklepath, and **Pooke Wood** contain 72.83 acres (29 hectares) of woodland on a steep north-facing scarp. The boundaries between these woods were altered between the 1796 and 1886 maps (Figs. 3 & 4).

Sticklepath (**Beacon Hill Plantation** on the 1796 Estate Map). It is difficult to determine from the documentary evidence whether this plantation is on old pasture or on a former coppice with earth-banked compartments. Its present structure is of mature sweet chestnut (*Castanea sativa*), scots pine (*Pinus sylvestris*), some larch, beech and sessile oak, with abundant regeneration of ash and sycamore. The woodland has been regularly grazed and has a ground flora of wood soft grass (*Holcus mollis*), bluebell (*Hyacinthoides = Endymion non-scriptus*) wood speedwell (*Veronica montana*) and other flora of damper woods in parts.

A feature of the boundary with the pasture below (north of) the wood is the presence of a bank and ditch that appear to be quite separate from the footpath known as Sticklepath (Steep path).

Epiphytic lichen species characteristic of ancient woodlands are notably absent except on a few boundary trees.

Pooke Wood—comprises two areas, one of mature oak with some scots pine planted about 1820, whilst the rest has been included in the Dedication Scheme and was extensively felled and replanted since 1959. There are few remaining ancient trees within the wood, but on the boundaries with the pasture there are trees with Lobarion species (see p. 132/133) on.

GEOLOGY AND SOILS

One of the chief factors influencing the native flora, as well as the management regimes within the valley, is the nature of the bedrock and the soils derived from it. This landscape is carved out of Devonian siltstones, with occasional bands of sandstone and limestone. The rock weathers to give a rich, almost neutral, red loam characteristic of this area and of part of South Wales on the other side of the Bristol Channel. On the steeper slopes the rock is very near the surface and small quarried areas are frequent where stone has been taken for buildings or roads. The northern aspect of the Brendon Hills is an anticline so that the north-facing slope of Pooke Wood and Sticklepath is damp with spring lines that provide water for the settlements of Chidgley and Nettlecombe. The east-facing slope of Kingswood is drier. These differences are reflected in the species of trees and ground flora found there, the former containing abundant ash regeneration with opposite-leaved golden saxifrage (*Chrysosplenium*) dog's mercury (*Mercurialis*) and bugle (*Ajuga reptans*), whilst the latter has sessile oak with holly and rowan. The bilberry/whortleberry (*Vaccinium*) or bracken dominated ground flora here is characteristic of the drier slopes of both Exmoor and the Quantocks.

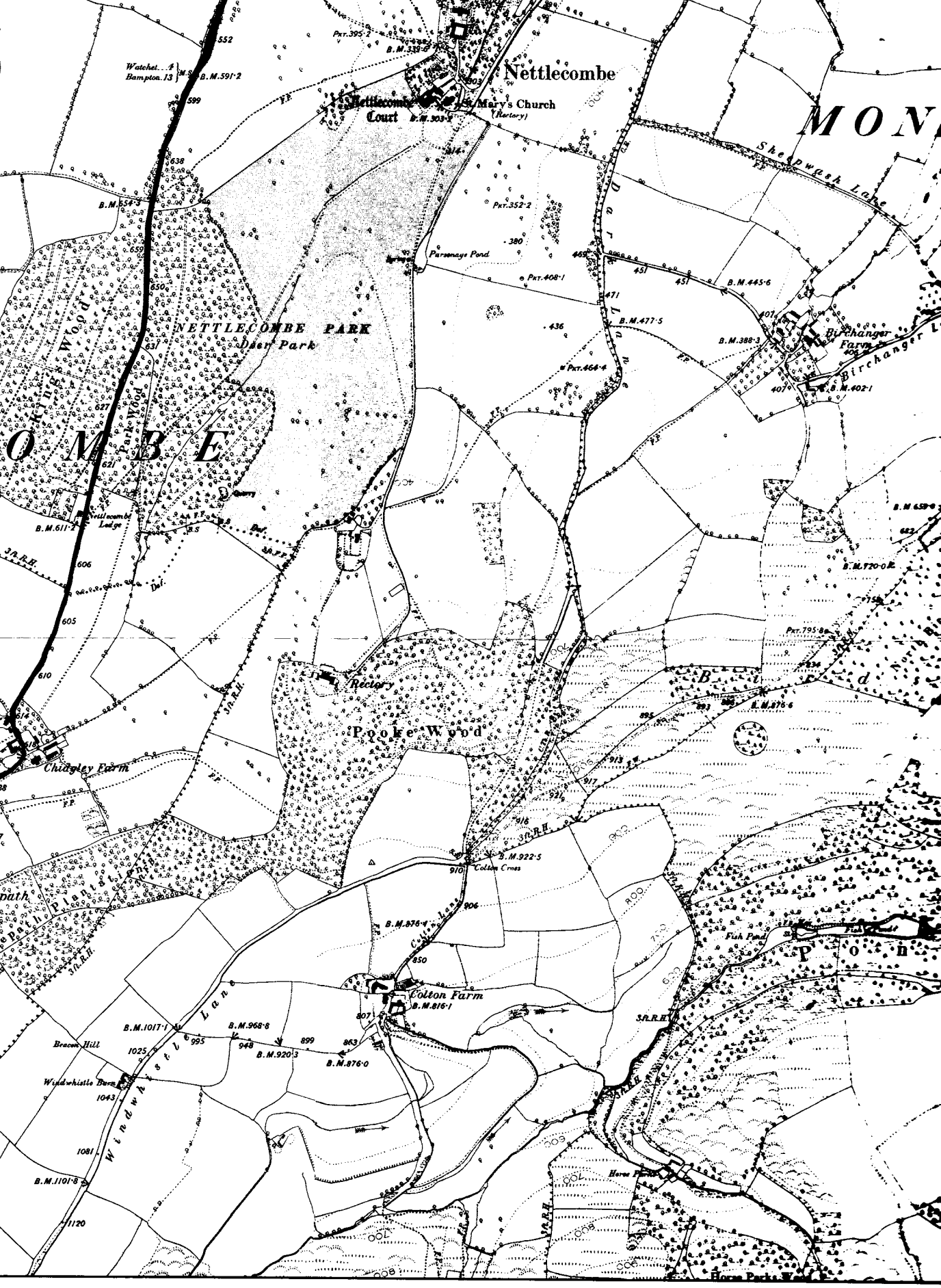


FIG. 4.

Portion of the Ordnance Survey map of 1886, showing the extent of Park Wood and with both parkland areas distinguished in grey.

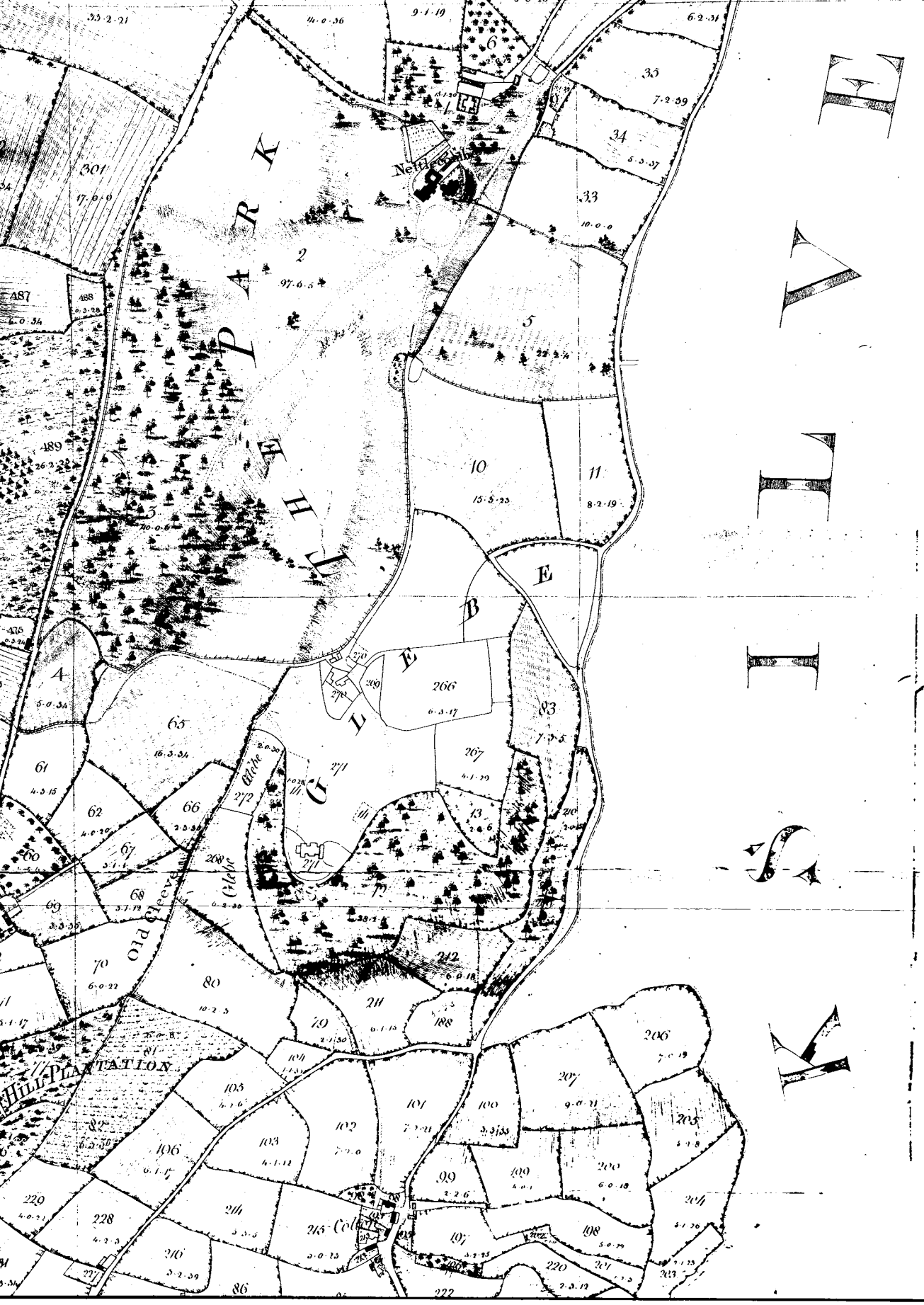


FIG. 3.

Portion of a map of the Nettlecombe Estate in 1796 showing Great Park, Park Meadow and Beacon Hill Plantation amongst other places mentioned in the text. Original on permanent loan to the Somerset Record Office: reduced photocopies framed in The Leonard Wills Field Centre.

Table 1. *The average monthly rainfall figures (1979–1982) for the two climatological sites in Nettlecombe, compared with the data from Flatford Mill Field Centre on the East Coast of England*

	Rainfall			*Relative Humidity*	
	Nettlecombe Court	Birds Hill	Flatford Mill	Nettlecombe Court	Birds Hill
January	74	78	40	88	89
February	79	83	33	87	90
March	144	158	61	82	87
April	37	40	25	79	80
May	65	78	44	80	78
June	65	73	57	81	85
July	46	49	34	82	86
August	62	77	38	80	86
September	70	86	49	83	86
October	130	146	81	85	90
November	90	102	56	86	87
December	166	172	62	89	89
	1029 mm	1142 mm	580 mm	mean 84	mean 86

The valley is only 5 km from the coast and there is a considerable maritime influence on the climate—especially on the relative humidity which is frequently over 80% when the south-westerly winds are blowing (Ratsey, 1973). The precipitation is also characteristic of a coastal site in southwestern England, with rain on about 170 days a year. The high average rainfall throughout the year contrasts with Flatford Mill Field Centre's records on the east coast (Table 1). Temperature records show more of a continental pattern, with a tendency to colder nights in the valley and regular ground frosts between November and April. Valley temperatures are generally warmer than those on Bird's Hill (1.5 km to the south on high ground) during the summer months and this, in turn, affects the relative humidity.

High rainfall is characteristic of high land in West Somerset (Fig. 5). In the deep coombes of this area the relative humidity is also high, creating the conditions in which epiphytic lichen communities, characteristics of ancient woodland, flourish. These communities are still widespread in the southwest and even where the tree cover is sparser than of old, as in Nettlecombe, the climate allows their survival. This situation contrasts strongly with that in the drier eastern counties where these particular communities can only survive in a few undisturbed ancient woodland sites.

The Distribution and Traditional Management of Ancient Woodland Sites

Notwithstanding the influence of climate, the distribution of the old-forest lichen communities today is most frequently related to conditions of past management. Although management practices have changed considerably from the time when man first settled and enclosed areas of the original "wildwood" (Rackham, 1976), in some areas a continuity of environmental conditions has permitted the survival of epiphytic communities characteristic of that wildwood.

