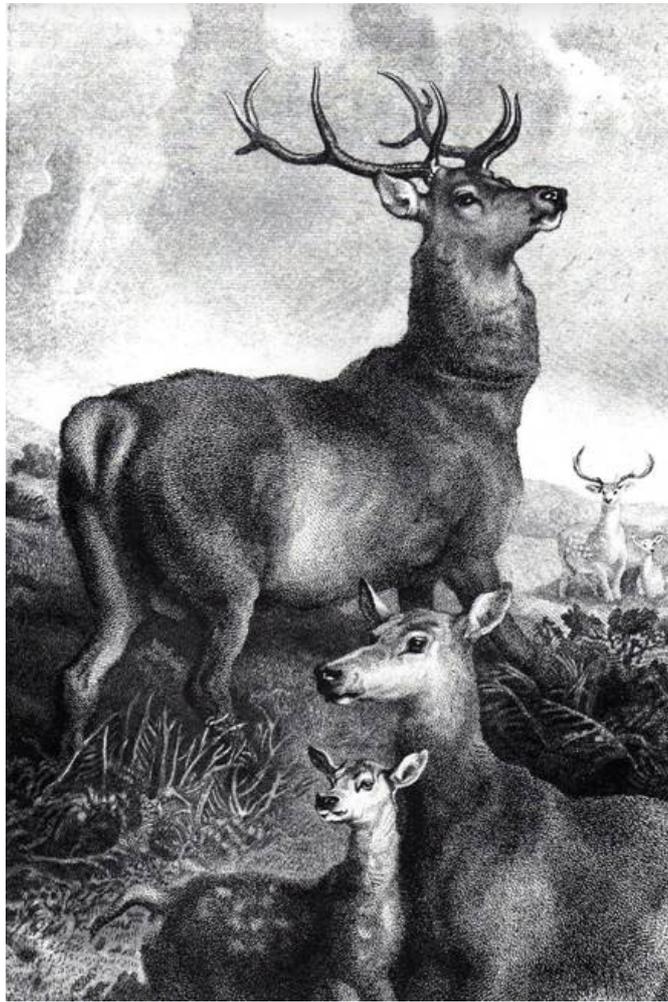


The Ecology and Economics of Medieval Deer Parks

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Summary

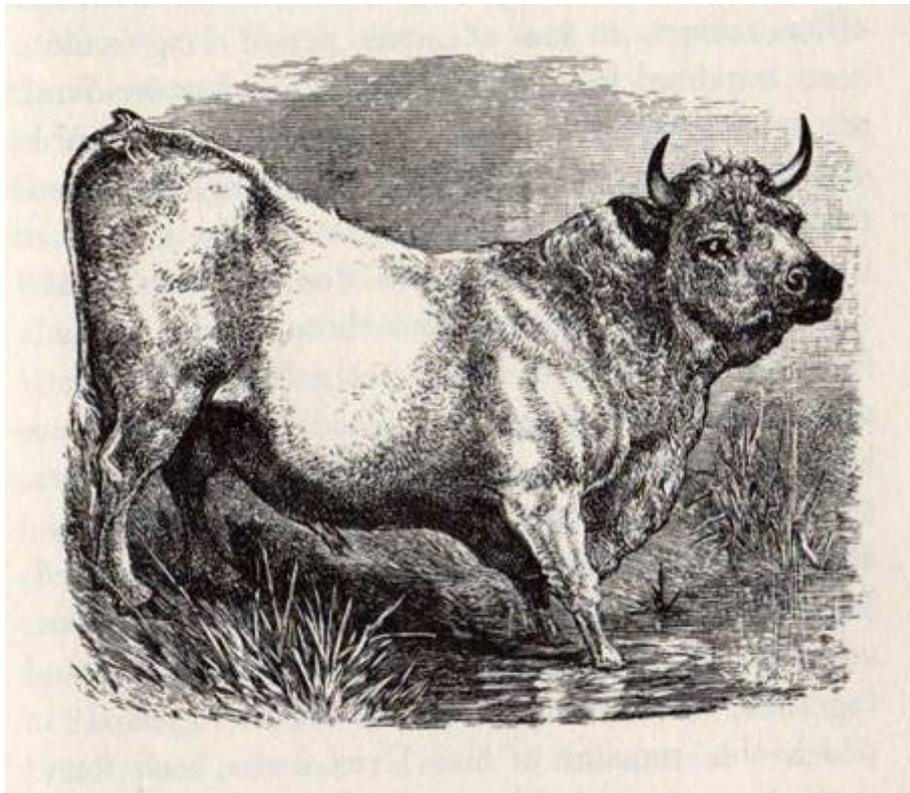
Where deer parks survive, and even this is rare, they do so as a unique landscape separated in time and function from their origins. They reflect the landscapes of the time and place they were imparked and the changes in economic function and ecology over a long lifespan. The ecologies of these landscapes were driven by uses in a multi-functional system of economic utilisation. As purpose changed so did ecology, each new phase incorporating, preserving, or removing those that preceded it. It is argued by Frans Vera (Vera, 2000), that these are landscapes that originate in medieval or earlier times, and give a unique insight into once great primeval savannah across much of northwestern Europe. Certainly, their remarkable biodiversities provide evidence of such potential lineage. These landscapes present palimpsests of ecology and archaeology that reflect their economically driven origins over 800-1,200 years.

