

## Oliver Rackham - Notes

**Oliver Rackham. 1975. Hayley Wood. Its History and Ecology. Cambridgeshire & Isle of Ely Naturalist's Trust LTD, Cambridge, England.**

**W.H. Palmer.** One of finest ancient woods in eastern England; unrivaled detailed study of the social history of a site.

**Harry Godwin.** "...Conservation of an ecosystem must be based upon thorough knowledge of its many components and of the mechanisms by which they operate. The need for management, like the need for adequate knowledge and controlled experimentation on which to base it, is now fully conceded. The means for realizing this in practical terms is another matter..."

"detailed ecological study in the field has revealed again and again that, even in quite unexpected regions, past human activity has strongly shaped the apparent natural cover of the landscape."

**S. Max Waters.** 1962 purchase. Clay soils so despite dry climate the flat site hold waters; wet spring, may dry suddenly in summer. Largest surviving semi-natural oak-ash wood in West Cambridgeshire; fame as an oxlip wood and large primrose population. Secluded yet near Cambridge; square so could accommodate experimentation.

1963 on – coppice plots to show traditional cyclical coppice treatment; small permanent clearings (glades) – opened and maintained by annual cutting and partly as thickets and brambles; re-open rides, removal of silt accumulated in Great Pond; studiously avoided anything that would encourage drainage as detrimental to distinctive plants. Shelter, two hides and bridges for visitors.

**Rackham.** Ancient woods (doesn't definitely characterize – or distinguish from primary; page 50 infers ancient = primary) – biologically important and historical monuments in themselves. Hayley Woods recognizable single element to resident of Domesday Book times. Form is intricate blend of natural and artificial elements including features derived from practices of centuries long past and even prehistoric forest. Comprise half of county's total woodland. West Cambridgeshire – 25 ancient woods mainly on chalky boulder-clay.

Subject – development of woodland as an element in local topography; function as an element in local economy; influence of past management on present-day ecology.

Generalizations of English history are detrimental to historical study of woods – regional differences, specific distinct qualities.

Sources – pollen analysis, earthworks, woodland structure and vegetation (annual rings of living trees), maps and other documents, timber of ancient buildings.  
World's earliest large mosaic air photo – 1922 (no plates just published prints)

Hayley – 95% primary – 114 acres, Old Hayley Woods “a site which has never been other than woodland since prehistoric times”. “woodland continuously since prehistoric times”. Two secondary woods.

1251 first mentioned. Appears in every succeeding century. Probably much older. Maps reconstructed – 1251, 1600, 1810, 1969. Reconstructed some details from air photos – don't plow forests and seldom dig in them, etc.

Woods preserve surface features that have been on the site since wooded. Ridge-and-furrow etc. indicate secondary woods. Bank and ditch – banks invariably on woodland side as earthwork to drain field and fence the woods. Stabilizes the outline of a wood. Not straight as went around large trees. Often scattered pollarded trees. Irregular hollows – characteristic of primary woods – few inches deep up to so feet across. Natural irregularities form glaciation. Non-woodland origin. Easily destroyed by plowing, can't survive outside primary woodland.

Describes the history of the roads, ownership, splitting and merging. Depicts elm invasion and other plant movement, clearing etc. with arrows and lines.

Great Pond – “armed” with 3-6 arms, starfish; 5 feet deep, steep-sided with flat bottom. One per 100 acres – provided large edge for herd – possibly >1 field. Most woods have ponds – for horses working in them (?but shape?). No mound – worked form existing hollow? Dry in summer.

Medieval woods common as medieval churches until 1945. Managed for sustained yield beginning 600 years ago and maintained for half-millennium. Produced timber and wood or underwood. Main regular product was such wood – mostly for fuel. Coppice from stump or stool. Standards – mainly oaks, allowed to each full size, scattered among coppice. Felled to yield timber and wood form branches. Two crops compete against each other. Woodmanship NOT forestry (forester plants trees). Intensive and yet conservative as maintains continuity of site. Woodmanship always taken for granted by contemporaries and seldom discussed in abstract. History needs to be laboriously reconstructed.