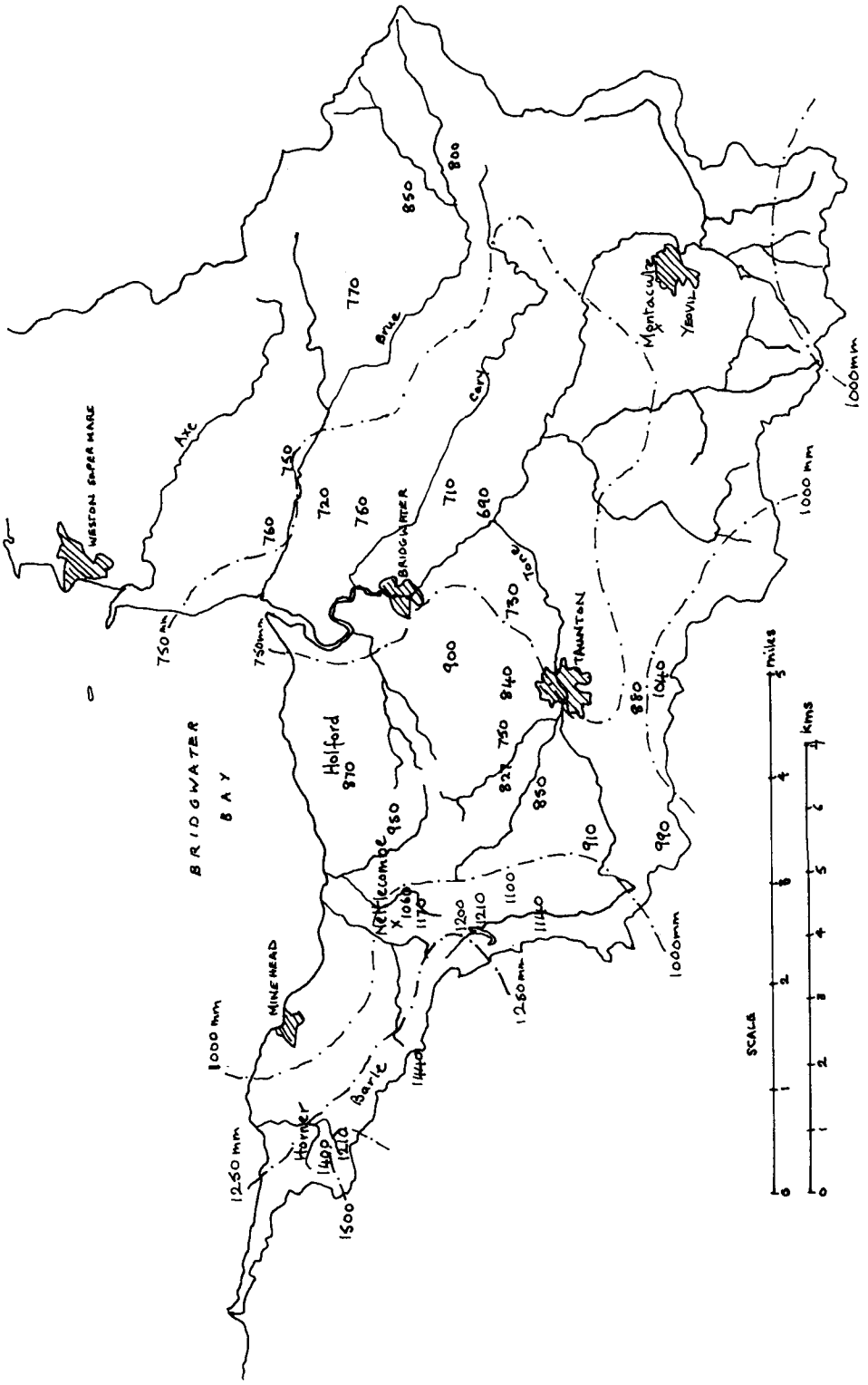


FIG. 5.
The distribution of rainfall in Somerset. The map also shows the location of various sites mentioned in the text.

The traditional forms of management—as Royal Forest, chase, medieval park or common land—were adopted for a variety of reasons, yet each produced a stable wood pasture regime, viable enough to persist for many centuries. They all encouraged grazing whilst restricting the removal of ancient trees.

Royal Forests

Although Royal Forests are generally associated with the Norman Kings, this is mainly due to their passion for defining boundaries and rights of usage. The Saxon Kings before them had also been great hunters, but left few records of the areas of land concerned. There is, however, a record in a Taunton charter to a Saxon hunting party progressing to "Curig vel Williton".

It is possible that the Normans took over the long-established hunting grounds and defined them with perambulations and their complicated system of Forest Laws. The Forests were large unenclosed tracts of land set aside for hunting the wild animals of the chase—red deer (*Cervus elaphus*), roe deer (*Capreolus capreolus*), swine (*Sus scrofa*) and hare (*Lepus capensis*)—by the king and his lords. Although under the jurisdiction of Forest Laws, these areas considerably exceeded any woodland boundary and often included settlements and enclosed land. Some, such as Exmoor, were mainly moorland and contained very little woodland. Much of the area was commonable, as it is today in the New Forest (Hampshire)—a unique survival in Western Europe. Elsewhere much former Royal Forest land is enclosed and either farmed or forested.

The Royal Forests of Somerset were:- Exmoor, Mendip, Neroche, Selwood and North Petherton (including Quantock). Eyton (1880), in the *Domesday Survey of Somerset*, calculated that there were 14,400 acres (5760 ha) of woodland and 21,600 acres (8640 ha) of pasture within the King's Forest in the hundreds of Carhampton, Williton and Cannington (between Williton & Cannington) (Greswell, 1905).

Chases

Chases are tracts of forest land leased by the Crown to prominent subjects—Lords, Bishops or Abbots. Rackham (1980) warns that the term is not used consistently. There are none in the area around Nettlecombe.

Parks

Medieval Parks were created to maintain a supply of meat, usually in the form of the introduced fallow deer (*Dama dama*) but also through the establishment of rabbit (*Oryctolagus cuniculus*). These animals provided a valuable source of fresh meat in winter at a time when regular supply of fresh beef or mutton was unobtainable. The poor, if they had any meat in winter, had to rely on salted-down supplies: the Parks not only supplied their owners with venison and other game but also provided an income from grazing.

There are few records of Parks before the Normans arrived, but one of them is of the Royal Park at Clarendon in Wiltshire. In the Norman period, Parks were created by Royal License to empark, given to a private individual. The owner was required to enclose them, and sometimes the type of enclosure is specified in the grant. At Ashton-Lyon, a grant of 1392 states that the lord should "enclose the aforesaid lands with ditches and hedges" (Greswell, 1905). In other places an outside ditch and an inner bank with a pale of cleft oak stakes was commonly used. By 1509, Polydon Vergil, Archdeacon of Wells, remarks that "almost everywhere a man may see clausures and parks paled and enclosed and fraught with Venerie" (Greswell, 1905).

There are 36 deer parks mentioned in the Domesday survey of Britain, but at least another 290 were created by license to empark between 1200 and 1350 (Carter & Hatherley 1979). Saxton included 700 deer parks on his 1575 map and 16 of these are in Somerset. They are mainly distributed in the regions of open woodland with pasture in the environs of the Royal Forests. Dunster and Nettlecombe Parks are probably associated with ancient Saxon hunting grounds. Parks often contained parts of the original wilderness and frequently included fragments of the primary forest (Brandon, 1953).

Deer Parks varied considerably in size. The Ashton-Lyon park was described in 1892 as 1000 acres (400 ha); Dunster Park was 416 acres (166 ha); Nettlecombe Park, 97 acres (38.8 ha); Combe Sydenham, 13 acres (5.2 ha) whilst a park at Hatch was only 8.5 acres (3.4 ha) (Greswell, 1905). As the deer were enclosed within the park, the area had to be large enough to sustain the herd throughout the year. The size of the herd and the variety of habitats were important considerations when creating a park.

With improvements in agriculture the deer parks gradually fell out of use, until the eighteenth century when a new generation of parks were created by wealthy noblemen as landscape amenities to their country seats. However, park-like landscape is not created overnight and many of these eighteenth century parks incorporated ancient trees (features of earlier parks) as well as new plantations to create a classical landscape.

Common Land

On common land, certain local inhabitants (the commoners) had rights of:–

pasture—that is, of grazing their beasts

pannage—that is, to turn out their pigs in autumn to feed on acorns and beech mast.

estovers—that is, the collection of dead branches for fuel

turbary—that is, the cutting of peat.

They did not have a right to remove timber trees or to enclose ground, and thus a wood pasture regime was maintained. Commoners' grazing and other rights have survived into the twentieth century in a few areas, particularly on poor hill land that would have been uneconomic to enclose and improve. In most places, however, the commoners sold or divided their right and, with the landowner's consent (and often encouragement), enclosed and improved the former commons. In Somerset, many small commons still survive. They, as well as large tracts of land on the Quantocks and Exmoor, include wood pasture sites that are rich in epiphytic lichen species.

The Environmental Features of Wood Pasture

We can reconstruct the conditions within a wood pasture regime from documentation and from an examination of the surviving examples. Trees grown in the open develop a spreading "park-like" habit. Parkland trees were frequently pollarded at around 50–80 year intervals. As this prolongs the life of the tree, surviving examples are often of a great age (as well as of a characteristic shape, Fig. 10) although this may be difficult to establish as the heart wood may be missing or rotten. Trees were originally pollarded (rather than coppiced) to provide a supply of wood above the reach of browsing animals. Constant grazing and browsing discouraged regeneration and created a "savannah" woodland of scattered trees and open areas. Within this system any farmland or true woodland had to be embanked and fenced.

Within well-grazed parkland, shrubs other than holly (which resists browsing) are scarce. The grassy sward, to judge from a surviving example in Knole Park (Kent), would have been dominated by fine-leaved tufted grasses, especially *Agrostis tenuis*, as most parks were on poor and acidic soils. It may have been the reduction in grazing pressure that allowed bracken to

invade. Extensive local dominance of bracken is characteristic of many old parks today. This plant is sensitive to trampling but, once established as a closed stand, is not palatable to animals and shades out most other plants.

Documentary and Field Evidence Concerning Nettlecombe

The Manor of Nettlecombe is described in the Domesday survey of 1086 as being held by the King for one knight's fee (Bush & Corbett, 1970). It comprised 6 acres (2 ha) of meadow (for hay), 100 acres (40 ha) of pasture and 50 acres (20 ha) of woodland. There was (arable) land for 20 ploughs although only 12 were used. Today, the remaining parts of Nettlecombe Manor contain 234 acres (94 ha) of pasture, 70 acres (28 ha) of arable and 123 acres (49 ha) of woodland. This land has never been sold in historical times.

Following the completion of the Victoria County History's (V.C.H.) survey of Nettlecombe Parish (see V.C.H. V; to be published 1985), an inventory of each unsorted box of Nettlecombe records held at the Somerset Record Office is now available. This greatly facilitated the location of information concerning woodland and park management. There are, however, anomalies concerning the location and extent of the deer park following the original grant of free warren made to Simon de Ralegh in 1304. We have used the distribution of epiphytic lichen communities to confirm the areas involved.

The Park

The grant from Edward III is made to Simon "and his heirs" that they "should have for ever free warren in all his demesne lands of Nettlecombe and Rowdon... provided that these lands are not within the bounds of our Forest." This type of grant was frequently associated with emparkment and in some cases (but not this one) the creation of a park is mentioned in the grant.

A Park is first mentioned in a 1532 survey of Nettlecombe as being northest of the manor. In 1556 it was said to be 80 acres (32 ha) in extent. In 1619 it was described as being 70 acres (28 ha) in extent and comprising the fields shown in Table 2. During this period the Lord of the Manor regularly supplemented his income by taking grazing animals, such as the cattle and horses of local inhabitants, into the Park—as mentioned in a notebook of 1582. This area of park is now pasture and lies below the Home Farm. It is the location of the paled deer park indicated on Speed's map of 1610.