There is a wealth of literature on a diversity of aspects of medieval parks, from their invertebrate ecologies, to rare lichens and bryophytes, to their herds of deer, their fishponds, and to the politics of fashion and taste and the provision of sport and entertainment for an affluent elite. This is a far greater literature than can be the focus of this paper, although much more is covered in the other papers of this volume. However, it is clear that there is still a need for more multi-disciplinary meetings such as the conference held at Sheffield Hallam

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University in September 2007. Very often each specialist group has its own meetings and produces its own literature, each excellent in its own sphere, but crying out for these riches to be brought together in one place. Some key aspects of forests and chases are brought together in Langton & Jones (2005), and many of these relate to early parks too. Paul Warde in that volume notes how fuel uses and its economy for example, are neglected fields of historical research. The same oversight applies to parklands, which driven by economy and politics have acquired a uniquely rich ecology and a heritage interest, that are both steeped in history. To more fully understand and appreciate the wildlife and heritage of the medieval parks we must consider not only their ecology, but also the social drivers behind their origins and their survival. Their study crosses to that of other recreational, hunting, and productive landscapes such as chases, forests, wooded commons, and wastes. In particular, with the emphasis on *deer* parks, we must also look to literature on hunting (e.g. Blüchel, 1997) and associated activities such as falconry. With the food production aspect of the park, it is useful to consider literature on warrens (e.g. Henderson, 1997; Williamson, 2006) and fishponds for example.

An Introduction to Parks and their Ecology



Since Oliver Rackham's seminal works *Ancient Woodland* (1980) and *The History of the Countryside* (1986), it has been clear that wood-pasture was once the most abundant type of wooded landscape in northwestern Europe. In essence, wood-pasture is a system of land management where trees are grown, but grazing by large herbivores is also permitted by domesticated, semi-domesticated, wild, or a combination of stock. Wood-pasture in England is well documented for over one thousand years, and *Domesday Book* (1086) probably records a landscape dominated by the practice. It has been suggested that wood-pasture was an ancient system of management that developed in a multi-functional landscape where woodland was plentiful and where there was little need for formal coppice. The latter is a more intensive and rigorously managed system, intended to ensure vital supplies of wood and timber in a resource-limited landscape (Fowler, 2002; Hayman, 2003; Perlin, 1989). Pasture-woodland is an older (and in many ways, system that is more 'natural'). Significantly, most livestock, wild or domesticated, will take leaf fodder or browse, if offered, in preference to grazing (Vera, 2000).

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Medieval parks are part of a suite of landscape types that mix trees and grazing or browsing mammals. These include wood-pasture, wooded commons, forests, the relicts of what was probably in prehistory a great wooded savannah across much of northwestern Europe. In both origins and ecology parks as essentially a form of 'pasture-woodland', related to forests, heaths, moors, and some commons, with grazing animals and variable tree cover. Aside from the obvious external enclosure, these landscapes are often essentially unenclosed grazing lands. In considering their ecology, it is important to establish origins and relationships to other wildlife habitats.



The idea and techniques of constructing and maintaining a park to keep animals such as deer long pre-dates the Norman Conquest; parks being known from the first century BC in both Roman Italy and Gaul. Cummins (1998) notes a document of Charlemagne from 812 AD that clearly refers to the maintenance of a hunting park and its boundary. The dates of establishment and the numbers of parks in England remain a matter of debate. There is evidence at Conisbrough Castle Park, South Yorkshire for example, of a possible lineage of enclosure from around 600-700 AD (Paul Buckland and Colin Merrony pers. comm.). However, the functions are not confirmed and the locations of earlier and medieval features are displaced. Liddiard (2003) presents an overview of parks in the context of *Domesday Book*, drawing attention to the possible similarity between parks and hays; the latter being rather enigmatic and perhaps representing a variety of hunting structures with differing degrees of permanence.

In the two centuries following the Norman Conquest, numbers of parks in England increased dramatically to perhaps 3,000, with possibly fifty in Wales, and eighty in Scotland. From the early thirteenth century, a royal licence was technically necessary to create a park in areas of royal forest; though Cummins (1988) notes that in both England and Scotland baronial parks were also created without licence. Where documents survive, they provide invaluable reference materials for a now vanished age, giving insight into landscape and ecology. The average English medieval park was around 100 acres, although size could vary considerably. The date of establishment, the area enclosed, the functions of the park and the interplay between enclosed and unenclosed areas all influence the ecology of these landscapes (Jones, 1996; Jones *et al.*, 1996).