Management descriptions from five centuries. 1251 – cut rods, hurdles, fencing. 1356 – underwood sold every seventh year = average coppice rotation. 1584 – felled twice in 21 years, keeping animals out, oak as timber separate from underwood. 1765 – timber, bark, underwood. Coppice cycle lengthened form 7 to 10 years and then to 20-30 in 1900s. Great detail by OR from data in other woods. Rings show decline after cutting followed by a gradual recovery.

Most fuel was domestic – industrial elsewhere. Went to lord's demense farm, villagers, other estates. Timbers reconstructed form buildings – posts, joists, rafters. Trees 5-40 per acre.

*Loppium et chippium* – bark, branches, rotten wood, leaves. Very little allowed to burn or rot.

2 – 4 men to run the woods.

Reconstructed coppicing form one stool back to 1785 – 9 coppicings, 14 year cycle. Coppice cycle lengthened presumably because growth declined. Wattle and daub form buildings show a decline. Exhausting the phosphate in the soil (no climate influence? Evidence strong for P and soil explanation?).

1000 BC – West Cambridgeshire almost a continuous forest. Anglo-Saxons destroyed most of prehistoric forest. No idea how – killing the stumps is the difficult part. By Domesday – 1086 - about as open as today. Minimum around 1279.

Most woodlands not grazed. Some for pigs but relative unimportant overall for pigs.

Hayley Wood in Decline – He means woodland management. Economic and political – cheap coal, investment in wood industry to forestry, which is not woodmanship. Commercial woodmanship ended about 1950. Most of Hayley last cut in 1887 – 1915. Also more valued for sport than produce. Deer also arrived (~1900?unclear)

Most woods heavily cut between the wars. But such “devastation” was once part of woodland practice. But preferentially cut larger trees – unusual.

Prehistoric flora – mosaic pattern. Moisture a strong factor and sections very wet.

Certain plants characteristic of ancient woodlands others of secondary. *Mercurialis perennis*, *Paris quadrifolia*, *Millium effusum*. Slowly invade adjacent secondary woods. Absence of secondary woodland indicators. Some are good indicators even after centuries.

Oxlip – ancient woodland indicator is gradually invading, slowly advancing into the Triangle (secondary). Whereas Primrose usually on woodland margins. Cowslips form grasslands – remain around Old Wood.

Many woodland species don't cross open country so each wood left with species that were in it when separated, less those becoming extinct. Possible hedge connections. Possible evolution.

Underwood is a much better indicator of history – less control by the woodmen, little direct manipulation. Represent the prehistoric forest as modified by centuries

of coppicing acting indirectly as an environmental factor. Floras little changed since Ray's 1660 records.

But no controls, no comparable unmanaged woods. Some changes in the reverse direction due to the decline in woodland management but not possible to revert.

Coppicing impacts – decline in species that don't stand coppicing or don't compete well as a coppice. Beech – poor; pine – never; lime – doesn't compete well, good by itself; exterminates herbs that don't fare well with exposure – sun, drying, or competition by tall vegetation; tidying up and removal of wood that reduces bryophytes, fungi, etc.; removal of big trees and their epiphytes; grazing – pigs etc. Conditions now more uniform

Loss of marginal grassland very damaging – plough and expanding woods. Also decline of coppicing and declining management in general. Many light demanding species of woods declining. Increase of dead wood – good.

Even in a remote place – flora tends to increase by migration and accidental introductions.

Stools – some low and massive; some small and underground;

Maidens – originate from seed

Suckers – form roots or underground stems

Emergents – very tall

Standards – single-trunk trees

Large coppice – low massive stool with a few trunks, telegraph pole size

Small coppice – many slender stems, small form small stools

Scrub – trees of coppice height, no stools; hawthorn

Clones

Ash stools – gets bigger with each cutting; diameter is rough guide to age. Generally elongate, not round. Typical – massive hollow trunk 3 ft in diameter and 2 ft high with 3-4 large poles. Always rotten inside. Some in Suffolk and Essex up to 3m in diameter. Among oldest trees in Britain. 7-12 inches – cut once. Decreasing numbers with size. Death due to shading. A few very old ones. Some medieval. One with rings to 1775. Poles on given stool generally same size. Average height 16 inches, larger are taller – possible due to higher cutting each time or earlier woodmen cutting higher so out of reach of rabbits.

