INDICATIONS OF ANTIQUITY

Some observations on the nature of plants associated with ancient woodland

Jonathan Spencer

In most districts of Britain it is possible to compile lists of plants which show a close degree of association with long-established semi-natural woodland (Peterken 1981). Oxlips, *Primula elatior*, for example, have been shown to be closely associated with the ancient coppice woods of East Anglia (Rackham 1980), Hay-scented Fern, *Dryopteris aemula*, with the relict native woods of western Scotland (Page 1989), and a whole host of mosses, liverworts and lichens with the woods of the Atlantic seaboard or the ancient forests and chases of lowland Britain (Ratcliffe 1968; Harding & Rose 1986). Such species are often regarded as 'ancient woodland indicators', being infrequently found in woods of more recent origin, even where these are of native species arising naturally from other former semi-natural habitats, such as old commons.

Where the expertise is available, similar lists of fungi, flies, snails and beetles can be compiled, demonstrating that an affinity with ancient semi-natural woodland can be found amongst a wide range of organisms. An understanding of the biology of these relict species, along with that of more widespread common species, can be very informative, providing an insight into past land-use history and its ecological impact. For example, archaeologists have long been making use of assemblages of fossil snails and beetles to interpret past ecological conditions.

The concept of ancient woodland indicator plants has gained considerable currency in recent years. It is now familiar to most naturalists and foresters and has proved to be of great value in encouraging a greater interest in woodland natural history, as well as in developing a broader understanding of the origins of our native woodland. It has also been widely used as a tool for field identification of our older woodlands in the absence of readily available old maps and historical records. However, despite this increased interest, the behaviour of these indicator species within different woodland plant communities in various parts of the country, and the aspects of their reproductive or dispersal biology that contrive to confine them to long-established or ancient woodland, are rarely fully appreciated. More importantly, because of the emphasis placed in recent years on the management history of the sites where such species occur, rather than on the intricacies of their biology, there is a widespread lack of appreciation of the limitations of the approach. At worst this can lead to a risk of falling into the pitfalls of circular logic: those woods that contain 'ancient woodland indicators' are by definition ancient woodland.

Another aspect of this increased interest has been an exaggerated interest in the ecology of ancient woods at the expense of other less venerable, but equally interesting and informative, woodland. It has led to a strong emphasis being placed on the conservation importance of those woodland plant communities which contain many of the species that have come to be associated with ancient semi-natural woodland, such as found in ash-maple-mercury woods (Rodwell, in press), while undervaluing the importance of other types of ancient or recent secondary semi-natural woodland. These woodlands, such as oak-birch-bracken woods of acidic sandy soils, may be of considerable importance and interest for invertebrates and fungi but are typically poor in flowering plants. The value placed on woodland pedigree has also meant that the importance of woods such as secondary carr woodland, arising on former marshland or fen, and the relict woodland vegetation along streamsides and flushes on old heaths and commons have sometimes been undervalued.

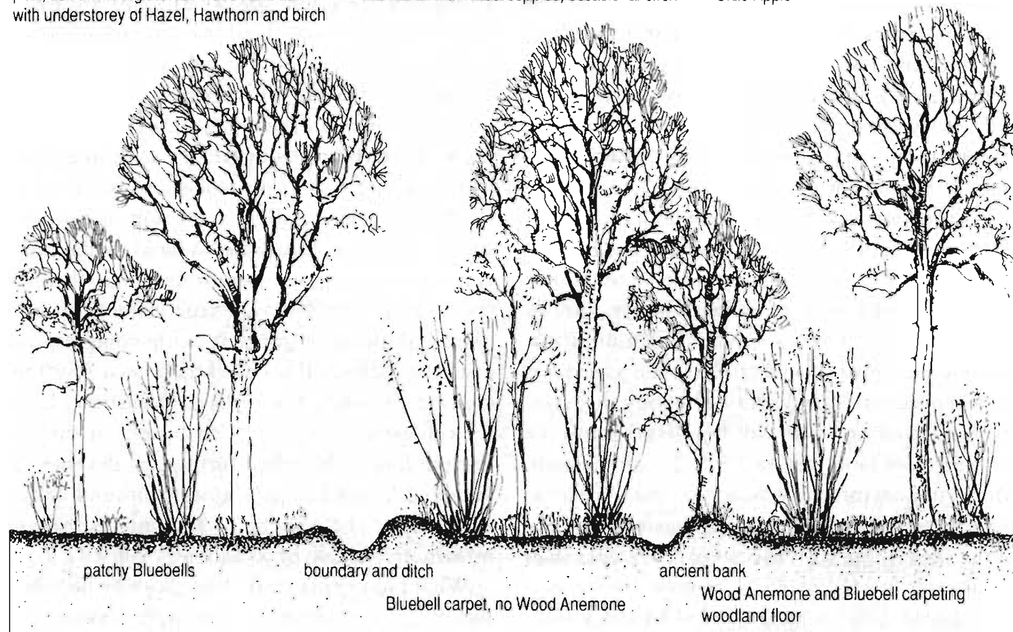
Few species of animal, the insects of old pasture woodlands excepted (Harding & Rose 1986), and very few species of plant are found only in ancient woodland, yet many have come to be widely regarded as 'architectural features' of ancient woods: the finials, crockets and tracery of a medieval woodland landscape. Their presence or absence is often seen as calling for an historical rather than an ecological explanation.