The 97 acres (39 ha) of the southern or Great Park, shown on the 1796 Estate Map (Fig. 4) are not however mentioned in the 1619 survey. Nor are the 40 acres (16 ha) of Park Wood, although Kingswood is accounted for and is the same acreage as on later surveys. This suggests that the area was not producing an income for the estate in 1619, but may have been common wood pasture for the inhabitants of Nettlecombe, the settlement at this date being along the valley towards Combe. This is also suggested by the creation of a second park in 1755, south of the house, and including Park wood and adjoining land. However, there are earlier references to this area as a park. In 1524, a lease refers to Kingsdown Close 'by Park Gate' (now opposite the lodge below Kingswood), and in 1741, a survey mentions:– "Chidgley Close, the Legger, part of Furze, Hockworthy Mead, Hancock's Tenement, part of Burcher's, all let into hand and enclosed within the Park". Chidgley Close is the field adjacent to Chidgley Pond and Park Wood, while the other areas are described on the 1619 survey as being on Beacon Hill—now called Sticklepath. The documentary confusion over the southern park is probably due to the changing etymology of the word park over this period. The environmental evidence indicates the ancient semi-wooded management of this area and its extent. By the latter half of the

Table 2. *Nettlecombe Parks, their extent in the 1619 estate survey, the 1838 tithe map and the 1973 Ordnance Survey map*

1619 estate survey	acres	rods	perches	1838 tithe map	acres	rods	perches	1973 OS map acres
Nether Lawn	8	0	0	Little Lawn	8	0	20	10.38
Myddle Lawn	12	2	20	South Lawn	11	2	34	10.66
Yonder Lawn above the rayles	10	2	20	North Lawn	11	2	3	11.00*
Park below the rayles	38	2	0	House Piece Meadow	12	1	19	11.18
				Park Great Meadow	30	2	38	31.30**
Total	69	3	0	Total	73	1	34	74.52
Great Park not included				Great Park	97	0	5	101.72**

Notes: *Now combined with another field.
**Now divided into several fields.

eighteenth century, both Parks are regularly mentioned in surveys and called respectively Great Park Meadow and Little Park Meadow.

In 1792, the Great Park was landscaped by Thomas Veitch of Exeter, after the style of 'Capability' Brown and from his estimate we can interpret many of the features in the Park today. The southeastern boundary of Great Park is in a valley that formerly contained several dwelling houses—as indicated on Day and Masters' map of 1782. These cottages were removed when the Park was landscaped and the inhabitants re-housed at Woodford in cottages dated 1824, 1852 and 1865—implying rather a long interval between the landscaping of the Park and the building of the replacement cottages!

Veitch also estimated to "make a sunk fence all through the canal field in length 77 pole (387 m) making the said sunk fence 7 feet (2.13 m) deep on the side nearest Nettlecombe and 6 feet (1.8 m) wide at the bottom, so as to make a proper fence for deer on one side and cattle on the other when a railing is put on the higher side of the sunk fence to be only 3 feet 6 inches high (1.07 m)". The ditch still remains around the northern and western boundaries of South Park although the fence of this ha-ha has disappeared. This area has also been landscaped but it incorporates some large standard oaks (and, formerly, a wych elm of great girth and age) that clearly predate Veitch's landscaping. Elsewhere in the Great Park region are other ancient pollards and standard trees, relics of the open pasture and the edges of Park Wood.

The Glebe (i.e. church) lands associated with the Parish of Nettlecombe were formerly in the area around Combe House (marked as "Combe" in Fig. 1), extending to the southern boundaries of South Park (formerly called the Canal Field). These were later exchanged and brought into the estate in the eighteenth century, prior to the building of Combe House as a more suitable rectory and a second son of the family. Although we do not know the exact location of the earlier rectory described in sixteenth and seventeenth century terriers, there is an approach to Nettlecombe from Colton Lane down the sunken track at 'J' on Fig. 1 which runs between the former glebe lands and the Nettlecombe lands. This entrance is not marked on the 1796 map (Fig. 3) and so had fallen out of use by this date. In 1639, the parsonage is described as being bounded on the south and west sides by the highway, which description fits the location of the present Combe Cottage, with the 'high-

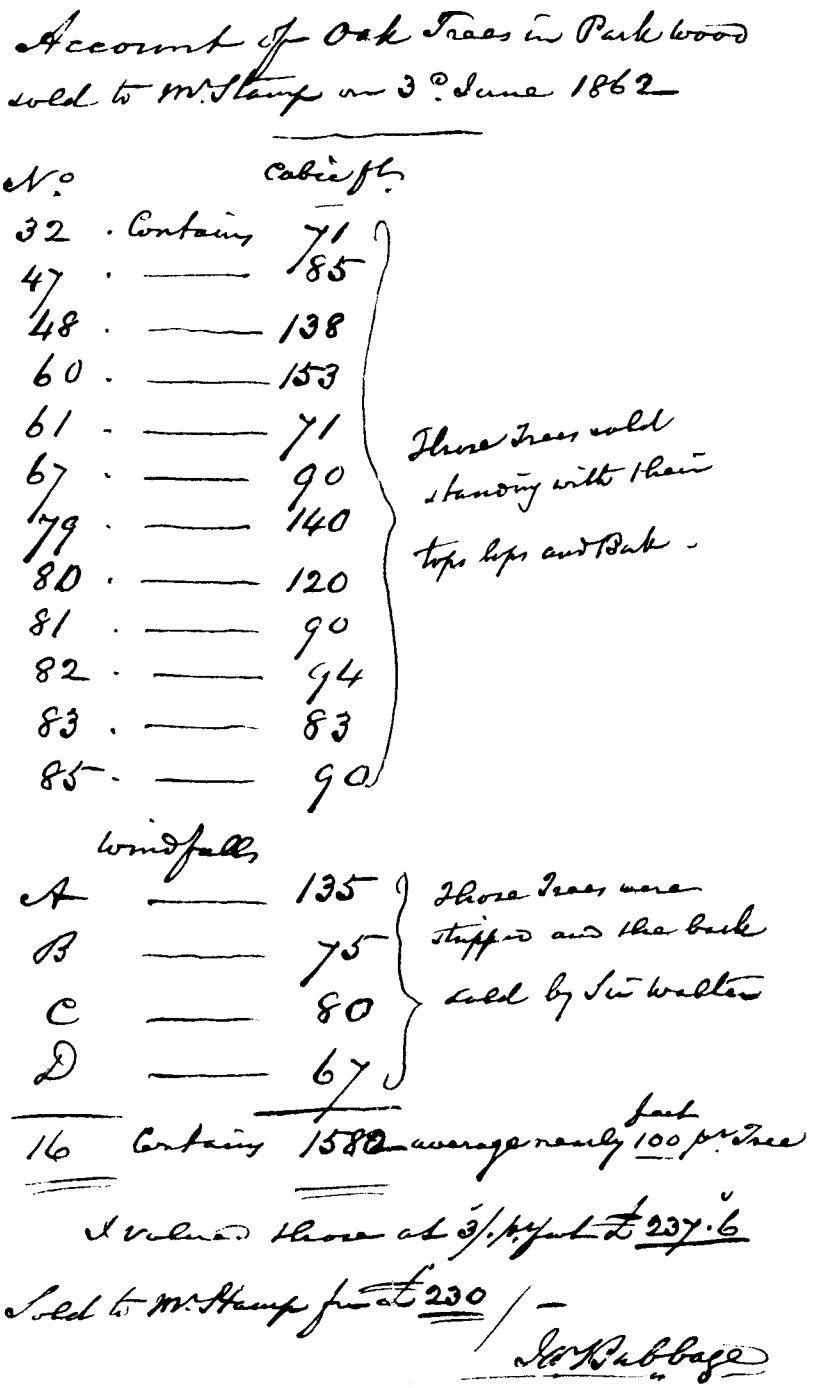
way' to Nettlecombe on its southeastern boundary and the path to Chidgley to the west, just outside the enormous ditch that bounds Great Park at this point. The parsonage land is described as being north and east of the house—which also indicates that Combe Cottage is the original site for the dwelling house.

Woodlands

Evidence for woodland acreage and management comes mainly from leases, bills of sale and account books in which the work done in the woods was recorded. Although only Kingswood and Rowden Wood are mentioned in the 1619 survey, sixteenth century accounts include work done in Treborough, Bower and Woodadvent Woods. Nettlecombe seems to have been known for its timber at this period as in 1591 oaks were bought to build a market house in Cornwall!

However, the early accounts do not give us information concerning the Park and Park Wood management. The nineteenth century accounts give considerable detail, both of the state of the woodlands and of trees sold or work done in them. By 1796, the pastures taken into the Park with Hancock's tenement were put down to Beacon Hill plantation (Fig. 3). In 1826, a survey of Nettlecombe woods includes 606 acres of woodland. These were described as:- 124 acres of young and thriving timber (including Pooke Wood), 187 acres of timber or timber with coppice (including Kingswood, Park Wood, Bower Wood and Treborough Wood), 116 acres of coppice and 89 acres termed plantation. The remainder are described as sundries. Today the "young and thriving timber" part of Pooke Wood is a mature stand of sessile oak, so the site must have been felled prior to 1820. Coppice was used for charcoal burning, as shown by a lease of part of Bower Wood in 1821 to a charcoal burner for 20 years, it having last been cut in 1806. This practice continued into this century (R. J. Greenslade, *personal communication*). Bark from coppice and timber trees was sold for tanning (see Fig. 6) and there are numerous mentions of the haulage and sale of bark in nineteenth century accounts. Other timber sold between 1829 and 1866 included:-

		Oak	Ash	Elm	Chestnut	Cherry	Sycamore
1829		2014	201	94	1	1	3
	itemised:-						
	Park Wood	138					
	Pooke Wood	16					
	Treborough	342					
1854		471					
	itemised:-						
	Treborough	199					
	Woodadvent & Kings Copse	144					
	Bower Wood	128					
1862		101					
	Nettlecombe	85					
	Park Wood	16	(as in Fig. 7)				
1866		120					
	Treborough	72					
	Woodadvent	48	(by railway)				


Account of Oak Trees in Park wood
sold to Mr Stamp on 3d June 1862

No.		Cubic ft.	
32	Contains	71	Those Trees sold standing with their tops lops and Bark.
47	——	85	
48	——	138	
60	——	153	
61	——	71	
67	——	90	
79	——	140	
80	——	120	
81	——	90	
82	——	94	
83	——	83	
85	——	90	
	Windfalls		
A	——	135	Those Trees were stripped and the bark sold by Sir Walter
B	——	75	
C	——	80	
D	——	67	
16	Contains	1582	average nearly 100 p.r Tree last

I valued those at 3/. p.r foot £237.6

Sold to Mr Stamp for at £230/—

Jas Babbage

FIG. 6.
A note of the sale of timber from Park Wood in 1862 by Mr. James Babbage, Estate Manager, including a note of the cubic footage of some of the trees.

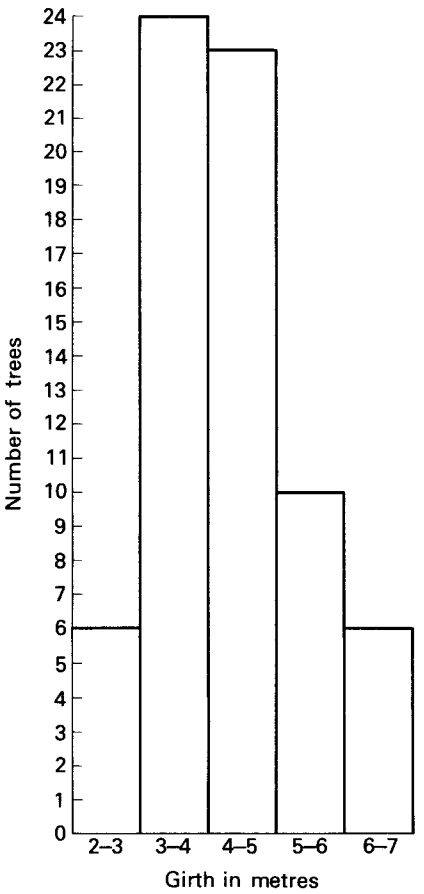


FIG. 7.
Girth size histogram for a sample of Nettlecombe oaks.

According to the accounts, Park Wood was extensively felled in 1829, although Park Wood is shown on the OS map of 1886 (Fig. 4) extending into Great Park. Today, the only remaining ancient trees from this date are to be seen in areas 'D' around Chidgley Pond and 'E'. There are no ancient trees within the present Park Wood.

During the nineteenth century, much planting of native oak and other hardwood trees was done in the woodlands, in Pooke Wood, Park Wood (within its present boundary) and, probably, Kingswood as these trees are of similar age to those in Pooke Wood. The areas of coppice mentioned in the 1826 survey of Kingswood are still apparent below the conifers in the upper part of the wood.

Although the growth habit of many of the Great Park oaks indicates from early until nineteenth century pollarding, no reference to this has been found in the records so far. From the variation in ring density on the stumps of recently-cut pollards, it seems to have taken place at between 50 and 80 year intervals. The age of the standard trees in the Park areas is best estimated by using girth as an indicator of age, with growth rate in the valley estimated by ring counts on trees that have fallen or been felled. Girths of 69 trees were measured in all parkland situations throughout Nettlecombe, excluding woodland standards. The sample of girths is shown in Fig. 7. Ring counts gave 190 years for a girth-at-base of 3.5 m; 230 years

for a girth of 4.3 m; and 260 years for a girth of 4.5 m. The girths-breast-height would have put these three trees in the 3–4 m category. From the data in Fig. 7 it is clear that many of the oaks are older than the eighteenth century landscaping and, moreover, that there has been very little planting of oak trees within the Park or woodland environs at that date or since.