Maple – stools uneven in size and age (presumably). Stools lower (<18 in) as cut near the ground.

Plots diameter versus number of stems.

Tree ring chronology.

Unusual in that a number of trees are dying, near end of normal lives. Rare in GB. Oaks form 1916-24 caterpillar outbreak. Die at different age sin elm woods where doesn't compete. 50-100 years to decay. Oldest trees 200 years.

Foresters – most trees form seed. Woodmen – from suckers and coppice.

Oak – rarely establishes from seed. None in Hayley since 1840. Abundant seed. 92% germinate. Predation of seeds and seedlings. Rodents, deer, caterpillars.

Need to establish oaks for 22<sup>nd</sup>. But don't know how to do this.

Drainage – bad for rich woods – turn valued plant communities into dull ones.

Managed woodlands – gets complete light when cut. Few species require shade. Continuous shade not a natural feature of deciduous woods. Coppicing leads to cycle of conditions and ground vegetation. Flowering and growth. Light, temperature, moisture,.

Management – Trust opened up rides, started coppice experimentation. 57 species confined to railway – 1/5<sup>th</sup> of species. 13 recorded in woods in 19<sup>th</sup> C.

The Hayley Wood railway, with its complex structure and history, is the most interesting wood margin in the country...Unfortunately there is no substitute for railwaymen in managing railway vegetation.”

Deer incompatible with oxlips, coppicing and oak replacement

**Oliver Rackham. 1986. The History of the Countryside. Dent, London.**

Reviews sources of information – plants, air photos, maps, boundaries, written records (place names, Anglo-Saxon charters, Domesday Book, medieval records,), testimony and tradition. Many peats have lost their top layer from digging.

Domesday Book. William the Conqueror. 1086.

“I cannot analyze the historic landscape without noticing how much almost every aspect of it has been lost since 1945”.

Due to modern ag, modern forestry, development comes a long way behind; also “neglect of traditional land-uses and consequent natural changes, especially trees growing where they do not belong”.

Leads to loss of: beauty, freedom, vegetation and wildlife, and meaning.

- Beauty especially the loss of the small and complex and unexpected.
- Freedom from movement into open spaces.
- Of historic veg – “to recreate an ancient wood is beyond human knowledge, though we might re-create a historic grassland if we were to live to the age of 200”.
- Meaning – of our roots and the growth of civilization. Each historic wood, hearth, grassland etc. is unique and has something meaningful to tell us.

Myth – countryside always changing. Kaleidoscope Myth. Evidence and tendency make the most of change versus stability. Changes in some places and at some times.

New habitats do not replace old. Most new ag has spread the commonplace at the expense of the wonderful or rare. Subsidize ag to have expensive food and a ravaged countryside.

“Conservationists should not usually seek the restitution of features already destroyed, which is rarely worthwhile. They should seldom seek to remove land from production: long-standing land-uses should be maintained or restored. But they should resolutely oppose any further advance of the commonplace or loss of meaning. Historic landscapes and buildings are similar in many ways...”

“More intractable than destruction...is the blight of tidiness which every year sweeps away something of beauty or meaning.” Grind away stumps, remove mis-

shapen trees, cut hedges to ground, “unconscious vandalisms that hate what is tangled and unpredictable”

“The landscape is like a historic library of 50,000 books. Many were written in remote antiquity in languages which have only lately been deciphered; some of the languages are still unknown. Every year fifty volumes are unavoidably eaten by bookworms.” (Imperfect metaphor)

“Education in the knowledge and care of the countryside has far to go and has yet to reach many important people. No art gallery’s conservation department would think of burning a picture by Constable, however badly decayed...Yet this kind of pastiche is daily perpetrated in the guise of the ‘conservation’ of the landscape.”