Ancient Wooded Landscapes

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In Britain, there are two broad distinctions in 'ancient woodland' landscapes. Firstly, there are coppice woods, often managed since the medieval period as simple coppice, or more frequently 'coppice-with-standards'. Such areas have relatively few large trees, but strikingly rich and sometimes diverse ground floras. Secondly, there are parklands, which may have historic links back to their use as medieval parks. These areas generally have poorer ground floras due to grazing livestock, and are characterised by massive and ancient trees, chiefly 'pollards'. In terms of wildlife conservation, it has been assumed that coppice woods were excellent habitat for woodland birds and flowers and parks for rare lichens and fungi growing on the trees, and insects or other invertebrates that depended on veteran tree dead wood habitat. The general assumption was that coppice woods had strong links to ancient landscapes and vaguely conceptualised 'wildwood' (Beswick and Rotherham, 1993).

Research over the last twenty years has shown many of these assumptions incorrect or naïve in their interpretation. Researchers such as Paul Harding developed interest in British pasture-woodlands, and Frans Vera has challenged many accepted 'truths' of woodland history, placing park landscapes in their wider ecological context. Much current excitement about deer park landscape ecology is because they appear to represent the closest analogies to northwestern European primeval forest landscapes. Parks are juxtaposed with, but different from, medieval coppice woods. They are unique resources for conservation; providing insights into ecological history (Rollins, 2003). Research by scholars such as Keith Alexander and Roger Key have transformed the understanding of the importance of parks for invertebrates, and Ted Green has awakened interest in ancient tree fungi and the significance of the trees themselves. In northern Britain, Chris Smout (2003), and others have transformed our knowledge of Scottish woods and the Caledonian Pine Forests and palaeo-ecologists such as Paul Buckland have closed gaps in information concerning these landscapes and their ecologies in prehistoric and more recent periods.

Recent studies are drawn together by seminal writings of authorities like Oliver Rackham (1976), George Peterken (1981 and 1996), and Donald Pigott (1993) to forge coherent visions of woodland landscape ecology, with parks representing an important component. It is of significant that until relatively recently medieval parks were not considered by conservation agencies to be 'ancient woodland', and so seemed to be the 'Cinderellas' of nature conservation. From a broader 'woodland' perspective, it is possible to assess the historical ecology of medieval parks and to attempt to place them in their landscape context. Parks have trees (usually but not always), and large (and sometimes smaller) grazing mammals, and to survive trees need protection. Some parkland trees are ornamental and others are managed '*working*' trees, with fundamental differences in species and structures associated with these different functions. Taigel & Williamson (1993) and Bettey (1993) give useful introductions to the complexities of these landscapes. Such historical contributions are important since the ecologists must understand history, and the historian the ecosystem. The potential of cross-fertilisation is considerable: Rackham (2004) provides an eloquent exposition on the evolution of park landscapes and of their trees in particular, and Muir (2005) is a particularly accessible account of recent developments.

The Parkland Palimpsest

It is necessary to differentiate medieval parks from other imparked areas and from other associated grazing landscapes, a process that can often be difficult. Indeed as other papers in this volume demonstrate, there are major differences of opinion and hence difficulties in defining exactly what a park was or is. Parks share features with other unenclosed grazed landscapes with trees and woods, such as chases, forests, moors, and heaths. A complicating factor is that many parks took in significant elements of earlier landscapes when they were enclosed often from 'waste' or 'forest'. In some cases, park management has allowed parts of this ancient ecology to survive or, in other cases, parks include features from periods of

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positive management with specific ends and outcomes, followed by abandonment, or changed use. Each phase will necessarily preserve, modify, or remove the earlier ecology of working landscapes that have sometimes evolved over a thousand years or more. To understand today's ecology requires awareness of changes through both management and neglect. Imparkment may have affected the original ecology in different ways:

1. **Preservation:** original features and species maintained within the enclosed area.
2. **Modification:** original features and species maintained but modified within the enclosed area.
3. **Removal and replacement:** original features and species removed by enclosure and subsequent management, to be replaced by new features and a new ecology.

Such processes may have occurred during the original establishment of an early park or at each subsequent phase of 'improvement' or abandonment, generating both continuity and innovation. Such a process varies from site to site, in some cases all that remains is a single veteran tree or it may be a significant parkland resource with substantial elements from earlier periods. Trelowarren Park on the Lizard remains as an intact boundary with mature trees and an ancient woodland flora; yet the parkland core has long since gone, replaced by agricultural fields. According to Pett (1998), it was disparked before 1736 when Tonkin described it as '*long since disparked*'. Charles Henderson the Cornish historian writing in the early 1900s, noted that '*The site is not known but there is a part of the demesne called the Warren*'. Old trees on the park pale are not veteran park trees, but hedgerow trees since grown out. Earthworks and differences in vegetation may be evidence of changed land-use and boundaries, with a 'ha ha' being dug in the early 1800s to form a boundary between the estate and the unenclosed moorland of Goochilly Down (Pett, 1998). In a similar vein, at Calke Abbey in Derbyshire for example, the present-day park includes large areas of former medieval open fields, with their characteristic sinuous ridges and furrows. Other parks incorporate short, straight ridge and furrow from Napoleonic or Victorian steam-plough incursions into the park landscape during the late eighteenth and nineteenth centuries.