Both the standard and pollarded trees have a particular habit when grown in open park-like conditions, with wide spreading crowns and numerous side branches as illustrated in Fig. 10.

Parkland epiphytic habitats

The distribution of trees within the farmed areas is shown on Fig. 1. Standard trees grown in forest conditions are only found in areas E and D, and these have subsequently developed side branches since the removal of the major part of Park wood. Since the exposure of these trunks to a drier atmosphere in the last century the Lobarion elements in the epiphytic community have almost disappeared except in the damper Chidgley Pond area D and one tree in the upper part of area E. However the old forest elements of the dry bark community are widespread on these trees.

Old pollards are found chiefly in the region of Great Park, F, and on the boundary with the Glebe, K. These have been exposed to increasing amounts of fertiliser as well as to more exposed conditions since surrounding trees have gone. Park-like standards are found throughout the area, the largest specimens being in areas G, H and L. Where the fertiliser drift from arable land is not excessive these oaks contain a rich Xanthorion community. Standard trees around the lower pond, N, and in the eighteenth century landscaped clumps in South Park are poor in epiphytic species.

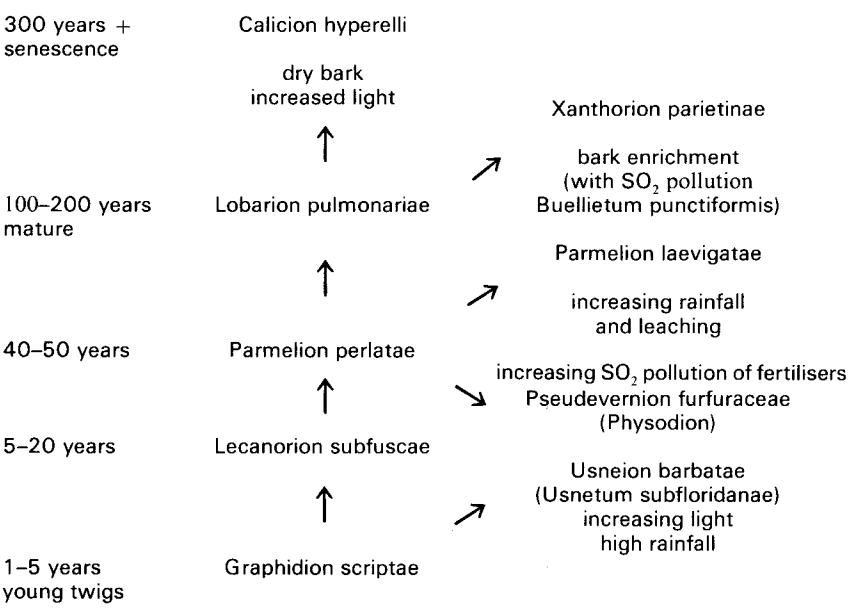


FIG. 8.

The succession of lichen communities with age under various conditions. The vertical route indicates the "normal" succession on oak in unpolluted lowland old forest and parkland.

DESCRIPTION OF EPIPHYTIC LICHEN COMMUNITIES IN THE ENVIRONS OF NETTLECOMBE AND THEIR RELATIONSHIP TO ENVIRONMENTAL FACTORS, INCLUDING MANAGEMENT

Within such a climatically-uniform regime as this high-rainfall/high-humidity valley presents, epiphytic lichen communities develop that are characteristic of the species, age and situation of their host tree. The factors influencing the association of species include:-

1) The intensity of illumination.
2) The humidity of the environment throughout the year.
3) The age of the bark surface.
4) The smoothness (or roughness) of the bark surface.
5) The rate of shedding of the bark.
6) The continuity and the age of the woodland cover in a site.
7) The inclination of the trunk or branch—this will affect illumination and humidity.
8) Aspect.
9) Rainfall and the amount of bark leaching.
10) The degree of impregnation of the bark by organic nutrient.
11) Air pollution.
12) Agricultural fertiliser pollution.
13) The acidity (pH) of the bark surface.
14) The basic nutrient status of the bark.
15) The presence of tannins, betulin, resins etc.
16) The basic moisture retaining and absorbing properties of the bark.
(See James, Hawksworth & Rose in Seaward, 1980).

The expected succession of lichen communities with the age of a tree in a humid but relatively unpolluted valley, such as Nettlecombe, is shown in Fig. 8, together with some of the variants due to exposure, light and agricultural management. Within each "alliance" one or more distinct "associations" may occur, depending on the local conditions. The associations are characterised by the species that occur regularly and are said to be "faithful" to the association, largely confined in occurrence to it. Other species may occur in several different associations, or their presence may be indicative of changing conditions. Those associations occurring in Nettlecombe and other southwestern combes are described in Table 3.

In the early stages of twig colonisation by endophloedal species of the Graphidion, a variation in the light conditions can produce different associations. Open park or gladed situations encourage the development of an Arthopyrenietum punctiformis (common in Nettlecombe), whilst deeply-shaded situations encourage a Pyrenuletum nitidae (rare in Nettlecombe but common in the bottom of steep-sided Exmoor combes). In moderately-shaded woodlands the Graphidetum scriptae will develop, as it does in Sticklepath and other valley side woods.

Although each association contains characteristic species, some of these may vary from region to region whilst others may be sensitive to disturbance e.g. coppicing or pollution. Within the Arthopyrenietum, *Tomasellia gelatinosa* is rare in this area, although frequent further west and in Welsh cwms, especially on *Corylus* twigs. *Mycoporum quercus* is not frequent except in unpolluted woodland and parkland situations, as along the edge of Park Wood and along woodland margins on Exmoor. In West Somerset, the Graphidetum scriptae rarely includes *Phaeographis dendritica* (a species characteristic of this community in some southern and western areas) but does include locally the, nationally rare, species *Graphina ruiziana* in the anciently-wooded valleys. However, under increasing organic or chemical pollution this entire alliance may be absent and replaced by an algal growth on the bark surface.

Table 3. *Epiphytic lichen communities found at Nettlecombe, at elsewhere in Southwest Britain. For further details and descriptions of the lichen communities see James, Hawksworth & Rose in Seaward (1981)*

Alliance	Association	Characteristic Sites, Species & Location
Calicion hyperelli	Calicietum hyperelli	found on dry sides of ancient trees in shaded and humid situations. Characterised by: *Chrysothrix candelaris, Calicium viride, Cliostomum griffithii* and *Schismatomma decolorans.* This association is only relict at Nettlecombe but remnants of it occur in old forest sites elsewhere in the Southwest.
	Lecanactidetum premnae	found on well-lit ancient parkland and woodland oak trees that have become dry and less-acid with age. Characteristic species include:- *Lecanactis premnea, L. lyncea, Opegrapha prosodea, Schismatomma decolorans* and *Arthonia impolita.* Widespread at Nettlecombe in the regions of ancient parkland and forest although sometimes restricted to few species in sheltered crevices of bark receiving inorganic fertiliser pollution. Restricted elsewhere to old forest sites.
	Lecanactidetum abietinae	widespread in nineteenth century plantations, forming extensive pink/grey patches on the drier sides of trees. *Calcium viride* occurs within this association and, in older but still acid woodlands *Schismatomma decolorans* and *S. niveum.*
Graphidion scriptae	Arthopyrenietum punctiformis	found in humid woodland situations, on twigs, characterised by species with scanty eustoscthalli such as: *Arthopyrenia lapponina, Arthonia punctiformis, A. radiata, A. tumidula, Mycoporum quercus, Opegrapha atra, Tomasellia gelatinosa.* Rare in the Southeast: found at Nettlecombe on the edges of Park Wood. Frequent elsewhere in old forest sites on hazel.
	Graphidietum scriptae	found in moderately-shaded woodland conditions on smooth-barked tree species, young or old. Characterised by: *Graphis* species and *Phaeographis.* Rare in the Southeast. At Nettlecombe it is only frequent in the Sticklepath Woods, elsewhere it is common in Exmoor woods.
	Pertusarietum amarae	found in woodland and gladed situations on standard trees, usually on trunks. Characterised by: *Pertusaria amara, P. hymenea,* and *P. pertusa;* and in old forest conditions by *Schismatomma quercicolum* (in ed.) and *Thelotrema lepadinum.* Found at Nettlecombe on rougher, more water-retentive, bark than the Graphidietum scriptae, in woodland areas. It is more widespread in the woods of Exmoor valleys.
	Pyrenuletum nitidae	found in densely-shaded ancient woodlands, on smooth or rough-barked trees. Characterised by: *Pyrenula nitida, P. nitidella, Enterographa crassa, Arthonia lurida, A. spadicea, A. tumidula, Opegrapha atra, O. viridis, O. rufescens* and *Porina leptalea.* This association is only relict at Nettlecombe on ancient trees in areas B and D (Fig. 1). It is, however, widespread in the Barle Valley, at Horner and elsewhere on Exmoor.
Lecanorion subfuscae		found on well-lit twigs and young hard wood trees, characterised by: *Lecanora chlarotera, L. expallens, Opegrapha atra, Parmelia subaurifera, P. exasperata.* Rare at Nettlecombe on the edge of Park Wood. *Pertusaria leioplaca* and *Rinodina sophodes* occur at all sites.
Lobarion pulmonariae		found on mature and old trees in ancient woodland sites in regions of high humidity. Characterised by species in Table 4. Local at Nettlecombe, in region E and of

Table 3. *Continued*

Alliance	Association	Characteristic Sites, Species & Location
		Pooke Wood (Fig. 1). Elsewhere along valley bottoms of ancient Exmoor woodlands e.g. Barle, Horner and others. With increased shade the alliance becomes species-poor and with increased drying species from the Calicion appear. See relevées nos. 8 & 9 in Table 6.
Parmelion perlatae	Parmelietum revolutae	found on well-lit trunks and branches of hardwood trees in pastures and open woodlands. Now the "central" community of well-lit mature hardwood trees of pH 5–6: formerly a Lobarion would have succeeded, at least in the more humid situations. Characterised by: *Cliostomum griffithii, Evernia prunastri, Pyrrhospora quernea, Parmelia caperata, P. glabratula, P. perlata, P. saxatilis, P. subaurifera, P. sulcata, P. taylorensis, Pertusaria albescens, P. amara, P. flavida, P. hemisphaerica, P. pertusa, Phlyctis argena, Ramalina farinacea, Rinodina roboris.* Formerly more widespread at Nettlecombe, now restricted to woodland and areas of semi-permanent pasture. Increase fertiliser or SO_2 level reduce this association to Pseudevernion; Widespread elsewhere.
Pseudevernion furfuracae	Pseudevernietum furfuraceae	found in woodlands with a high rainfall on trees with a bark pH of 3.0–4.0. Characterised by: *Hypogymnia* species *Evernia prunastri, Platismatia glauca, Parmelia saxatilis, P. sulcata, Pertusaria amara, P. pertusa,* and *Ochrolechia androgyna.* Found in oak woodlands—Kingswood, Pooke Wood, Sticklepath and frequently elsewhere on Exmoor and the Quantocks.
	Ramalinetum fastigiatae	found on exposed trees in more or less eutrophicated, well-ventilated situations. Characterised by *Ramalina* species. May develop from Usneion or Xanthorion Fig. 8. Frequent in Nettlecombe Park and elsewhere.
Usneion barbatae	Usneetum subfloridanae	found on well-lit (canopy) branches in areas of clean air and high rainfall. Characterised by an abundance of: *Usnea subfloridana* and *U. florida.* Frequent at Sticklepath, Pooke Wood environs and Park Wood. Widespread elsewhere.
Xanthorion parietinae	Buellietum punctiformis	found on trees in open parkland situations receiving heavy organic or moderate inorganic fertiliser pollution. Characterised by: *Diploicia canescens, Buellia punctata, Lecanora chlarotera, Pyrrhospora quernea.* Widespread at Nettlecombe on most parkland trees. Infrequent elsewhere except in similar situations. More sensitive to pollution than the two following associations.
	Parmelietum elegantulae	found especially on the horizontal boughs of eutrophicated trees in areas of permanent pasture. Characterised by: *Parmelia elegantula* and *P. laciniatula.* Very local at Nettlecombe and elsewhere.
	Physcietum adscendentis	found on well-lit, enriched and *mature* tree trunks in old parkland sites. The climax community in this alliance. Characterised by: dominant species of *Physcia, Physconia,* and *Xanthoria.* Increased exposure leads to increased *Ramalina* in this association. Widespread on old parkland trees at Nettlecombe. Local elsewhere.