Auroch – woodland animal. Last extinct in 1627 in Jaktorowa Forest, Poland.

Bear, wolf, beaver, wild swine, crane.

Loss of plants – destruction and alteration of habitat – drainage, ploughing, neglect of management, increasing heath fires; collecting and eradication; air and rain pollution;

“Allowing heath, grassland, or fen to become overgrown with trees does more damage than burning and is almost as destructive as plowing.”

Many woodland plants are affected by the decline in woodland management”.

“The most severe declines in all wild plants are among the weeds”.

Naturalized animals – rats, mice, rabbit, fallow deer, pheasant, grey squirrel, dove.

“Many weeds, such as plaintain, mugwort, and shepard’s purse, were originally arctic plants living in the tundra of late-glacial Britain; they somehow survived the millennia of wildwood, and in Neolithic times found a new lease of life as weeds. Other weeds...came from the oriental homeland of agriculture.”

Naturalized plants – chestnut (shown to be non-native by pollen), sycamore (*Acer pseudoplatanus*), *Rhododendron ponticum* in Ireland (was there in prior interglacials) now a menace to conservation, rosebay willowherb (*Epilobium angustifolium*), *Spartina anglica*, *Bromus interruptus*

Woods...result from long-running interactions between human activities and natural processes, to both of which the historian has to give due weight”.

“The history of woods is infiltrated and corrupted by myth and pseudo-history”.

Wildwood – natural forests. E NA patches still survive.

Woodland – lands on which trees have risen naturally. Managed by the art of woodmanship. Reproduce by natural growth.

Wood-pasture – land-use involving grazing animals and trees. Conflict with techniques to resolve these.

Plantation – not natural vegetation. Few species, often conifers that do not maintain themselves. Established and replaced by planting = forestry in GB.

Forest – with capital F is land on which the king or other magnate has right to keep deer. Place of deer to medieval, not trees.

Coppicing and suckering – efficient and very reliable ways of getting a new crop.

Pollard and bolling (permanent trunk)

Timber trees vs underwood – timber buildings and wood fires. Both have different meanings and uses.

“Woods do not cease to exist through being felled”. Self-renewing, not exhausted.

Some woods derived from the original wildwood. Others are secondary – arisen on land that has at some time not been woodland.

“Almost all land by nature turns into woodland. Let a field be abandoned – as many fields have been down the centuries – and within a year it will be invaded by oaks springing from acorns dropped by passing jays, or by birches from wind-blown seed. In ten years it will be difficult to reclaim; in thirty years it will have ‘tumbled down to woodland’. The same happens to chalk downs, heaths, fens, and some moorland whenever the grazing and burning cease that had held trees in check.”

Secondary woods may be of any age – prehistory onwards. Primary woods = ancient woods. Secondary = ancient woods.

Secondary – generally pioneer species that easily invade.

Wildwood. To understand the wildwoods of British prehistory we should look across the Atlantic to the wildwoods encountered by early American settlers and still surviving in fragments.”

Within each geographic province – many types of wildwood. Soils, etc., mosaic, varied structures, disturbance (no fire, less destructive storms). Few native trees that can grow up in the shade of other trees.

Mesolithic impacts. Hunting, gathering and may have involved definite management of land and vegetation.

Neolithics – sudden impact. “They immediately set about converting Britain to an imitation of the dry open steppes of the Near East, in which agriculture had begun.”

Attacked elm and may have let loose the elm disease.

Neolithics spread almost instantly throughout British Isles. 50% decline in wildwood by early Iron Age – 2500 BP.

“To convert millions of acres of wildwood into farmland was unquestionably the greatest achievement of any of our ancestors. It belongs to an age far beyond record or memory, and we know little of what men were involved, how they were organized, how much of their time they spent on it, how many man hours it took to clear an acre and what they lived on while doing it”. “Cattle, sheep and goats probably helped the clearance process by browsing the regrowth and eventually killing the stumps.” But may doubt whether in prehistory there were enough livestock to do this except close to settlements.