There is a clear problem in that ecological research has often failed to differentiate between different origins and histories. For many ecologists, a park is a park. The reality is very different and consequently the study of ecology in parks is often not set within a reliable historical framework. There is also little hard information on the ecology of these landscapes in previous period when they were 'functioning' parks. For such evidence, assumptions are often made retrospectively, based on modern observations. Either that or they are gleaned from material such as household and estate accounts. The complexity of park occurrence and presentation in the landscape, both today and in the past, is illustrated by Squires and Humphrey (1986), investigating and mapping in detail the parks of the former Charnwood Forest, Leicestershire. To understand the historical ecology of parks, it is essential to appreciate their form and function, and how these have changed over time. In many cases, only a fragment of the earlier landscape is visible today, and sometimes these fragments remain unrecognised. Even where a park survives with proven continuity to earlier periods, however, the management today will differ from the past. Whilst the former ecology, or the management that maintained it, may not be fully understood, it is known that the two were inextricably linked. That park management, the wider landscape in which it is seated and specific features within it will have fluxed greatly over what is often a long history, is not in doubt. The ecology of today reflects this part continuum and part palimpsest. As Squires & Humphrey (1986) suggest, the appreciation of any particular park requires consideration of form and function, and the context of the development of the manor as a whole. Such thinking applies to a park's ecology as it does to other aspects of the landscape.

The Uses and Functions of Medieval Parks

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Cantor (Squires & Humphrey, 1986) notes that the medieval park was an important feature in its landscape. He emphasises, however, how the medieval park was different in character to its modern counterpart, the latter based on images of eighteenth- or nineteenth-century landscaped parks, or of nineteenth- or twentieth-century municipal parks. As Cantor notes, medieval parks were very different, often areas of rough, uncultivated landscape, usually wooded, and frequently on the edge of manors away from cultivation (Cantor & Hatherly, 1979). Owned by the lord of the manor, these were designed as hunting parks, stocked with deer and other game, and providing food and sport in varying balance. Our vision of a working medieval park is in a landscape of open field, waste, woodland, and royal forest, with their ecologies inexorably linked.

Medieval parks provided hunting, foodstuffs, and wood and timber for building and fuel. Alongside deer, medieval parks contained wild boar, hares, rabbits (reintroduced to Britain by the Normans), game birds, fish in fishponds, together with grazing for cattle and sheep. In the case of parks such as Bradgate, pannage (feeding pigs on acorns) from the oaks provided revenue in rents. Parks generally had large areas of heath or grassland (called launds or plains) dotted with trees, along with woodlands (called holts or coppices, and if for holly (*Ilex aquifolium*) hollins). The launds and the coppices provided food for animals in summer, and in the case of hollins, through the winter months. The park may have held and maintained deer (fallow (*Dama dama*), and red (*Cervus elaphus*)) for the table and for the hunt. In the latter case, this sometimes involved release beyond the park pale and into the chase beyond (Whitehead 1964 and 1980). Cummins (1988) discusses the size of parks and the differences between smaller baronial parks with semi-domesticated animals, and the much larger royal parks. Some parks extended over many miles, Woodstock (Oxon.) had a perimeter of seven miles and permitted hunting on a grand scale. Others were much smaller, with some little more than deer paddocks. It follows that their ecologies must have been similarly varied with larger parks able to maintain more of the earlier wilderness and the associated ecology. There were also links between both hunting in parks and in the forest or chase beyond, and in their ecologies. Alongside deer, other livestock exerted additional grazing pressures, with, for example, specific areas set aside, enclosed, and maintained as rabbit warrens. The extent and influence of parks could be substantial and beyond one individual site: according to Cummins (1988) in 1512, the Earls of Northumberland had 5,571 deer in twenty-one parks spread across Northumberland, Cumberland, and Yorkshire.

Solitary trees in the launds were pollarded (high coppice), and some shredded (branches removed from the tall, main stem). The only new tree growth outside the woods took place in the protection of thickets of hawthorn (*Crataegus monogyna*), holly, and bramble (*Rubus fruticosus* agg.). There were special woods called holly hags or hollins where holly cut on rotation fed the deer in winter. A boundary fence, called the park pale; a cleft oak fence, or a bank with a cleft oak fence, or a wall, surrounded the park. If there was a bank, it normally had an internal ditch. Park pales often contained structures called *deer leaps* to entice wild deer into the park. Buildings in parks included manor houses (from Tudor times), keepers' lodges, and banqueting houses. The park was multi-functional and part of the wider economy of the manor. Turf and stone were extracted, mineral coal too if it occurred. Squires and Humphrey (1986) noted arable crops such as cereals grown within the park pale. Deer were a priority but shared the landscape with other domestic stock such as cattle, horses, and even goats. The park at Wharnclyffe Chase near Sheffield even acquired North American Buffalo in the early twentieth century (Jones and Jones 2005). Many parks such as at Wharnclyffe near Sheffield had warrens within them or close by and relict 'pillow mounds' and other features may now evidence these.