Table 4. *The epiphytic lichen species recorded at Nettlecombe, with the additional species found in the Barle Valley woodlands*

(a) The Nettlecombe epiphytic lichen flora

Acrocordia gemmata (syn: *Arthophyrenia alba*)
Anaptychia ciliaris
Anisomeridium biforme (syn: *Arthopyrenia biformis*)
Arthonia impolita
Arthonia punctiformis
Arthonia radiata
Arthonia spadicea
**Arthonia vinosa* (syn: *A. didyma*)
**Arthopyrenia cinereopruinosa* agg
Arthopyrenia lapponina (DLH) (syn: *A. fallax*)
Arthopyrenia punctiformis
†*Bacidia biatorina*
Bacidia laurocerasi
Bacidia rubella
Buellia punctata
Calicium glaucellum (DLH)
Calicium salicinum
Calicium viride
Caloplaca citrina
Caloplaca ulcerosa
Candelaria concolor (DLH)
Candelariella reflexa (DLH)
Candelariella xanthostigma
Cetraria chlorophylla
Chrysothrix candelaris (syn: *Lepraria candelaris*)
Cladonia anomaea (syn: *C. pityrea*)
Cladonia chlorophaea
Cladonia coniocraea
Cladonia digitata
Cladonia fimbriata (PWJ)
Cladonia macilenta (PWJ)
Cladonia ochrochlora
Cladonia polydactyla
Cladonia squamosa
Cliostomum griffithii (syn: *Catillaria griffithii*)
Dimerella diluta
Diploicia canescens (syn: *Buellia canescens*)
**Enterographa crassa*
Evernia prunastri
Fuscidea lightfootii (syn: *Catillaria lightfootii*)
Graphis elegans
Graphis scripta
†*Gyalecta truncigena*
Gyalideopsis anastomosans (DLH)
†*Haematomma elatinum*
Hyperphyscia adglutinata (syn: *Physciopsis adglutinata*)
Hypocenomyce scalaris (syn: *Lecidea scalaris*)
Hypogymnia physodes
Hypogymnia tubulosa
Lecanactis abietina
**Lecanactis lyncea* (syn: *Opegrapha lyncea*)
**Lecanactis premnea*
Lecania cyrtella
Lecanora chlarotera
Lecanora confusa
Lecanora conizaeoides
Lecanora dispersa
Lecanora expallens
Lecanora symmicta (syn: *Lecidea symmicta*)
Lecidea granulosa
Lecidea hypopta
Lecidea uliginosa
Lecidiella elaeochroma
Lepraria incana
Leptogium lichenoides
†*Leptogium teretiusculum*
**Lobaria amplissima*
**Lobaria pulmonaria*
Micarea prasina (syn: *Catillaria prasina*)
Mycoporum quercus (syn: *Dermatina quercus*)
†*Normandina pulchella*
Ochrolechia androgyna
Ochrolechia subviridis (syn: *O. yasudae*)
Ochrolechia turneri
Opegrapha atra
Opegrapha herbarum
Opegrapha niveoatra (PWJ)
†*Opegrapha prosodea*
Opegrapha rufescens
Opegrapha varia
†*Opegrapha vermicellifera*
**Pachyphiale cornea*
Parmelia caperata
**Parmelia crinita*
Parmelia elegantula (DLH)
Parmelia exasperata (syn: *P. aspera*)
Parmelia glabratula
Parmelia laciniatula
Parmelia pastillifera
Parmelia perlata
Parmelia quercina
**Parmelia reddenda*
Parmelia revoluta
Parmelia saxatilis
Parmelia subaurifera
Parmelia subrudecta
Parmelia sulcata
Peltigera hymenina (PWJ)
Peltigera membranacea
Peltigera praetextata
Pertusaria albescens var *albescens*
Pertusaria albescens var *corallina*
Pertusaria amara
Pertusaria coccodes
†*Pertusaria coronata*
Pertusaria flavida
Pertusaria hemisphaerica
Pertusaria hymenea
Pertusaria leioplaca
Pertusaria multipuncta
Pertusaria pertusa
†*Pertusaria pupillaris* (PWJ)
Phaeophyscia orbicularis (syn: *Physcia orbicularis*)
Phlyctis argena
Physcia adscendens
Physcia aipolia
Physcia tenella

Physcia tribacia (PWJ)
Physconia enteroxantha (syn: *Physcia enteroxantha*)
Physconia grisea
Physconia perisidiosa (syn: *Physcia farrea*)
Physconia pulverulacea (syn: *Physcia pulverulenta*)
Platismatia glauca (syn: *Cetraria glauca*)
**Pyrenula chlorospila* (syn: *P. nitidella*)
Pyrrhospora quernea
Ramalina baltica
Ramalina calicaris
Ramalina farinacea
Ramalina fastigiata
Ramalina fraxinea
Rinodina roboris
Schismatomma decolorans
Schismatomma virgineum (DLH)
Sphinctrina turbinata (syn: *S. gelasinata*)
**Stenocybe septata*
**Thelotrema lepadinum*
†*Tomasellia gelatinosa*
Usnea florida
†*Usnea inflata*
Usnea rubicunda
Usnea subfloridana
Xanthoria candelaria
Xanthoria parietina
Xanthoria polycarpa

(b) Additional species recorded from the Barle Valley woodlands.
†*Arthonia elegans*
†*Bacidia epixanthoides*
†*Bacidia circumspecta*
Bryoria subcana
**Biatorina atropurpurea* (syn: *Catillaria atropurpurea*)
†*Catillaria pulverea*
**Catillaria sphaeroides*
†*Cetrelia olivetorum*
†*Chaenotheca brunneola*
†*Cladonia caespiticia*
Cladonia floerkiana
Cladonia pyxidata
†*Collema furfuraceum*
**Dimerella lutea*
†*Graphina anguina*
†*Graphina ruiziana*
†*Lecanora jamesii*
Lecanora pallida
Lepraria membranacea
Leptogium cyanescens
**Lobaria scrobiculata*
**Lobaria laetevirens*
†*Megalospora tuberculosa*
†*Melaspilea ochrothalmia*
†*Micarea cinerea*
**Nephroma laevigatum*
†*Nephroma parile*
†*Opegrapha corticola*
†*Opegrapha ochrocheila*
**Pannaria conoplea*
Parmelia laevigata
†*Parmeliella testacea*
**Parmeliella triptophylla*
**Peltigera collina*
**Peltigera horizontalis*
Peltigera testacea
Phaeographis dendritica
†*Phyllospora rosei*
**Porina leptalea*
Pseudevernia furfuracea
Pyrenula macrospora (syn: *P. nitida*)
**Rinodina isidiodes*
†*Schismatomma niveum*
**Schismatomma querciolum* (Coppins, in ed)
†*Sphaerophorus globosus*
Stenocybe pullatula (syn: *S. byssacea*)
†*Sticta fuliginosa*
**Sticta limbata*
**Sticta sylvatica*
†*Strangospora ochrophora*
†*Usnea articulata*
†*Usnea ceratina*

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*Indicates those species regarded as faithful to the Old Forest Communities that are used to estimate the RIEC.
†Indicates other species associated with Old Forest Communities.
Nomenclature follows Hawksworth, James & Coppins (1980) as updated by Hawksworth.
The initials DLH (Dr. D. L. Hawksworth) and PWJ (Mr. P. W. James) after some records indicate those species that have not been seen by the authors *in situ*.

Table 5. *Lichen relevés at Nettlecombe and Exmoor sites*

Species are arranged in alliances or associations, and are listed in order from faithful species through associated species to others. Cover values after Braun-Blanquet (see Shimwell, 1971). +, present but less than 1%; 1, 2–5%; 2, 6–25%; 3, 26–50%; 4, 51–75%; 5, 76–100%.

	Species	Relevé number														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CALICION LECANACTIDETUM PREMNEAE	Lecanactis premnea	2		1	3	+		1								
	Schismatomma decolorans	2	4	1	3	+										
	Calicium viride		1													
	Arthonia impolita		1	+	1											
	Enterographa crassa			+	1			1								
	Lecanactis lyncea			2												
	Opegrapha prosodea			+	2											
	Diploicia canescens	3						2								
	Chrysothrix candelaris		+												+	
	Lepraria incana		3							1						
	Pertusaria amara		1												2	
	Pyrrhospora quernea		1												1	+
XANTHORION	Xanthoria parietina					+										
	Anaptychia ciliaris					2										
	Buellia punctata					+			+						+	+
	Physcia aipolia					2										
	P. tenella					+										
	Physconia enteroxantha					+										
	P. grisea					+			+							
	P. perisidiosa					+										
	P. pulveracea					+										
	Ramalina baltica					2										
	Parmelia quercina					2										
	Candelariella xanthostigma		+			+										
	Ramalina fastigiata					+										
	Cliostomum griffithii					+										
	Lecanora dispersa					+										
	L. expallens				1	+						2				
	Ochrolechia subviridis					1										
	Parmelia glabratula				1	1		1				+			2	
	P. subrudecta					1	+		2						2	1
	P. subaurifera					+										
	P. sulcata					1		2	+							
	Ramalina farinacea			+		2		1	1							+
LOBARION	Lobaria pulmonaria						4	2			2	3	2	3		
	L. amplissima							3	3							
	L. scrobiculata											3				
	Sticta limbata													+		
	S. sylvatica												1			
	Nephroma laevigatum									3			1			
	Parmeliella triptophylla												3			
	Peltigera pratextata										1					
	Pachyphiale cornea						+									
	Megalospora tuberculosa												1			
	Dimerella lutea											+	+			
	Peltigera membranacea												1			
	Normandina pulchella					+	+						1			
	Biatorina atropurpurea											+				
	Phyllopsora rosei									2						
	Thelotrema lepadinum									+						

PARMELION PERLATAE

Opegrapha herbarum				1											
Ochrolechia subviridis				+	+										+
Pertusaria albescens				1			2								1
Cladonia chlorophaea				+					2		2				
Phlyctis argena							+		3		2				
Anisomeridium boforme								+							
Parmelia perlata						+							2		2
Parmelia revoluta													1		
P. caperata				+									2		2
Pertusaria hymenea				1		+			2				1		+
P. pertusa													1		+
P. hemisphaerica													+		1
P. coccodes															2
Rinodina roboris		2				1									+
Evernia prunastri				+									1		+
Lecanora chlarotera									+						1
Usnea subfloridana													+		
Hypogymnia physodes													+		

Relevés 1–8, 14 and 15 are at Nettlecombe, see Fig 1 for their location
9, is at Horner Combe, 10 and 13 at Hawkcombe, Porlock, 11 at Sale Wood Exton, and 12 at Horse Wood on the Barle.

The Pertusarietum amarae may be found on somewhat larger stems of smooth barked trees, and may persist for many years. On the other hand the progression from the Arthopyrenietum, through the Lecanorion to the Usneion may have taken place (under humid conditions) by the time a twig is 5 to 10 yr old. On young twigs, the crustose species of the Lecanorion will colonise the rougher areas or girdle scars and the angles of branches.

The Usneion barbatae is frequently a spectacular alliance in the perpetually humid woods of the southwest. It may occupy a considerable surface area of a tree, from the young twigs to quite large branches. The abundance of fruticose *Usnea* species gives the trees a festooned appearance. Although characteristic of well-lit woodland canopies, this association may intergrade with the Ramalinetum fastigatae, where *Ramalina* species replace the *Usnea* in more exposed situations. Both associations are widespread in Nettlecombe, the Ramalinetum being characteristic of the open park areas and the Usneetum of the woodlands and sheltered valleys.

The Pseudevernion, or Physodion of British authors, is widespread in this region and may develop for several reasons. It occurs naturally in regions of high rainfall with associated leaching of the bark, but it may also be induced by increasing acidity due to sulphur dioxide (SO_2) pollution). In these situations it may replace the Parmelion perlatae. At Nettlecombe, it is only widespread in the environs of Sticklepath and along the outskirts of Kingswood, possibly indicating pollution from industry in South Wales. Research into the relationship of lichen communities to SO_2 levels is in progress at Nettlecombe, whilst the pH of the rainfall is now determined daily at two sites.

The Parmelion perlatae is represented in Britain by the Parmelietum revolutae, the dominant cover being of the large foliose species of *Parmelia*, particularly the pale green "dinner-plates" of *P. caperata* that occur, with other *Parmelia* species on large branches and trunks in open woodlands throughout this region. The Parmelietum revolutae contains some species that are associated with mature and long-standing woodlands in clean air situations. *P. perlata* and *P. revoluta* are both restricted, in Nettlecombe, to regions bordering present or former woodland, or ancient semi-wooded parkland—as in areas in A, B, C, D, E, F, and K. However, this community is in no sense an indicator of old woodland as we have found it to colonise

mature planted trees fairly quickly. Elsewhere it is fairly frequent in the valley woodlands of Exmoor and the Quantocks. It may grow up into the larger branches of trees in sheltered sites. This association is the precursor to the Lobarion.