In New England a task of similar magnitude was accomplished by European settlers in about 180 years (1650 to 1820).” Metal tools, partially combustible woods, large population continually reinforced from homeland, places already [periodically burned by Indians, conifers easily killed, lived where hurricanes kept trees small, grew maize which gave them time. But boulders to remove and even more rapid regrowth than GB.

“Almost the whole area had become woodland again by 1900 – American agriculture is a story of wasted toil”.

British trees difficult to kill. Don’t burn, difficult even with machine and poison.

“British woodlands (except pine) burn like wet asbestos”.

Some Neolithic areas regrew – were abandoned for unknown reasons.

Farmland doesn’t result from people felling trees for use. Most wood wasted. Big trees not much use. But the resprouting stems are much more useful than the original tree. First evidence of this woodmanship and elaborate coppicing to produce rods of exactly the same size – 6000 years old – Somerset Levels.

New England ...”thousands of miles of field-walls lost in the woods, and the cellar-holes where thousands of farmsteads had rotted back into the ground. In America there was merely an economic cataclysm, and only pots lie under the bushes...”

Domesday (1086 A.D.) – 6208 of 12580 settlements reported woodland. “Most of England consisted of farmland with islands of wood”. Norman England – few woods > 4 miles across, many areas > 4 miles from woods.

Anglo-Saxon earlier times are similar. Woods have individual names and were permanent. No real evidence of A-S clearance – already tamed.

**Buildings.** Over 90% timbers are oak. Most made from the smallest pieces possible. Waney – rounded corners on piece squared up to work form roundwood.

Typical 15<sup>th</sup> C farmhouse – 330 trees – only 3 18 inches; half <9; 10% <6”

Good roads; large impot business form Norway, Baltic, C Europe – pine.

Woodland in 1086 – 15% of Englandl 10% by 1350, decline slowed by Black Death in 1349. Much of that then survived to 19<sup>th</sup> C.

Can rarely ascertain why one woods survived and another not; social value, economic value and cost of destroying them.

Not destroyed for fuel. Woods not used up. Not aware of a single woods which was destroyed for iron, etc. Not fly by night operations; actually more woods in areas around industry; industry protects against farmland; large tracts protected; not destroyed for shipbuilding;

Oak bark for tanning – principal tree; initially as by-product for timber felling; 1780-1850 became gigantic industry – huge consumer form almost every source of wood;

Since 1800 – long careful wood management declined; goods linked to boom and bust economy; management for timber not energy – wood replaced by coal, oil, atoms; paper and pulp form other countries; clearing for farms etc; gamekeeping and removal of public; Not so in France, Germany, Switzerland.

1870 most woods survived to 1945.

“Ancient woods have great powers of recovery” – 1914-45 fellings not damaging overall and allowed some to catch up on neglect.

“The greatest threats to ancient woodland for a thousand years came form the destructive course which both agriculture and forestry took in Britain after 1945... Foresters acquired woods and treated them as if they were moorland, trying to poison or otherwise destroy the vegetation and to replace it by plantations”

Confier plantations destroy trees and herbs – shade and litter.

“Many ancient woods refuse to die; replanting merely wastes money but has no lasting effect”.

Woods are not on land that was good for growing trees., but on land that was bad for anything else”.

Sinuuous outline to woods – digging trench and bank around existing trees. Bank to inside.

“Stools are not men or machines; they do not die of old age or wear out; the process can go on indefinitely.”

Red maple stools 2 ½ feet across; English maple may be 15 feet; ash rings may be 18 feet; giant coppice stools are among the oldest things in Britain.

*Tilia cordata* – pry tree. Lime. Largely confined to AW. Oxlips. Suite of indicators. Recent woods – ivy, *Alliaria*, cow parsley.

Agriculture = real destroyed of woodland. But les in last 10 years; more fuel use.

“Our historic woods are not mere isolated relics of antiquity, but belong to an unbroken tradition extending through the Middle Ages back to the beginnings of coviliazation and beyond”.