Other parks had productive fishponds that may survive today as ornamental features, but more often are abandoned, frequently obscure complexes of shallow pools and channels for an early industrial farming of fish (mostly carp), for the table. An anonymous monk wrote in 1468

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'The mill pond. And in the seven year of the king, twenty-eighth day of January, I brake mine greatest pond in the park, and out of that I took great breams, sixty-five. And put them into the mill pond the which is new made; and I put the same day in to the same pond six great carps and ... little carps twelve score.' (Fagan, 2006). In most medieval parks that have survived through the landscape period until today, the water features are often highly modified for ornament, and may bear little resemblance and often have no link to the productive medieval ponds.

With socio-economic changes, the fashions for parks and the means for their upkeep fluctuated. Most deer parks were created from 1200 to 1350. They then declined following the impact of the Black Death (Mileson, 2005). Subsequently, boundaries moved, and small parks were enlarged or replaced by new creations. Parks and their relationship to great houses also changed with time and fashion. Originally an enclosed area at a small distance from the main house, perhaps containing hunting lodges later parks were increasingly the settings for houses and gardens. The house moved to the park, or the park was moved or modified to envelop the house. Expensive and difficult to maintain, many deer parks fell from fashion, abandoned and destroyed. Between the fifteenth and eighteenth centuries, medieval deer parks were deliberately removed (disparkment), to become large, compartmented coppice woods, or farmland. As the rural economy changed so did the values and costs of a park. Many were abandoned during the English Civil War (1642-1649), and few survived intact as the wave of agricultural improvement swept through the landscape from 1600 onwards. Some such as Tinsley Park in Sheffield, and Tankersley Park in Barnsley, were lost to industrial development as landowners discovered coal and ironstone beneath their land. A small number retained their medieval character, and some of their functions to the present day.

Park Ecology

The ecology of working parks reflects the factors described above. What survives today mirrors these events and pressures. Park landscapes had unimproved grassland across much of the grazed area, species and communities varying with grazing intensity. Many grassland plants and associated invertebrates cannot cope with short swards and intensive grazing. However, if grazing levels were low or areas seasonally protected from livestock, the vegetation would grow tall, flower and set seed; similar to modern unimproved pasture and hay meadow. Such areas would be rich in wild flowers and in associated invertebrates such as butterflies, bees, and hoverflies. They would be part of a patchwork of shorter grass, bare ground, and in acidic locations, heath. Wet areas such as valley bottoms, or land with impeded drainage, had extensive moist grassland, marsh or bog. The typical plants of ancient woodlands (such as dog's mercury (*Mercurialis perennis*), wood anemone (*Anemone nemorosa*), primrose (*Primula vulgaris*), and bluebell (*Hyacinthoides non-scripta*)) would have been restricted and found only in enclosed woods, copses, lane sides, hedgerows, or streambanks, and perhaps in areas of less intensive grazing.

Keystone species in the park were deer, with other grazing mammals of varying domestication; these animals being the main drivers in the deer park ecosystem. Other important ecological components were fungi in the unimproved grasslands, and associated with extensive animal dunging. There would have been a rich fungal flora of both mycorrhizal associates of both trees (ectomycorrhizas), and of grasses and forbes in the sward (vesicular-arbuscular mycorrhizas). These would present as both individual groups of toadstool fruiting bodies as can be seen today with the dung-associated species such as the shaggy ink caps (*Coprinus* sp.), and as spectacular 'fairy rings'. Associated with animal dunging would be rich faunas of coprophagous and predatory flies, and dung beetles. It can be assumed that high numbers of animals would lead to carcasses and faunas of species such as burying beetles. With the high numbers of mammals were rich faunas of parasites such as mites, ticks, and biting or egg-laying flies.

Imparking sometimes included deliberate or accidental preservation of domesticated, semi-domesticated, or wild grazing mammals within the enclosure. The white park cattle are a case in point, with the Chillingham Park herd in Northumberland perhaps the best example; aside from a small herd established some distance away as a precaution against foot-and-mouth disease, this unique breed of ancient cattle survives at only one location. Whitaker in 1892 described the park as 1,500 acres, well wooded, and with moor and wild grounds (Whitaker, 1892). This ancient and extensive park enclosed and encapsulated an entire ecosystem that has been maintained ever since, though with considerable modifications as described by Stephen Hall (this volume). Outside the park, species including the cattle have long since disappeared. Enclosure of large areas of semi-natural landscape was not the exclusive prerogative of the deer parks. Ornamental parks of the seventeenth and eighteenth century often involved similar scales of enclosure, sometimes from common fields but often from the 'waste'. This may have included marshes, grasslands, heaths, and extensive bogs. Hotham and North Cave Park in the East Riding is such an example (Neave and Turnbull 1992). Management as a park also affected other species both within and beyond the pale. In particular, predators were vigorously controlled and this would have impacts on ecology that were deep and long lasting; the control of both foxes and wolves being noted in estate accounts.