The Lobarion develops on the wetter sunnier sides of ancient trees particularly on oak and ash in this region, while the Calicion develops on the drier shaded side of the trunk. The Lobarion pulmonariae is mainly composed of large foliose species of *Lobaria* and bryophytes, with certain crustose lichens in between. It appears to be the climax community on mature hardwood trees and was formerly much more widespread throughout Britain. In Eastern Britain it is now largely a relict community indicating ancient woodland or sites of it. It requires high humidity, moderately well-lit sites and a continuity of woodland cover as it seems unable to colonise even old plantations once the original woodland cover has been destroyed.

There are many rare or local species in this alliance. Some may survive in communities that have already lost the *Lobaria* species and are thus indicators of a former richness. Species faithful to this alliance are marked + in Table 4. Species used in the estimation of the Revised Index of Ecological Continuity appear with an asterisk. The Nettlecombe *Lobaria* sites are rapidly deteriorating, (individual plants existing in a depauperate condition) due to increased exposure and drying out as well as to the increasing pollution from the surrounding improved grassland and arable land. The crustose species of lichen, e.g., *Thelopsis rubella* and *Dimerella lutea*, and some of the bryophytes normally found in the Lobarion have now largely disappeared from Nettlecombe. *Lobaria pulmonaria* is confined to one tree in Park Wood, two trees (one fallen) on the margin of Pooke Wood, and to three oaks by Chidgley Pond. *Lobaria amplissima* was recorded in Somerset for the first time in areas D and K (Fig. 1) at Nettlecombe, although it has subsequently (1984) been found in the Barle and Horner valleys. This is now a very local species associated with ancient parks and woodlands. It is now only widespread in North Wales, the Lake District and in Western Scotland.

The Calicion hyperelli occupies the drier side of the trunk but is more widespread than the Lobarion—although frequently in a depauperate condition, as in some of the relevees in Table 6 where the Lecanactidetum premnae is confined to bark crevices, or to trees that are protected from nitrogenous pollution. However, on the outliers of Park Wood, it occurs with a rich community of ancient-woodland species that includes many members of the Lecanactidetum premnae.

The Lecanactidetum abietinae occurs in Sticklepath and Kingswood. The former is an eighteenth century plantation: the latter was widely replanted in the nineteenth. Elsewhere in Somerset, this association is widespread in nineteenth century plantations, forming extensive pink/grey patches on the drier sides of trees.

Finally, the most species-rich alliance in Nettlecombe is the Xanthorion; all three of the constituent associations being found within both parks mentioned in the documents. The Buellietum punctiformis can withstand moderate inorganic fertiliser/sulphur dioxide pollution and is thus widespread on the ancient park trees that are now surrounded by improved pasture or leys. It is dominated by crustose species and by the squamulose *Diploicia canescens.* The Parmelietum elegantulae is restricted to an area of ancient trees in Court Field (H in Fig. 1) on the oak with the largest girth, and on the large turkey oak. It occurs with *Parmelia pastillifera, P. perlata, Physconia grisea* and *Rinodina roboris.* The Physcietum adscendentis is frequent on the ancient and well-lit tree trunks in and around the old parkland and pasture (e.g. Glebe) sites in areas F, G, K, L, and M (Fig. 1). Where it is found on well-ventilated exposed sites it is modified towards the Ramalinetum fastigiatae.

Table 4 lists the lichen taxa found in Nettlecombe. Table 5 shows the species present within

●	SUNNY SIDE				DRY SIDE				
TREE & AREA REFERENCE	OLD FOREST ELEMENT	XANTHORION ELEMENT	POLLUTION/ ACIDIFICATION	NORMAL	LECANACTIS PAGINGA ELEMENT	XANTHORION ELEMENT	POLLUTION/ ACIDIFICATION	NORMAL	ADDITIONAL COMMENTS
M Q.P.		✓		+✓					Anaptychia ciliaris Parmelia quercina
L Q.P.		✓			(✓)	✓			poor – inc. in Ramalina
Park rd. edge. Q.P.			✓	✓				✓	Parmelia revoluta Cetraria chlorophylla
K Q.P.		✓			✓				
K Q.P.	✓	✓			✓				Lobaria amplissima
Cenvirons Q.P	✓			✓					mossy with Zygodon baumgartnii Cyclicta truncigena, Normandina p.
D Q.P.	✓	✓			✓				
D Q.P.	✓			✓	✓				Opegrapha lyncea.
D Q.P.	✓			✓	✓			✓ sparse	Lecanactis premnea Enterographa crassa Pachyphiale carneo
F Q.P.	✓	✓			✓	✓			
F. Q.P.	✓	✓		✓	✓	✓		✓	Signs of fertiliser application.
F. Q.P.	✓	✓		✓	✓	✓		✓	
B Q.P.			✓	✓			✓		Platismatia glauca Hypogymnia spp. etc.
B Q.P.	✓		(✓)				(✓)		Lecanactis abietina Thelotrema lepadinum
B Q.P.				✓			(✓)	✓	Lecanactis abietina Arthonia spadicea
G Q.P.			✓	✓	(✓)			✓	
G Q.P.	✓	✓			(✓)			✓	Schismatomma pericav. Site sheltered from N.
G Q.P.	(✓)	✓	✓		(✓)	W	✓		N. side with bare bark + algae.
G Q.P.		W		✓	(✓)	W	✓		N. side much algae. Lecanactis premnea surviving in cracks.

FIG. 9.
A specimen recording sheet from the Nettlecombe epiphyte survey.

the associations characteristic of ancient woodland and parkland both in Nettlecombe and on Exmoor.

AN OUTLINE OF THE SURVEY OF THE DISTRIBUTION OF EPIPHYTIC LICHEN COMMUNITIES AT NETTLECOMBE CARRIED OUT IN THE SPRING OF 1982

The object of the survey was to ascertain the distribution of ancient woodland and parkland epiphytic lichen associations at Nettlecombe and, from this, to recognise former areas of woodland and parkland whose documentary evidence was conflicting or non-existant. However, as management practices have changed rapidly over the last thirty years, particularly with the widespread improvement and ploughing-up of grassland, we added this factor to our recording sheet. A specimen form is reproduced as Fig. 9 showing samples from areas indicated on Fig. 1

Conclusions from The Survey

Despite the lack of documentary evidence for Great Park in the medieval documents, the widespread existence of the Lobarion and Lecanactidetum indicates an old wood-pasture regime for this area. This is also suggested by the presence of the ancient pollarded oaks. The Buellietum punctiformis has appeared on many of these trees, indicating the increased use of inorganic fertiliser associated with improvement of the pasture. But the absence of the species-rich Xanthorion indicates that this is not the site of the ancient park pasture that was let out for grazing in 1582. The Xanthorion is found in the North Park and in the regions of the former glebe pastures and South Park, all of which appear to have been part of a long-standing permanent pasture-with-trees form of management. As there are few trees remaining there are no indications of the boundaries of the North Park in the lichen communities. However, the documentary evidence presented in Table 2 indicates the boundaries of this park. The boundaries of Great Park are not easy to define. No acreage is given before 1796. The old forest epiphyte communities extend to the boundary between Park Wood and the road, to Chidgley Pond and to the Glebe lands towards Nettlecombe Park Road. Although parts of Chidgley were taken into the park in 1791, there is no epiphytic indication that this was part of the ancient park, and nor indeed are there ancient pollards or standards. The distribution of old forest epiphyte communities along the edge of the former Glebe land may simply reflect the ancientness of the boundary with the Lord of the Manor's land and that it was always a well-wooded track. Veitch's extensive earthworks for the eighteenth century park must have removed any earlier banks and boundaries. On the southern boundary between the Glebe and Great Park there is an extensive ditch with large banks. The large oaks along this boundary support relict old forest epiphyte communities—which are not found in the upper portions of this boundary where it becomes a hedge and the Parish Boundary. The gap between this point and Chidgley Pond is, today, crossed by a modern fence and there is no indication of any older boundary on the ground. However, the epiphytic communities strongly indicate that this area is the limit of the ancient wood-pasture. We cannot doubt that the old extension of Park Wood into the deer park, shown in the 1886 map (Fig. 6) is part of an older park and that the ditch and earth bank surrounding Park Wood today is not ancient. The name "Kingswood" implies that it was woodland when the King held the manor, and we suggest that some of this ancient sessile oak woodland was incorporated into Great Park as Park Wood. The remnants of these trees are now confined to areas D and E.

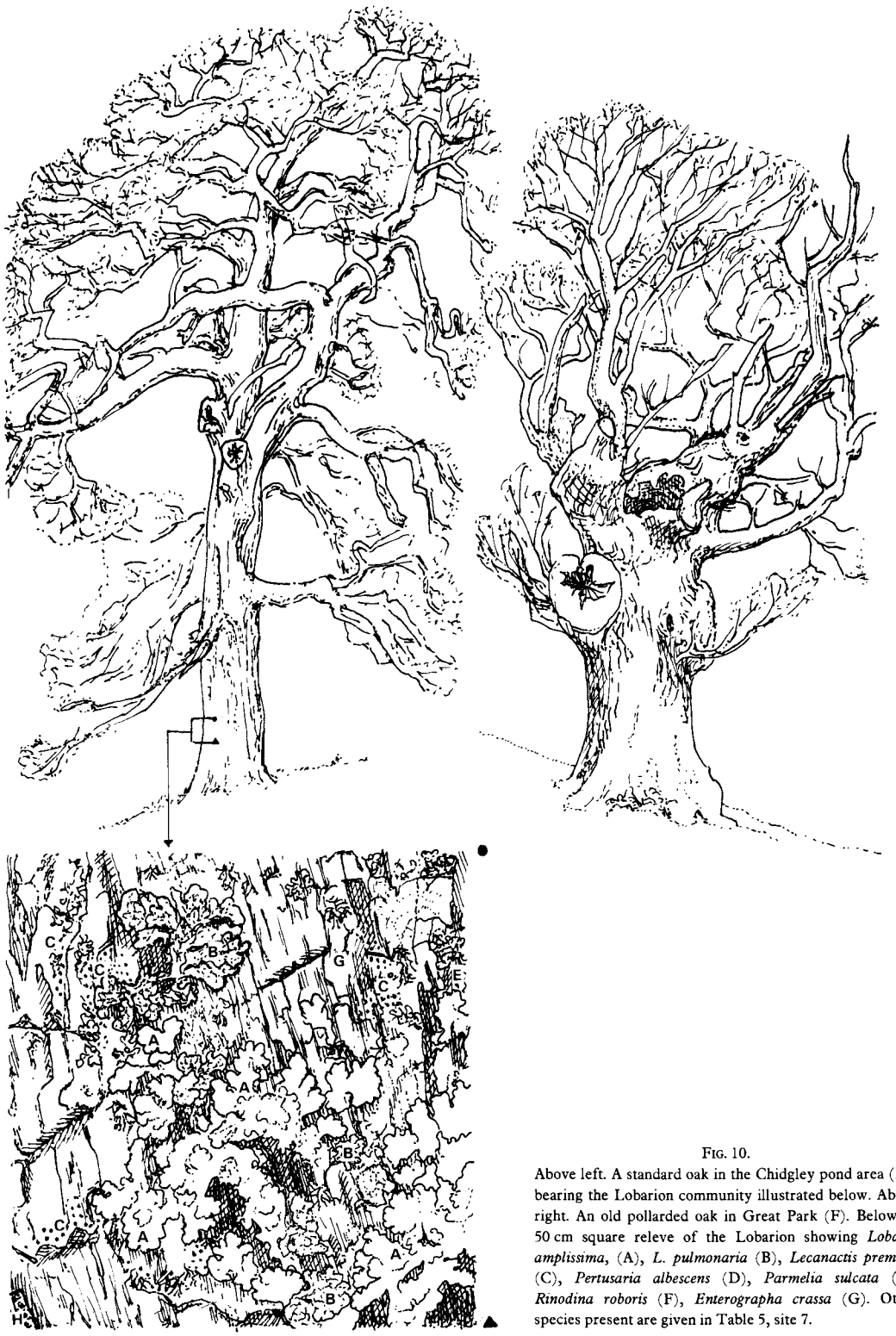

FIG. 10.

Above left. A standard oak in the Chidgley pond area (D), bearing the Lobarion community illustrated below. Above right. An old pollarded oak in Great Park (F). Below. A 50 cm square releve of the Lobarion showing *Lobaria amplissima*, (A), *L. pulmonaria* (B), *Lecanactis premnea* (C), *Pertusaria albescens* (D), *Parmelia sulcata* (E), *Rinodina roboris* (F), *Enterographa crassa* (G). Other species present are given in Table 5, site 7.