“Almost every wood of which the coppice stools still remain is worth preserving.”

“If we cannot coppice for the present, let use not be ashamed of doing nothing”.

“...all over Wales, Scotland, and Highland England woods have been ravanged for decades by sheep getting in through breaches in the boundaries. The simples conservation of them all is three strands of barbed wire”.

Wood pasture – 1200 years. Pannage – not very important. When grazing suppressed the wood pasture reverted to woodland.

Bets preserved woodland – Hatfield – deer, cattle, coppice woods, seven species of pollard, scrub, timber trees, grassland, fen, lodge and rabbit warren.

“Old trees are almost as rare as in the United States”. (!!??)

Ancient wood-pasture – many creatures on them.

‘grey, gnarled, low-browed, knock-kneed, bowed, bent, huge, strange, long-armed, deformed, hunchbacked, misshapen oak men’ Francis Kilvert 1876.

Overtopped and shaded.

Hedges – planted; inadvertent due to misuse and neglect of edges; remnants of former woods hollowed out. Great loss of hedges after WWII.

Stag-headed trees – many like that for decades.

Oxford and Wallingford – “fords” of rivers.

Ancient roads – abandoned, plowed, privatized;

Heath – dry versus moor with peat; old belief that these were wholly natural; from clearings created by people; some Mesolithic, many Neolithic; form common woods, not form thin areas or lightly forested areas. Some ploughed (much more so in grasslands and moors); no evidence of deliberate destruction of trees for framing – effect of long-term grazing; Calluna, Erica, Broom, bracken,; rabbits added motive for maintaining heath. Warrens all over England.

Sherwood Forest – not wood – vast heath encompassing many woods in 1154.

Most heathland plants can be grazed; furze = *Ulex europaeus*; many harvested for fuel, litter, thatch, compost, potash (bracken), brickmaking,

Fire often called necessary; “but we must not suppose that all heaths were burnt”. Rarely burn a crop. Amny so closely grazed that they seldom burned; those not grazed were kept free of animals for other purposes;

“Fire in a heath, as in a wheatfield, was a rare accident which most people did their best to prevent . . . many heathland plants and animals are now endangered by fires, and could not have survived to the present had heath fires been a regular event of the past”.

Ag reclamation destructive.

“On most heaths there is not enough grazing to keep down the oak and birch”

“Heathland is an ancient and beautiful part of our heritage. It is a symbol of liberty: most heaths are de facto open to the public, and their destruction has curtailed Englishman’s already meager right to explore his own country.”

Moorland – some natural due to rising water table and some generated by people. Wholly natural to wholly artificial. Much interaction of the two. Burning always more common than on heath.

Meadow = grassland mown for hay vs pasture grazed by farm animals. Very different plants as seasons different and selectivity different. Scythe does not pick what it bites.

All kinds of other artifacts.

## George Peterken – Natural Woodland

Potential conflict – conservation of the natural environment and the maintenance of historic conditions.

“The pattern of working is determined by modern limitations, not historical needs”.

“The woods are an expression of mankind as well as nature, and the people that matter have changed greatly”.

No one historic state.

Naturalness is a continuous variable. Woodland is natural if grown without direct management – quite impractical as all affected.

“Ancient” – wooded since 1600; versus “recent”. “Primary” if existed continuously since before original forests fragmented. “Secondary” originated on unwooded ground. Very difficult to prove conclusively if primary but relatively easy to determine Ancient.

Many slow colonists

Link between stability and diversity – uncertain.

Beech limited by – spring frost (sensitive), summer drought, late arrival after ice retreat.

Cline and Spurr 1942. “The primeval forest. . . did not consist of stagnant stands of immense trees stretching with little change in composition over vast areas. Large trees were common, it is true, and limited areas did support climax stands, but the majority of the stands undoubtedly were in a state of flux resulting from the dynamic action of wind, fire and other forces of nature. The various successional stages thus brought about, coupled with the effects of elevation, aspect, and other factors of site, made the virgin forest highly variable in composition, density and form.”