While ancient pollard trees and old coppice stools might be accurately viewed as part of a cultural rather than a natural heritage, this perspective detracts from the true interest of these plants as living organisms with complex and exacting ecological needs of their own. With the concept of 'ancient woodland indicator plants' so well established, the time is ripe for this understanding to be taken further, to develop the accepted 'dogma' into a more profound understanding of the biology of this interesting and informative group of woodland plants.

What factors may influence the distribution of those species which are strongly linked with ancient woodland? What might influence the distribution of woodland plants in woods of more recent origin? This short article is written primarily to encourage a more questioning approach to woodland ecology; to question the history and to stress the ecology in 'historical ecology'. If it encourages more first-hand observation of woodland plants in a wider range of habitats than just ancient coppice woodland it will have achieved its objective.

Indicators of ancient woodland: some widespread species in Britain showing a high fidelity for ancient woods

While a great many plant species show a fair degree of association with ancient woodland and other ancient habitats, in at least parts of their native range, comparatively few vascular plants appear to be so closely confined to ancient woodland that they can be truly regarded as reliable 'ancient woodland indicators'. Those few species which do demonstrate such a close affinity, in the opinion of the author, are discussed below. However, even these species can frequently be found beyond the bounds of ancient woodland, where they may have persisted for long periods of time as the landscape has changed around them; where they have found site conditions that



Variation in the structure and composition of the canopy and understorey of woodland of different ages and of varying past management is clearly demonstrated at Wallis Wood, a Surrey Wildlife Trust reserve. Wood Anemone remains largely confined to the ancient woodland, with limited spread into the old coppiced woodland. Bluebell carpets both the ancient and older parts of the wood, being both a readier coloniser and favoured by past coppiced management. Its spread into high forest conditions of the more recent woodland is slow and is still patchy. Its spread is fastest along deer tracks, as the heavy seeds are kicked along by passing deer. While composition and structure varies according to past management, one woodland plant community is present: the *Quercus robur-Pteridium aquilinum-Rubus fruticosus* community (NVC W10) (Rodwell in press)

are particularly favourable; where they have managed to colonise new sites or have simply been planted. All of the species listed appear to be plants of ancient woodland for sound ecological reasons, often related to their reproductive biology. Some can be regarded as relict species, persisting (often very successfully) under the present climatic or ecological regime but unable efficiently to make up ground once lost from an area or site. Others may be more closely linked with the environmental conditions found within older woods, rather than with their history or isolation.

The majority of woodland vascular plant species are simply not that closely associated with ancient woodland. While many species may be found in abundance in ancient woodland, their ecological requirements and behaviour under differing site conditions and management regimes need to be far more closely studied before they can reliably be used as guides to site history. Empirical observations over many years and in many different woods of various origins suggest that few species, beyond the limited cast below, are that concerned about history.