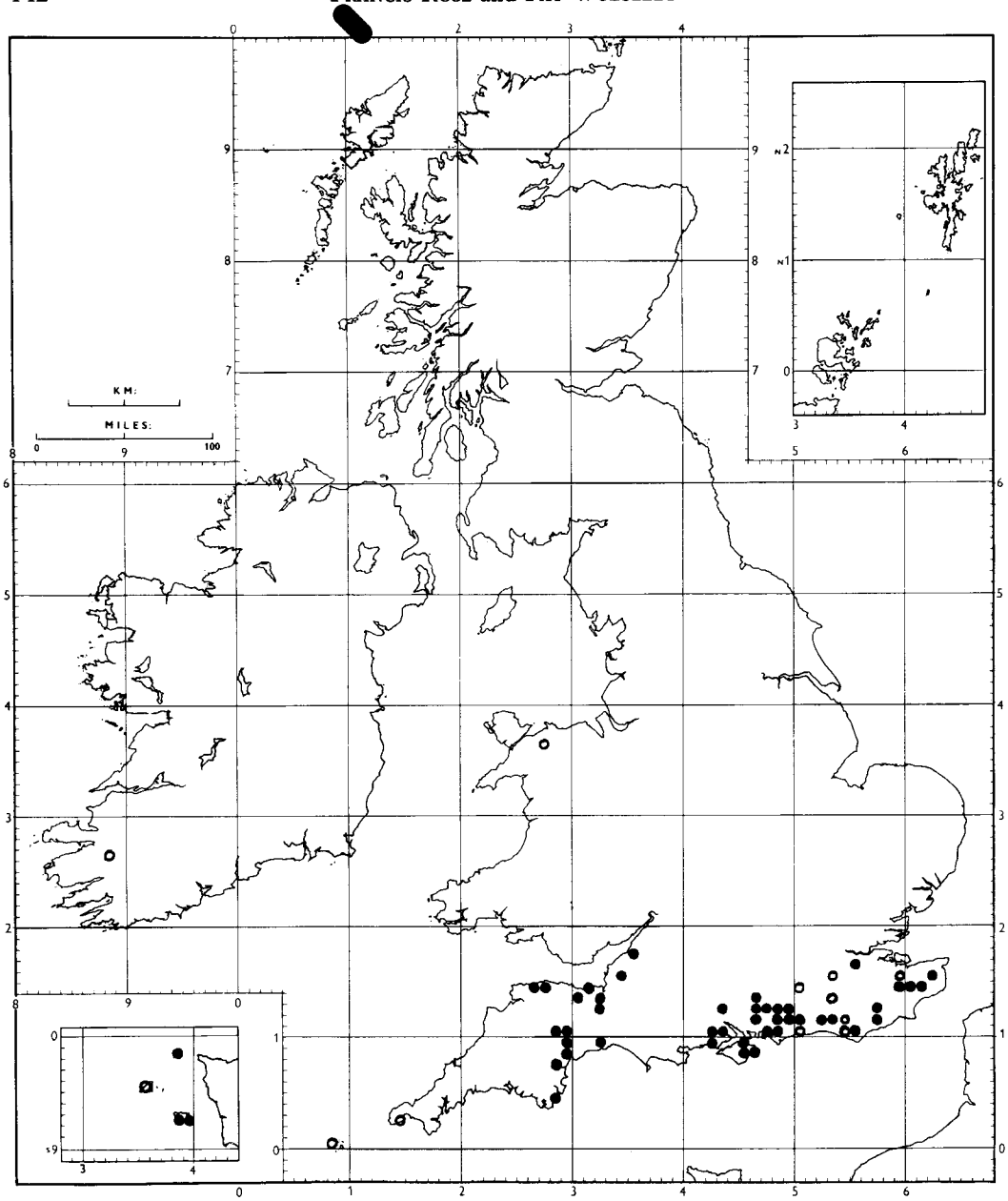

FIG. 11. The distribution of *Opegrapha prosodea* in Britain

NOTES ON LICHEN SPECIES OF SPECIAL PHYTOGEOGRAPHICAL INTEREST

Two species occurring at Nettlecombe, *Opegrapha prosodea* and *Parmelia quercina* have an extreme-southern distribution in Britain. They are not found north of a line from the Severn Estuary to Kent. *O. prosodea* occurs elsewhere only in southwestern Europe, from western France southwards. *P. quercina* has a very wide distribution in southern Europe, especially in

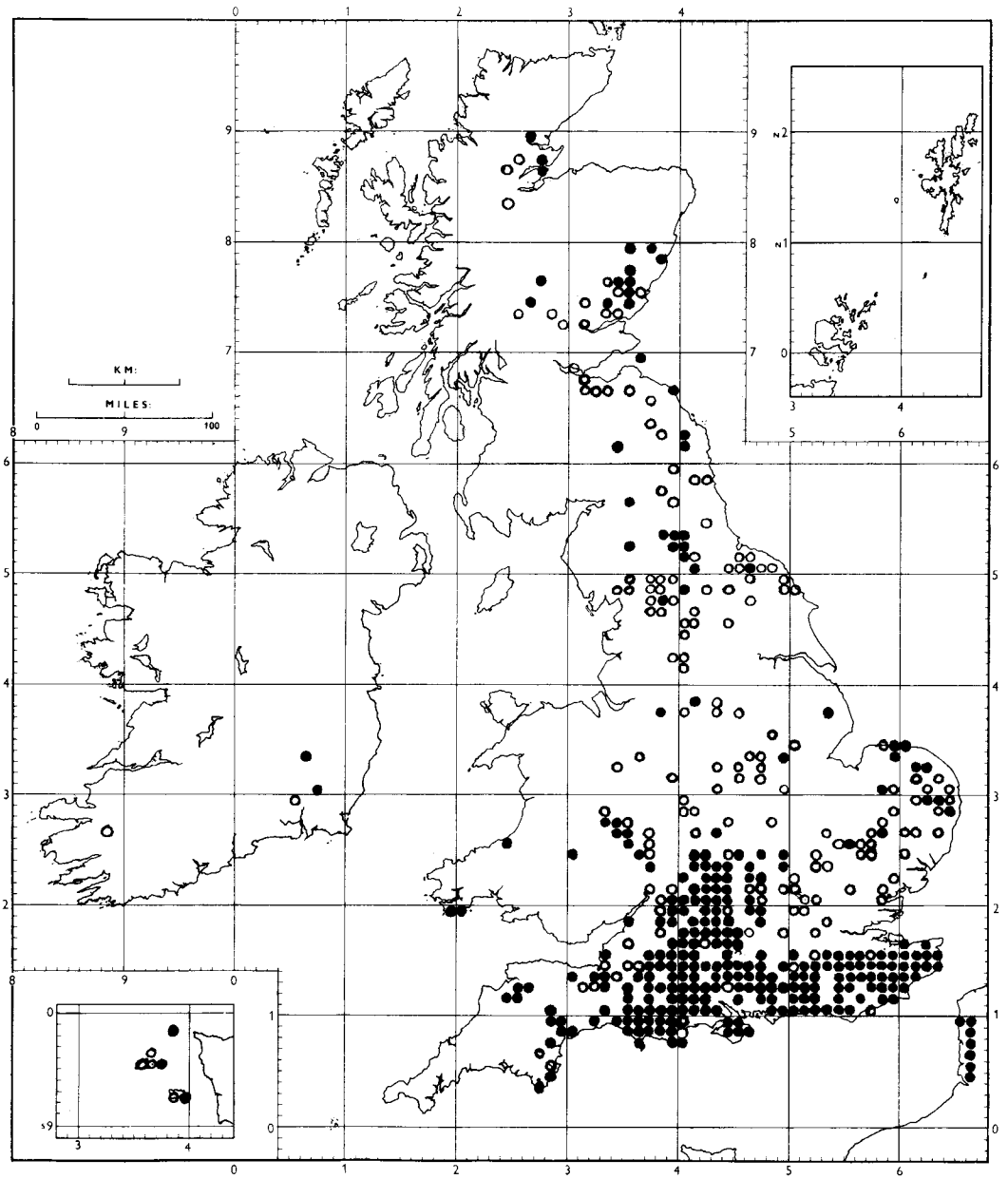

FIG. 12.
The distribution of *Anaptychia ciliaris* in Britain. Closed circles, modern records; open circles, former distribution.

the Mediterranean area. The mild, relatively sunny, climate of southern England appears to have allowed their spread to this country.

Anaptychia ciliaris is a species of wide distribution in central and south Europe which becomes less common in the high-rainfall oceanic areas to the west. West of Nettlecombe it only occurs in two of the driest parts of Devon—the Taw valley above Barnstaple and the Lower Exe valley about Exeter.

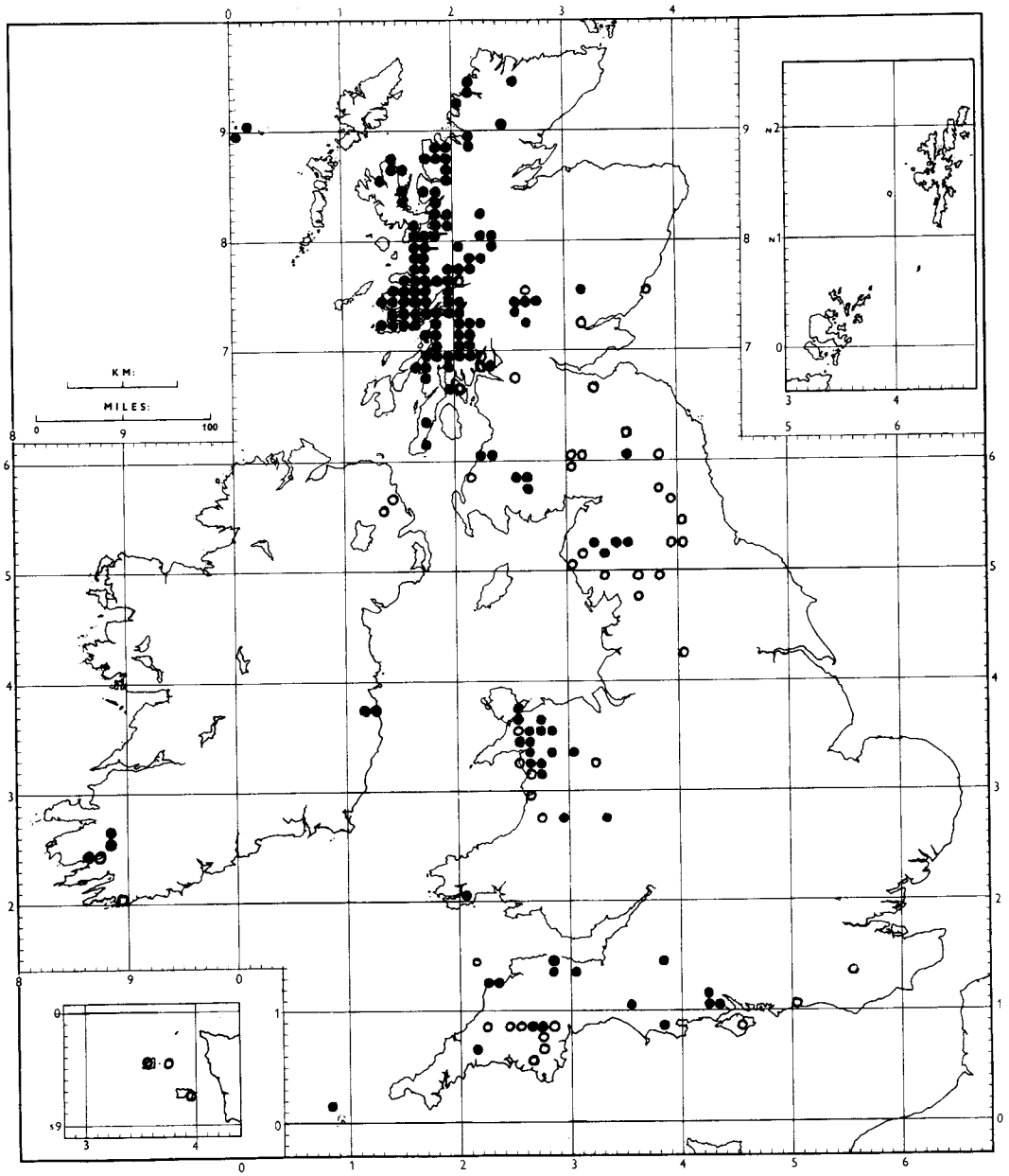

FIG. 13.
The distribution of *Lobaria amplissima* in Britain.

Lobaria amplissima is widespread in ancient montane forest in central and southern Europe, and in lowland forest relics in oceanic western Europe. It is now becoming increasingly relict and discontinuous due to forest clearance and management changes. It is now known only on some twenty-four individual old trees in England south of Lakeland, although is seems likely to have been widespread in earlier times.