Nature conservation management – natural woodland; traditional management; and management designed to achieve explicit targets such as diversity or conservation of a rare species.

Britain – distinctive: predominantly temperate broadleaf; native woodland reduced to a scatter of small remnants by extensive and prolonged deforestation; substantial reforestation in 20<sup>th</sup> C using non-native conifers such that Britain remains poorly wooded.

Rackham – importance of “meaning”.

“Surviving examples of traditional management demonstrate relationships between people and nature which cannot be re-created once they have been abandoned.”

“The countryside is a ‘book’ where we can study in minute and varied detail the long coevolution of human societies and the environment” (Rackham 1986) but only if preserve pollard etc. along with records to interpret.

Value in research, social and economic history. Historical monuments, some of oldest features in land.

Epping Forest and Dalby Woods show...”the diversity created by and inherited from traditional management is likely to be lost if reserves are allowed to grow naturally.”

Traditional management – manage as in the past. Protects the complement of species, usually maintains the greatest diversity of habitats, preserves the historic interactions between people and nature. Maintain traditional management where it survives and restore it elsewhere. SO, maintain some reserves as coppice. But what to do as management actually changed slowly over time? What are the essential features of traditional management? What to do with damaging aspects of TM? What to do with natural disturbance? Do forests need restoration from degradation?

Woodland conservation in Britain characterized by underlying conservatism. Including keeping forest types as what they are. Prudent, based on primary woods recognition, reinforced by limited amount of natural woodland. But kept people from recognizing value of secondary woods; plantations; purist attitude towards sycamore and other species;

Widley believed initially that natural woods were degraded – needed rehabilitation. Envisioned dense reproducing and self-replicating stands. Assumed stable forests, diverse, increasing richness over succession.

“It was believed that human actions had sacrificed this diversity, degraded this original state and created instability in a system which was naturally stable. These assumptions led further to a belief that existing forests could be rehabilitated to a highly productive, diverse condition.”

“Foresters have long found professional inspiration in the supposed need to rehabilitate degraded woodland. They have an urge to control and to predict”.

“Everyone was aware that mankind had destroyed most of the original woodland, but few entertained the possibility that the remnants were richer in some respects than the original on that site.”

Restoration of ancient semi-natural woodland to natural woodland limited by: difficulty in effacing effects of past management, restoring lost species, etc.; cannot insulate site from surrounding landscape or human activity including management; need to accept instability.

Restoration goals: original natural woodland; present-natural woodland; future-natural woodland. Or accepting present condition and configuration.

Various options: restore site and soil; remove planted and naturalized trees; reintroduce trees and shrubs; accept and simulate natural disturbance; re-introduce keystone species; control grazing; re-introduce other wildlife; (Transport lichens, beetles, fungi, bats; buffer from surrounding area; control physical process; - herbicide, fertilizer, nutrients from birds etc., soil, water flows; control people;

Recreating natural woodland is largely a benefit to science. Only approximate, always a facsimile, many values realized even when not very natural;

Broad principles:

- Historical principle – wildlife etc. better when historical approaches adopted and maintains features long present
- Natural principle – wildlife will propose to the degree that management approaches natural conditions appropriate to site. Can be in conflict with #1
- Graded response – nature conservation interest should be highest priority in woods that hold greatest interest

Wood Pasture – conflict owners of wood and rights to graze. Reduced from 87230 ha in 3 counties in 1086 to 1450 ha in 1976. Most to farmland.

Coppice – generally 4-30 year rotation; standards 60-100 years; widespread in pre-historic times; 18% of all British woodland in 1924; 1/6<sup>th</sup> that in 1980. In Middle Ages likely grazed once shoots tall;

Wood Meadow – cut for hay, branchwood burned for fertilizer. (Sjors). Pollard meadows, orchard meadows, coppice meadows.

High Forest

“Don’t waste time, Jump to conclusions’. This exhortation was found whilst surveying Castle Crag Wood, Borrowdale, Lake District, etched into the walls of a small cave. It seemed appropriate for scientists in nature conservation”.