Small-leaved Lime *Tilia cordata*

Once one of the most dominant and widespread of native trees in lowland England, the native Small-leaved Lime is now a local tree throughout its range. It is widely, if patchily, distributed from South Lakeland to Devon and from the west coast of Wales to Kent. It is found in widely scattered localities, occasionally being present in abundance in some woods or groups of woods. It is a catholic tree, being found on a wide variety of soil types, from limestone scarps to acidic sandstone slopes. However, in the present-day landscape, it shows a preference for lowland clay soils, though this observed correlation almost certainly results from past patterns of land-use; the pollen record suggests an abundant presence

in a much wider range of situations. In the north and west it may be most typically found in steeply sloping woodland, in ravines and wooded cloughs and hillsides. Further south it may be found as a part of the coppice underwood, very occasionally as a standard tree in hedgerows or in old coppice woods or, rarest of all, as native high forest. Shrawley Wood in Worcestershire is, perhaps, the most impressive and extensive stand of the latter.

Throughout its present-day range, Small-leaved Lime is almost entirely confined to ancient woodland sites, being only occasionally found in old churchyards or parkland (where it has almost certainly been planted), or in old hedgerows where, if present in abundance, it invariably marks the 'ghost boundaries' of former woodland. The Suffolk Wildlife Trust manages as a reserve just such a hedgerow, which has survived from a period of woodland clearance that took place in the 18th Century. Very occasionally Lime may be found on old commons. While its association with ancient woodland is very close, both old coppice stools and occasional maiden stems may be found in old secondary woodland adjacent to or in the vicinity of ancient woods containing Lime (Rackham 1980). In a very few instances it may be found in old secondary woodland some distance from other stands of native Lime; at least one example of old coppice stools occurring on ancient ridge and furrow is known in Northamptonshire.

Its present relict status is the culmination of a long and continuous decline over the last 6,000 years, and its past importance and present rarity have attracted the attention of many botanists and palynologists, notably that of C D Pigott of the Botanic Garden, Cambridge. Consequently, our understanding of the ecological history of Small-leaved Lime is perhaps better than for any other woodland plant.

Small-leaved Lime is essentially a continental species, favouring a climate with long hot summers. Studies of the reproductive biology of Lime at the extremes of its native range in Cumbria and Lancashire (Pigott & Huntley 1981) have shown that it depends on a long period of hot, sunny, summer weather with the temperatures rising to 20°C for several consecutive days in June or July (or July and August at the northern reaches of its range). This enables the pollen tube to grow sufficiently vigorously to reach the unfertilised ovule within the ovary. Such climatic conditions have not been prevalent in Great Britain since the onset of the Atlantic period some 7,000 years ago (see Colebourn 1989) when the climate became markedly colder, being cool and wet in the summer and cold and wet in winter. Under these conditions Lime is rarely able to produce much in the way of viable seed. Years in which seed production has been possible will have diminished considerably, especially in the north and west of its range, though suitable conditions may perhaps have been present in northern England in the Middle Ages (Pigott 1989). However, such climatic conditions do regularly prevail in southern England today, and regeneration from seed can frequently be found in woods of the right structure, where trees have been allowed to mature in open sunlit conditions. The fruits are wind-dispersed, the close proximity of most seedlings to parent trees suggesting that when the plant does produce viable

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Coppiced Small-leaved Lime in a Gloucestershire wood. This once widespread tree now seldom sets seed mainly due to climate change but can still be found growing vigorously, often from old coppice stools, such as shown here.

seed it does not travel very far. The seedlings are, however, very prone to predation by Bank Voles, *Clethrionomys glareolus*, and other small mammals (Pigott 1985). The ecology of these animals in woodland of various types is almost certainly a critical factor in the successful recruitment of Lime from seed. The relationship between Lime, climate, voles and man is, indeed, a complex one.

Despite having a poor capacity to reproduce by seed under prevailing climatic conditions, Small-leaved Lime possesses remarkable powers of vegetative growth, being able to regrow from coppice stools, broken roots, buried branches and fallen trees. It is one of the most vigorously persistent of native trees, being both shade-tolerant and itself casting a dense shade, and is a strong competitor with other tree and shrub species. It is, however, very palatable, both as fresh coppice regrowth and as a young seedling, and is consequently very vulnerable to the presence of grazing and browsing animals. Not surprisingly, it is generally absent from woods with a history of past grazing. Its virtual absence from former Royal Forests, other wood pastures or commons, and from areas such as the Weald, where extensive grazing by Saxon and earlier herdsmen took place, is very telling (Baker *et al* 1978). Its poor ability to make up lost ground coupled with its vulnerability to grazing are key features in determining the present distribution of this otherwise very catholic and formerly successful tree species in Britain.