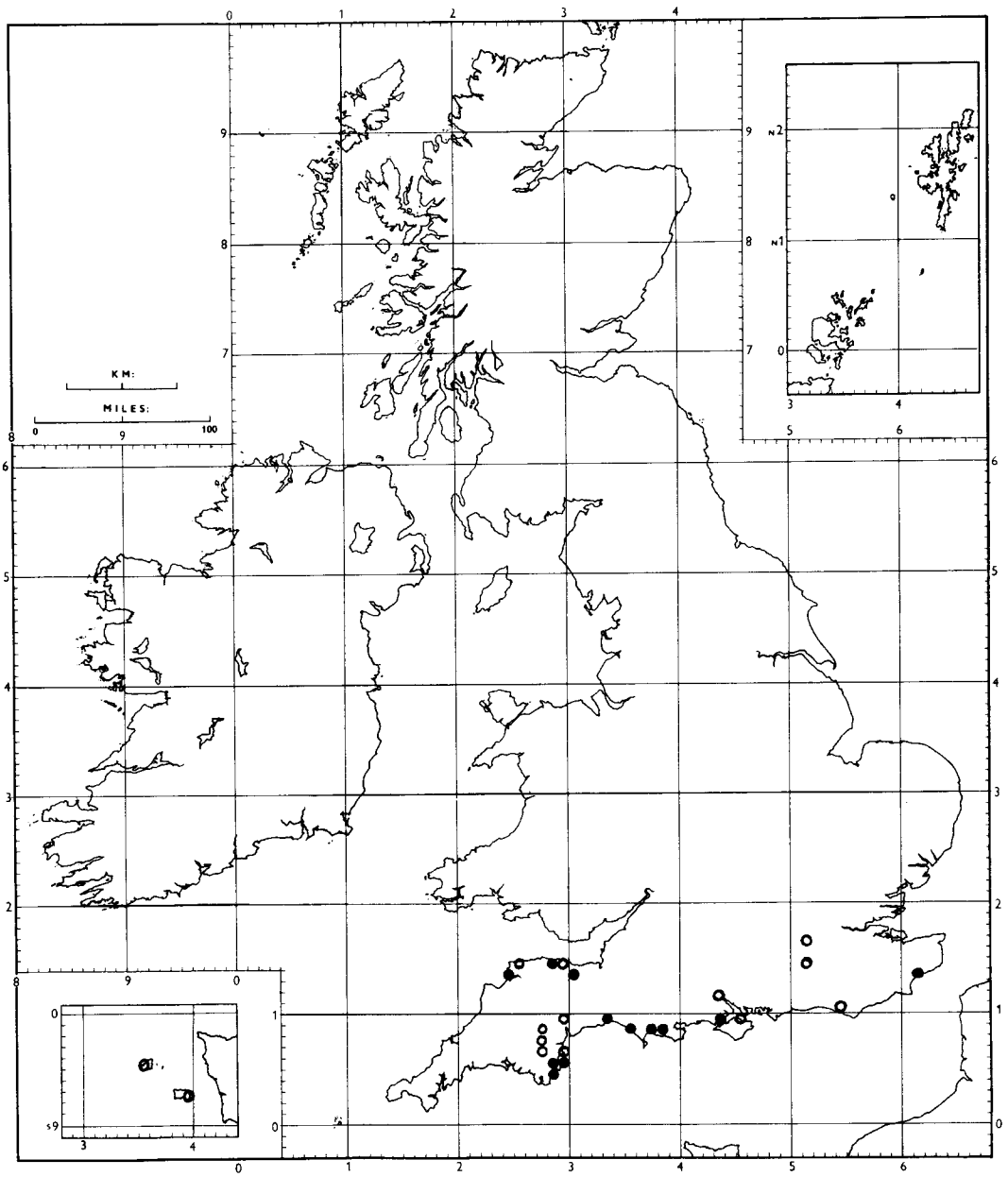

FIG. 14. The distribution of *Parmelia quercina* in Britain.

A COMPARISON OF THE LICHEN FLORA OF NETTLECOMBE WITH THAT OF OTHER WOODLANDS AND PARKLANDS IN SOUTH WEST ENGLAND (See Table 6)

Nettlecombe Park has an exceptionally large number of epiphytic lichen taxa (150), even for an ancient parkland of its size. The number is, however, exceeded by Melbury Park in Dorset (213), Boconnoc Park in Cornwall (188), Longleat Park in Wiltshire (161), the New Forest in Hampshire (295) and Horner Combe Woodlands in Somerset (166) (the latter two sites being of a much larger area).

Table 6. *Lichen species density km^{-1} and Revised Index of Ecological Continuity values for some old forest and parkland sites in Southwest England*

Site	Lichen Species Density km^{-1}	RIEC value
Boconnoc Park, Cornwall	188	145
Arlington Park, Devon	136	105
Shute Deer Park, Devon	93	65
Longleat Park, Wiltshire	161	90
Barle Valley Woodlands, Somerset	152	130
Holford Glen, Somerset	96	80
Horner Combe, Somerset	166	125
Montacute Park, Somerset	54	5*
Orchardleigh, Somerset	58	5*
Nettlecombe, Somerset	150	75
Mells Park, Somerset	122	60
Poundisford Park, Somerset	41	10*
Melbury Park, Dorset	213	120
Lulworth Park, Dorset	123	70
New Forest, Hampshire	295	135

*Parks heavily modified by eighteenth and nineteenth century management.

The relatively high number of taxa at Nettlecombe seems to be partly related to its age, but also to the range of habitats present. Nettlecombe contains not only trees of woodland areas with unenriched bark but also trees enriched by the dust from grazing-animal excreta and from fertiliser drift. These trees bear the species-rich Xanthorion community which is absent from the more purely woodland sites.

General modifications of the internal ecological environment of English Parks and woodlands (by felling, coppice management, drainage and SO_2 pollution), has been apparently much more severe in the drier, flatter countryside of East Anglia than in the hillier more humid areas from Kent to Cornwall and from south and west England and Wales northwards. This is well shown by Table 7 which lists those taxa occurring only in old woodland or parkland sites which (A) still occur through the southern coastal counties of England, but not in East Anglia, and (B) have a similar restriction, but do still occur (however rarely in East Anglia). There are at least thirty taxa in category A and only 11 in category B. If those taxa which extend through SW England only as far east as the New Forest today were considered, a large number of extra taxa would be included, but the table illustrates the contrast between England south of the Thames as a whole and East Anglia as an environment in which lichens more or less faithful to old woodlands can survive. Most old East Anglian woodlands survive as ancient coppices much modified by man from their primaeval structure. There are few forests except the heavily polluted Epping Forest, and few old East Anglian parklands have escaped the general "drying out" of the eastern landscape.

AN INDEX OF ECOLOGICAL CONTINUITY

A more instructive comparison than that of mere totals of taxa present, can be obtained by concentrating on those taxa that appear to be almost (or entirely) "faithful" to ancient

Table 7. *Epiphytic lichen taxa more or less confined to old woodland sites. (A) Those still present in Somerset and the counties of southern England as far east as Sussex (†) or Kent (*) but absent from East Anglia. (B) Additional species that do occur (albeit rarely) in East Anglia as well as in southern England*

A	B
†*Agonimia octospora*	*Arthopyrenia antecellans*
†*Arthopyrenia cinereopruinosa*	*Enterographa crassa*
**Arthonia vinosa*	*Haematomma elatinum*
**Biatorina atropurpurea*	*Lecanactis lyncea*
†*Bacidia biatorina*	*Lecanactis premnea*
†*Catillaria sphaeroides*	*Pertusaria pupillaris*
**Dimereila lutea*	*Pyrenula macrospora*
†*Lecanora jamesii*	*Ramonia chrysophaea*
†*Lecanora querciola*	*Stenocybe septata*
†*Lecidea sublivescens*	*Thelotrema lepadinum*
†*Leptogium teretiusculum*	*Usnea inflata*
†*Lobaria laetevirens*	
**Lobaria pulmonaria*	11 Taxa
†*Nephroma laevigatum*	
†*Ochrolechia inversa*	
**Pachyphiale cornea*	
†*Parmelia crinita*	
**Parmelia reddenda*	
†*Parmeliella plumbea*	
†*Peltigera horizontalis*	
†*Pertusaria velata*	
†*Porina coralloidea*	
†*Porina leptalea*	
†*Schismatomma niveum*	
†*Schismatomma querciolum*	
†*Thelopsis rubella*	
**Usnea ceratina*	
**Usnea rubicunda*	
†*Wadeana dendrographa*	
30 Taxa	

The nomenclature follows that of Hawksworth, James & Coppins (1980).

woodland sites. These were initially detected by comparing those taxa present in woodlands and parklands known from documents to be both very ancient and (at least in part) very little modified by recent management changes, with the taxa present in mature woodland of known secondary origin (or woodlands and parklands known to have been partially or totally denuded of their older trees at some time, followed by replanting around 100–250 yr ago.). Such comparison reveal that many epiphytic lichens are only found in the more ancient, less modified woodlands with mature and sometimes ancient trees present.

From a large number of such species, thirty taxa, known to be of relatively wide geographical distribution in England, have been selected and an index (The Revised Index of Ecological Continuity—RIEC) constructed (see Rose, 1976). To calculate the RIEC value for a site, the number of taxa present from the list of thirty is counted. Because it is highly unlikely that

all will occur within a 1 km² site (the average size for a park or wood) it is considered that the presence of 20 such taxa indicates a very high probability that the site is a very ancient one, with a high degree of continuity of a humid forest environment since ancient times. The total number of taxa found is accordingly multiplied by five, so that the presence of twenty taxa in a site will give a RIEC value of 100. It appears from further field recordings correlated with documentation that a RIEC value below 50 suggests either a much modified or else a secondary woodland. Known ancient woodland with a long history of coppice management tend to have very low RIEC.

RIEC values for a number of sites are given in Table 6. These correlate well with what is known of the present structure and past history of the woods concerned.

It is considered that the Index value may also be used profitably to assess the degree of continuity of woodland or parkland whose history is unknown. Sites of known history with RIEC values of 100 or more are all woodlands or parklands of very great age, traceable certainly to the Norman period or before as deer parks or as woodlands. All contain today areas of woodland with oaks (and sometimes other tree species) of a very wide range of ages, including at least some of a very great age. Sites with a very low RIEC value are either of relatively recent origin or have been highly modified by replanting in the eighteenth or early nineteenth centuries (e.g., Montacute, Orchardleigh and Poundisford Parks). Nettlecombe Park lies in an intermediate position: its RIEC value of 75 suggests that it is not an intact medieval park and the documentary evidence of felling confirms the reduction of the woodland and parkland so that the significant epiphyte communities are now those of dry bark on the peripheral trees of those areas.

In this case we know that these relict communities have survived for over 150 years, and may be expected to persist provided that other ancient oaks are available for colonisation and that some protection from bark enrichment is provided.

REFERENCES

BRANDON, P. F. (1963). *The common lands and wastes of Sussex.* unpublished PhD thesis, University of London.

BUSH, R. J. E. & CORBETT, G. U. S. (1970). Nettlecombe Court 1: the Trevelyans and other residents: 2: the buildings. *Field Studies,* **3,** 275–296.

CANTOR, L. M. & HATHERLEY, J. (1979). Medieval Parks of England. *Geography,* **64,** 71–85.

CHUBB, T. (1914). *Maps of Somerset.* Somerset Archaeoglogical & Natural History Society, Taunton.

DOBSON, F. (1979:1981). *Lichens, an illustrated guide.* Richmond Publishing Co.

EYTON, Rev. R. W. (1880). *Domesday studies.* Reeves and Turner, London.

GRESWELL, Rev. W. H. P. (1905). *The Forests and Deer Parks of Somerset.* Somerset Archaeological and Natural History Society, Taunton.

HAWKSWORTH, D. L., JAMES, P. W. and COPPINS, B. J. (1980). Checklist of British lichen-forming, lichenicolous and allied fungi *The Lichenologist,* **12,** 1–115.

JAHNS, Hans Martin (1983). *Collins Guide to the Ferns, Mosses and Lichens of Britain and Northern and Central Europe.* Collins, London.

JAMES, P. W., HAWKSWORTH, D. L. & ROSE, F. (1977). Lichen communities in the British Isles: A preliminary conspectus. Chapter 10 in Seaward, M. (ed.). *Lichen Ecology.* Academic Press 296–413.

RACKHAM, O. (1976). *Trees and Woodlands in the British Landscape.* Dent. London.

RACKHAM, O. (1980). *Ancient Woodland.* Arnold, London.

RATSEY, S. (1973). The climate at and around Nettlecombe Court, Somerset. *Field Studies,* **3,** 741–757.

ROSE, F. (1976). Lichenological indicators of environmental continuity in woodlands. in Brown, D. H., Hawksworth, D. L. & Bailey, R. H. eds. *Progress and problems in lichenology.* Academic Press.

SHIMWELL, D. W. (1971). *Description and Classification of Vegetation.* Sidgwick & Jackson, London.