Trees and Wood

The importance of ancient or old wood, living and dead or dying, standing or fallen, has been recognised over the previous two decades. Key publications (Read, 1999; Speight, 1989; Kirby & Drake 1993) have highlighted the role of wood for saproxylic invertebrates, especially insects. Others (Rose, 1974, 1976; Harding & Rose, 1986) have noted the habitat value for epiphytic plants, lichens, and fungi. A characteristic of most, but not all, parks were large, often very old, trees. In the best cases, these provide good quality saproxylic habitats and important continuity of resource over many centuries.

Park trees may have been a mixture of timber trees enclosed when the park was formed. Others were planted deliberately as part of the park management. Many parks such as Chatsworth in Derbyshire include later additions through the conversion of field systems and their hedgerow trees. These trees are now veterans in the contemporary landscape but originated in an agricultural environment. Most of the very old trees, often oak (*Quercus robur*), are specimens that have been actively managed for at least several centuries and then abandoned. Now ranging from youngsters of maybe 400 years, to real veterans of anything from 800 to 1,200 years, these specimen trees represent one of the most precious resources of former medieval parks. However, some parks known to be early established, such as Prideaux Place Park in Cornwall, are devoid of major veteran trees. It is possible that some parks never had them, or that they have been removed at some point in the park's long history. Early estate survey maps often record significant veteran trees which can be matched to the modern landscape. In other cases, removal is recorded in estate accounts. Younger veterans could be valuable timber trees taken in time of financial pressure. When the Duke of Newcastle's Clumber Park estate in Nottinghamshire was sold in the 1940s, the main interest was from local timber merchants who planned to remove all the veteran trees of any commercial value. The National Trust acquired the site and developed it as a recreational park, recouping some of their outlay from sale of large oaks from the park's ancient woods.

Large trees performed many functions in working parks, providing shelter in winter and shade in summer for cattle and deer. Importantly, they could also provide herbage to feed to the livestock; most deer and cattle preferring to browse on leaves and shoots, than graze grass. To ensure a continuous supply of branches and leaves, the trees were cut high, several metres above ground, keeping re-growth out of the reach of the grazing animals, until the parker cut

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it for fodder. The technique was known as pollarding and is in effect a high coppice. Furthermore, the provision of special hollins and hags ensured herbage was provided for livestock throughout the winter. For several months of the year, and longer during colder periods, grass does not grow in Britain and stock consequently depend on stores of hay, a valuable and often scarce commodity, and cut branches of evergreen holly. Pollarding extended the lifespan of trees beyond that normally achieved and in so doing ensured a major supply and continuity of dead wood, a highly important wildlife habitat.

Large oaks were grown for timber, in some cases, the trunks and boughs were carefully nurtured to form particular shapes and sizes for specific functions. Careful planning and management over many decades are key aspects of park historical ecology. The records of great estates often give precise details of the removal of trees, their price, and destination. Around the park, sometimes as individuals or as small groups, trees of a diversity of species, native and exotic, were planted. The form and the species obviously varied with time and fashion. Now neglected, these younger veterans add to the resource of dead and dying wood in the contemporary park landscape.

Where air pollution allows, the bark of these great trees provides habitat for rare lichens. However, oaks have acidic bark, are relatively poor in lichens, and gross air pollution for over a century has exterminated many species over large areas especially the English lowlands. With air pollution falling, there has been a remarkable recovery in the lichen populations of many areas including the veteran trees of former medieval parks. The importance of ancient pasture woodlands for survival of rare epiphytic lichens was highlighted by Francis Rose and colleagues, and the recovery well documented by Oliver Gilbert (Rose, 1974, 1976; Rose & James, 1974; James *et al.*, 1977).

The Importance of Dead Wood and Continuity

Of all the ecological features of ancient parks, conservationists regard the veteran trees and their dead wood as the priority resource. EU regulations have targeted dead wood because of its associated unique and diverse fauna and flora and because habitat loss and modification has resulted in critically low levels across Europe. Dead and dying wood provide unique opportunities for specialist fungi, invertebrates, slime moulds, and birds such as woodpeckers, while hole-nesting species such as owls and bats benefit from veteran trees. The latter are specially protected under EU and UK legislation following dramatic declines over the last fifty years. Parkland, especially if it includes rivers and lakes, provide some of their best habitats.

The value of dead wood for wildlife varies with aspect, humidity, temperature, state of decay, continuity on site (as many associated species are highly immobile), and whether it is on living or dead trees. If dead, then whether the tree is standing or has fallen also affects associated ecology. Careful analysis of associated fauna and flora provides insights into ecological history, and former site management, with the potential to document an ecological archive to complement other sources of historical information. In particular, many associated species require habitat continuity over time, presence, or absence of key species giving information on site management and on significant breaks in parkland regimes.