The closely related native Large-leaved Lime, *Tilia platyphyllos*, behaves in a similar fashion to Small-leaved Lime, suggesting that similar physiological and climatic constraints may be implicated. It is a much rarer tree, having a localised distribution in the Wye valley, the Derbyshire Dales, parts of Herefordshire and the chalk of the South Downs. Its behaviour here and on the Continent suggests that in Britain it is a relict species of limestone soils, while Small-leaved Lime is more typically a species of clays. It, too, frequently produces abundant fertile seed in southern England. Its distribution and ecology are discussed by Pigott (in Synge 1981).

The Wild Service Tree *Sorbus torminalis*

As with our native limes, the Wild Service Tree arrived and spread throughout Britain when the climate was far more continental than it is today, with hot summers and cold continental winters. Being a bird-dispersed species, often producing abundant fruit, it no doubt spread readily across the country. Its fruits can be readily germinated, though there is a requirement for freezing and thawing of the seeds to obtain the best results.

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Secondary oak woodland growing with Juniper on abandoned sheep pasture in the Dordogne. Wild Service Tree behaves very differently in this part of its range.

Whether this is to break down inhibitors in the seed coat or to deter destruction by a parasitic hymenopteran, known to prey on a large percentage of the seed crop in Britain, is not known; in spite of the considerable interest shown in this tree by naturalists and historical ecologists, this aspect of its biology does not seem to have been systematically investigated. It is probable that the change in recent millenia to cool, wet winters has curtailed the ability of the Wild Service Tree to spread from ancient woodland to new woodland sites in Britain. The production of fruit from the scattered population of trees appears to be insufficient to overcome predation by parasites, small mammals and losses from fungal infection, but the extent of these losses remains conjecture. The relationship between the plant, its parasites, its germination requirements and the weather would repay close examination.

Wild Service Tree is a persistent tree, producing vigorous rootsuckers, often at some distance from the parent tree. As a consequence it has maintained a wide distribution, if at rather low numbers, across its range in England and the Welsh Marches, being found as far north as Cumbria in the west and Derbyshire in the east.

While widely regarded as a tree of ancient woodland, Wild Service Tree is found in a wide range of other locations. It is often found as a hedgerow tree in south-eastern England, most notably in Kent, and is a feature of the scrub woodlands that occur on the landslips along the northern edge of the Isle of Wight. It occasionally occurs as a parkland tree in ancient deer parks with notable specimen trees known from Eastnor (Hereford) and Exton Park (Rutland). Its occasional presence in churchyards can almost certainly be attributed to past planting. In Europe, Wild Service Tree has a rather southern distribution, becoming scarcer in the north and west. It is a common tree in the Dordogne of central France where it is found with oaks, *Quercus robur* and *Quercus pubescens*, Juniper, *Juniperus communis*, and Box, *Buxus sempervirens*, in woodland developing on the extensive abandoned limestone sheep pastures. While the winters of Perigord are not severe (it is a markedly Atlantic region), the area does have more predictably cold dry winters than most parts of lowland Britain. Interestingly, under these conditions its biology lead it to be a plant typically of recent secondary woodland, readily dispersed from older established woodland by birds.

J Russell/Nature Photographers

Autumn leaves and fruit of Wild Service Tree. This species has traditionally been treated as something of a weed species . Will a more sympathetic view mean that it will become a more commmon sight in our woodlands?

Wild Service Tree is often found on the edges of ancient coppice woods, usually as small trees and rarely in any abundance, suggesting that in the past it was treated as something of a 'weed tree' of no great commercial value, to be cut out of the coppice or tolerated at the fringes of the wood. Such treatment would have considerably reduced fruit output in the past, contributing to the bias against recruitment from seed. Colonisation of new woodland sites has probably been no more than an exceptional occurrence over most of England and Wales for many years, except perhaps in the cold heartland of Kent. With most nature reserve managers now favouring this tree wherever it occurs, we might look forward to a greater incidence of colonisation of new sites as more fruit is distributed across the countryside and the occasions on which seedlings get away increases.

Robin Bush/Nature Photographers

Carpets of Wood Anemones at Cressbrook Dale in the Derbyshire Dales.

Wood Anemone *Anemone nemorosa*

The wide distribution and abundance of Wood Anemone in a good range of woodland plant communities make it one of the more useful of plants for interpreting woodland history, though its occurrence in open pastures and upland habitats in many parts of Britain limits its value as an indicator of ancient woodland in some areas. Nevertheless, across much of its range it demonstrates a strong affinity for ancient woodland, colonising adjacent secondary woodland very slowly. Only very rarely is it found in more recent secondary woodland, and where it does occur it is usually present in small discrete patches. This is in striking contrast to the abundance with which it may be found in ancient woods, particularly those with a long history of coppice management. The Wood Anemone is intolerant of the presence of deep shade, appearing in early spring and completing most of its photosynthetic activity before the onset of summer when the crowns of most of our native trees come into full leaf. Dense stands of evergreen species which cast a strong shade in the spring, such as conifer nurses, Holly, *Ilex aquifolium*, and other species, tend to eliminate it; furthermore, it does not appear to persist in the seed bank for more than a few years. The vegetative spread of this species by rhizomes is extremely slow, and once it has been lost from an area it takes many years to recover ground, spreading at a measured rate of one or two metres in a hundred years (Pigott 1990). It can spread by seedling production, but this seems to be a rare occurrence across much of its range.

Most of the Wood Anemone seed set in Britain appears to be sterile, though casual observation suggests that the situation varies to some extent across the country. Fertile fruits are reported from Scotland (Shireffs 1985) though seedlings are apparently rare. Evidence from studies in Poland (Trela-Sawicka 1975) suggests that the species possesses a complex genetic incompatibility mechanism which prevents self-fertilisation and which has led to the species being made up of many individual clones, most of which are also incompatible with one another. The amount of viable seed is, as a consequence, very low. The genetics of Wood Anemone, coupled with the very slow rate of vegetative spread of established clones and its lack of persistence in the woodland seed bank, effectively curtail colonisation of new woodland, even where this may be adjacent to ancient semi-natural woodland replete with the species.

In the west, notably in Devon and Dorset, Wood Anemones are abundant in hedgerows,

many of which may be considerably older features in the landscape than the copses and small woods. Understanding the behaviour of Wood Anemone here depends on a full appreciation both of the plant's biology and of the antiquity of the landscape. Elsewhere in Britain it may be found frequently in ancient meadows and upland pastures, as in the Derbyshire Dales, for example. Its presence in such situations is often explained by regarding it as having relict status following woodland clearance. Such explanations fall into the familiar pitfall of explaining an apparent anomaly by creating an historical 'just-so story' to account for it without clarifying the plant's ecological requirements in any way. Its persistence after the establishment of broad-leaved plantations or the growth of secondary woodland will no doubt conspire to confuse and confound historical ecologists in the future.

Roger Tidman/Nature Photographers

Lily-of-the-valley growing with its rarer cousin, May Lily, *Maianthemum bifolium*, in an ancient woodland in Norfolk.

Lily-of-the-valley *Convallaria majalis*

While Lily-of-the-valley is widely regarded as a plant of ancient woodland across much of Great Britain (Peterken, 1981), its behaviour across the country shows some striking contrasts. In the north of England, it is commonly associated with limestone pavements and screes, but it also occurs frequently on acid brown-earth soils and occasionally even on brown-podzolic soils. It occurs in ancient woodland in northern Britain, usually in woods on limestone, though it may be found on more acidic, rocky soils. In lowland eastern England, it is more typically a plant of dry, sandy soils within ancient woodland, often growing under bracken on sand lenses or sandy glacial deposits. Elsewhere in the south it may be found on similar sandy soils in woodlands of oak and birch on former commons, but it also occurs on limestone soils in the Cotswolds and in a few places in the Chilterns. It may also be found on some gleyed brown-earth soils under Lime and Hornbeam, *Carpinus betulus*, in the east of England, on clays and boulder clays. Generally, it is very locally distributed in Britain, being a rather rare plant even within the woods where it is found, though it can form extensive clonal patches. Large areas of apparently suitable woodland do not contain Lily-of-the-valley, including a great many ancient woodlands.