Relationships between ancient woodland, especially pasture woods, and their saproxylic fauna are critical to understanding park historical ecology. Invertebrates vary dramatically in habitat requirements, and importantly here, in dispersal behaviour. Some species migrate, in many cases over considerable distances, and others disperse moderate distances from their breeding sites to new areas. A few species are very limited in their ability to move, and in a very few cases, at least under contemporary environmental conditions, means only a few metres from the trees from which they emerged. In most cases the larval stage lives in the dead wood or associated habitats, and the adult, perhaps a beetle or hoverfly emerges to disperse, breed and lay eggs. The critical habitat is the dead and dying wood of ancient parkland trees, but other environments and communities in the park matrix are also important. Adult insects such as hoverflies or beetles, may feed on nectar and pollen of plants such as bramble (*Rubus fruticosus*), or hogweed (*Heracleum sphondylium*), and require suitably mature plants in abundance with the right conditions of temperature and sunlight. Some ancient woodland indicators, for example certain hoverflies, feed not on dead wood itself but on abundant aphids associated with old trees. However, the hoverflies still seem to be closely associated with continuity of old trees on site. Of the dead wood specialists, some feed on the wood itself in varying degrees of decay, others on the fungi that cause rot. For high-grade invertebrate faunas in these ancient habitats, the keys are habitat continuity and quality. Some species are very specific and in a few cases, like the black and yellow wasp mimic crane fly *Ctenophora flaveolata*, a Red Data Book species, dependent on soft, decaying heartwood of massive veteran beeches.

It is important to differentiate between species requiring dead wood habitats, and those that need continuity. This is because, as indicators, they tell different stories. Interpretation depends on assumptions about behavioural changes with climate fluctuations, many invertebrates dispersing more effectively during periods of hot weather. Such dispersal may be infrequent, but once every fifty years for instance, could facilitate colonisation of a new site, provided the habitat is suitable. Entomologists have meticulously compiled species lists for contemporary sites, and have produced lists for sites in the prehistoric landscape. These are powerful tools in assessing park landscapes, though palaeo-ecological information is limited by the preservation of suitable remains for analysis. Invertebrate taxa associated with veteran or over-mature trees in lowland England include beetles (Coleoptera), flies (Diptera), spiders (Aranea), and pseudoscorpions (Pseudoscorpiones), with species dependant on specific stages of decaying wood or bark, and particular humidities and temperatures. Not all the taxa are specific to old trees, some such as the furniture beetle (*Anobium*), the larvae of which are the woodworm, have adapted to old buildings, and even seasoned timber in the

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open air. A few species such as the highly synanthropic death-watch beetle (*Xestobium rufovillosum*) have their only records away from old buildings, in the timbers of ancient park trees (Buckland 1975, 1979). Harding and Rose (1986) provided a very useful overview and, although lists have since been updated, the principles remain very useful. They presented taxa in three categories:

Group 1: Species known to have occurred in recent times only in areas believed to be ancient woodland, mainly pasture-woodland.

Group 2: Species which occur mainly in areas believed to be ancient woodland with abundant dead-wood habitats, but which have been recorded from areas that may not be ancient or for which the locality data are imprecise.

Group 3: Species which occur widely in wooded land, but which are collectively characteristic of ancient woodland with dead-wood habitats.

Harding and Rose noted the dependence of reliable interpretation on understanding species' ecologies, and variation within species' range. Some invertebrates are very reliable indicators of habitat continuity at the periphery of their range, but occur more widely (in hedgerow trees or even gardens) at the core of their distribution. This suggests that with global climate change, some species distributions may vary markedly. The Lesser stag beetle (*Dorcus parallelipedus*) is locally common in southern England, occurring widely in ash woods and hedgerows, but much more restricted further north. Another species, *Hylecoetus dermestoides*, is widespread in the north and midlands of England, in woodlands and plantations, but much more tightly defined in the south, restricted to a few ancient pasture-woodlands. The most dramatic clusters of records occur at famous sites such as Moccas Park, Sherwood Forest, and Windsor Park, but there are many records for a range of taxa outside known parkland sites (Harding & Wall, 2000). This begs the question of whether some of these records relate to unrecognised remnants of medieval park landscapes and highlights the need for further integrated studies.

The Demise of the Park and the Impact of Landscaped Parks

Rackham (1986) stated that parks were troublesome, precarious enterprises. The boundary in particular was expensive to maintain, especially for large parks. Owners were often absent for much or all of the year, a situation that could lead to mismanagement and neglect. Deer often died of starvation or of other rather vague causes such as 'Garget', 'Wyppes', and 'Rot'. In Henry III's deer park at Havering, Essex, in 1251 the bailiff was instructed 'to remove the bodies of dead beasts and swine which are rotting in the park' (Rackham, 1978). Even well run parks faced ongoing problems of maintenance. Rackham (1986) noted that many smaller parks were short-lived, and by the thirteenth century, some were already out of use. Sometimes a park was retained but its location changed within the manor, with consequent impacts on their delicate ecologies.