This curious, localised distribution is in marked contrast with its widespread occurrence in parts of Scandinavia where, in southern Sweden, for example, it may be found in abundance in a great variety of situations, from rocky outcrops of glacial morainic material to alluvial meadowland. It can even be found on lakeshores, growing in the raw peaty litter of washed-up Common Reed stems, *Phragmites communis*. In spite of the popularity of this well-known plant, the ecology of Lily-of-the-valley in Britain is poorly understood. While its ability to colonise new sites is regarded by many as being poor, it nevertheless flowers freely and produces abundant fruit containing fertile seed in many years. The fruit are small orange berries, suggesting dispersal by birds or small mammals. Its vigorous, vegetative growth and apparent mode of dispersal suggest that other factors are contributing to its present restricted distribution.

Lily-of-the-valley is evidently neither a calcicole nor calcifuge species, but is a plant of oligotrophic soils. It avoids nutrient-enriched sites, particularly the heavy clays upon which much ancient woodland is situated in eastern counties. Nutrient-rich, eutrophic soils are also likely to be typical of many more recent secondary woods

Paul Sterry/Nature Photographers

Herb Paris growing with Dog's Mercury in a coppiced woodland.

developing on sites with some form of past agricultural history, especially in the Midlands, where the clay soils retain their nutrients for long periods of time. In at least one situation in Berkshire, it can be found in woodland derived from old pasture, but here the soils are very impoverished and sandy with a poor ability to retain nutrients for long. The abundance of this plant in a wide range of situations in Sweden might simply be reflecting the comparative youth of that country's soils.

Recent activities of man mean that the present distribution of Lily-of-the-valley needs to be interpreted with some care. It has been widely planted to enhance the charm of woodlands, both in landscaped woods and plantations and within ancient semi-natural woods. Conversely, its absence or rarity in a woodland may reflect the depredations of past collectors and commercial exploitation. Druce, in *The Flora of Buckinghamshire* (Druce 1926), comments on the presence of the plant in the greensand hills of the east of the county, adding: 'Woburn and Brickhill offer a wonderful sight of this plant despite the raids that have been made on it in recent years.' While it has survived in the Brickhills region, it has certainly disappeared from other woods in the Home Counties as a result of overcollecting.

Herb Paris *Paris quadrifolia*

A local but very widespread plant, Herb Paris has long been known to be a plant of ancient woodland. Why this should be so is far from clear. It is tolerant of deep shade, competing successfully with both Dog's Mercury, *Mercurialis perennis*, and the woodland canopy for light. Its poor powers of dispersal may reflect the absence of former dispersive agents. It is not a profuse producer of fruits, with each flower producing only a single black berry which, sitting on the woodland floor, does not seem to be designed to be attractive to birds and appears to be simply lost in the litter. In the past, perhaps, the rootlings of pigs or Wild Boars, *Sus scrofa*, may have carried the seeds or the berry to new localities (though this is pure speculation!) Its pollination and dispersal biology remain very poorly understood, as do its requirements for successful germination. Seedlings appear to be very rarely found in Britain. As with Lily-of-the-valley, we need to know a lot more about the ecology and reproductive biology of Herb Paris before we can claim to understand why it should be so restricted.

Herb Paris has a strong preference for moist, rich loamy or silty soils, often at the bases of slopes, where it grows in the damper nutrient-rich, but not necessarily nitrogen-rich, soils often in association with Dog's Mercury, Lords-and-ladies, *Arum maculatum*, Ash, *Fraxinus excelsior*, and Field Maple, *Acer campestre*. In woodland on poorer soils it may be confined to the bases of slopes where nutrients accumulate, growing with Alder, *Alnus glutinosa*, and its associates such as Opposite-leaved Golden-saxifrage, *Chrysosplenium oppositifolium*. Suitable situations of this sort are often only locally present in woodland and Herb Paris is consequently often confined to discrete local patches. Most of the woodland of moist, nutrient-rich soils will have long since been grubbed out for agriculture, and the present patchy distribution of Herb Paris and its virtual confinement to ancient woodland sites may reflect this. Suitable growing conditions may rarely occur in woodlands of secondary origin, most having arisen on soils of poor agricultural value. Many are also isolated within

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Traditional coppicing of our woods has been carried out for many centuries and has favoured certain plant species. However we must not assume because a wood has these plants that it is ancient woodland, a more questioning understanding of the ecology of the species and careful historical research are needed.

otherwise inhospitable agricultural landscapes.

Whereas Herb Paris has been found in only a few situations outside ancient woodlands over most of the country, it is notable that a recent survey of woodlands undertaken by the Gloucestershire Trust for Nature Conservation found Herb Paris in a number of recent plantation woodlands on the loamy limestone soils of the Cotswold Plateau. The plant is remarkably abundant in the ancient woods of the area. The suitability of the soils in both ancient and recent woodland, coupled with the comparative abundance of the plant in the nearby coppices, appear to have enabled this otherwise rather poor colonist to readily reach new suitable localities. Elsewhere in the country, the sparse distribution of the plant coupled with the scarcity of suitable new situations conspire to achieve the opposite, confining the plant to ancient woodland sites. Until we know more of its biology we shall be unable to say exactly why.

Some conclusions

Woodlands have been managed in the past to produce woodland products, not woodland plants and animals. The biological interest of ancient woodlands, and their importance for nature conservation, have arisen incidentally to other objectives – whether this be in the New Forest or in your local coppice. Only with the rise of nature reserves in the late 20th Century do we begin to see woodlands managed for woodland plants and animals as a primary objective. While there can be no doubt that past practices in woodland management have had profound effects on our woodland flora, we must not fall into thinking that the behaviour of woodland plants is explicable simply in terms of the management history of our woodland. A full understanding can be achieved only through a study of their ecology. Indeed, the mechanisms by which past historical change has influenced present plant distribution are comprehensible only through such investigations. The studies of the relationship between the reproductive biology of Lime, climate change and the history of Britain's native forests by Pigott *et al.* are an excellent example of an investigative approach leading to a fuller

understanding of both history and ecology.

While the species described above may be cautiously used as indicators of long woodland continuity in many circumstances, few other plant species are as faithful. Their association with old woodland may have more to do with their response to past coppice management, a form of management far more widespread in the past and rarely adopted in recent woods. Wood Spurge, *Euphorbia amygdaloides*, violets, *Viola* spp., and Primroses, *Primula vulgaris*, all of which are considered by some to be reasonable indicators of ancient woodland, may be found in abundance in coppices of quite recent origin. Conversely, plants of coppice woodland are usually not found in abundance in native high forests, whatever their age. For example, Oxlip is rarely found within native forests on the Continent, being a plant of wood-edge and meadow, avoiding the dense shade.

Coppice management has no doubt altered the availability of fruits of various trees in the past. The extent to which this might have influenced various species will have depended on both the age at which each species might reach maturity and the length of coppice rotation prevailing at any one time. Both species of Lime and Wild Service Tree may have been hampered in this way, but the most striking demonstration of the effect of coppicing may be seen in the Sussex and Surrey Weald, where woods of various ages arising on old abandoned farmland can be examined. Here the older secondary stands have comparatively little Hornbeam present, while the most recent secondary woodland contains many Hornbeam seedlings and saplings. Since Hornbeam coppice has been present for many centuries in the area, this difference in the rate of recruitment at various times in the past must result from the past active management of the coppice. Hornbeam may have been present in abundance, but not necessarily productive! One must be alive to all these vagaries when attempting to interpret woodland history and ecology.

Ancient woodland must clearly remain amongst the top tier of important woodland to be conserved and managed sympathetically. There is also a case to be made though for active conservation of a wide range of other important woodland sites, which may not be that old but which possess woodland plant communities, species or other features not found in ancient woodland. There is a strong case for identifying and conserving particularly meaningful sites, those which are comprised of woodland types of many different origins, encompass varying soil types, or demonstrate the consequences of a range of management histories. It is these sites which will provide the real insights into the ecology of our native woodland plants.

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