During the sixteenth century, the primary function of the park shifted from game preserve and source of wood and timber, to setting of the country house. A disused park might revert to woodland through neglect or deliberate re-planting. Many former parks became farmland, some like Trelowarren in Cornwall, retaining the park pale, bounding the newly enclosed fields. The late seventeenth and early eighteenth centuries witnessed a fashion to impose formal design and rigid regularity on both existing and new parks. Straight, tree-lined avenues, walks, and straight canals dominated landscapes. At the same time, there came a renewed interest in planting trees, and with wide vistas cut through existing woodlands, new woods were designed in regular patterns within the overall vision. Nature was perceived to be

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under strict control, and the parks paralleled the great gardens and houses they accompanied (Lasdun, 1992).

Changed fashions provided a new lease of life for some old landscapes, however, with the injection of capital necessary to maintain them against pressure to 'improve' *per se*. If changes allowed habitat-continuity, then some original ecology such as rare dead wood insects might hang on. As Rackham (1986) pointed out, new parklands were not created from a blank canvas, designers of parks and gardens generally adapted and imposed on earlier landscapes. This could mean working with and maintaining elements of an original park. It might also lead to the creation of a new park that incorporated earlier features from a non-park landscape. Even when formality was very much in vogue it was still felt that venerable trees added dignity to the feel of a country residence. In a social landscape, where lineage and continuity were highly valued, then a park that was new but looked and felt old, made an important statement. The designer would therefore not only plant anew but would incorporate elements of ancient countryside into their new landscapes. Old pollards and other trees from ancient hedgerows, lanes, or other boundaries were retained and made significant in new settings. This ensured that ancient pollards and sometimes coppice stools can now be found embedded in a landscape dominated by seventeenth- and eighteenth-century plantings.

Rackham described these as 'pseudo-medieval' parks suggesting this phase of landscape history both preserved some ancient parks, and created these new sites. He notes the New Park at Long Melford Hall, Suffolk incorporating earlier field boundary trees, similar to the situation in the eighteenth-century landscape park at Chatsworth, Derbyshire. A similar situation is found at Chatsworth in Derbyshire. Here in the eighteenth landscape park are trackways, boundaries, ridge-and-furrow fields, and veteran trees from the old field system. Oakes Park, formerly in North Derbyshire, shows a similar use of old field boundary trees to lend an air of elegance and antiquity to a created eighteenth century park landscape. Such sites can be identified not only from archives and records, but also from field archaeology and from their ecology. Landscape archaeology may include early but non-park features. They lack some ancient deer park indicators discussed previously, but can hold species of medieval woodlands, of hedgerows, and perhaps of veteran pollard trees. Again, this gives a site what I describe as '*acquired antiquity*'. In other words, the landscape has elements that would normally be associated with a genuinely ancient feature or area, but which it has acquired or 'borrowed' from fragments of an earlier period incorporated into a later design. Sheringham Park in Norfolk is a wonderful example of this, with veteran trees and ancient banks, not of a medieval park, but absorbed from commonland when the owner imparked the area in the 1700s. In many ways, this presumably is what the designers hoped to achieve, though perhaps not at the ecological level.

Wooded Landscapes, Forestry and Gardening

Perlin (1989) gives a detailed insight into the issues and demands for wood as fuel and for other purposes, and its impacts on societies over the centuries. A consequence of the over-use and exhaustion of a particular fuel, or of the restricted access for social or political reasons, was the need to find alternatives and sometimes to use less suitable materials. In some cases, the competition or restriction on use was due to the interactions of differing and alternative demands – timber for the navy, versus wood for charcoal driven iron smelting. Both of these competed with the use of wood for fuel – for rich and for poor, but especially the latter. Competition between commoner and peasant and the lord of the manor and between industrial use and domestic have been critical in determining the use of the woods and other natural resources. Hayman (2003) describes eighteenth century British landowners tightening their control over the landscape, with legislation passed to restrict the customary rights of forest communities to harvest underwood. This was a contest between the communal resource and the private domain, the *Black Act* of 1723 restricting woodland access. This affected not only

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fuel use but also the essential felling of estate timber by tenants for building. Some concessions were sought, such as the supervised access of the poor on one day per month to gather deadwood for fuel from the Sheringham Estate in Norfolk. The latter was an imposed grand park that took a swathe of productive common and farmland for its establishment. As discussed, the relationship between people and nature, politics and fashion were important in determining the lineage and evolution of park landscapes over time.

Nature and landscape were becoming the concern of the cultured British, philosophers, poets, writers, and artists. The eighteenth century brought a revolution in parkland design with, at the highest social level, symmetry, and orderliness displaced by informality and naturalness. This was the era of the great landscaped park, characterised by large areas of rolling grassland. Some were substantially re-contoured, with naturally shaped woods, clumps of trees (and roundels), individual large trees, and expanses of water. Such natural looking, but mostly artificially created, landscapes had necessary buildings such as lodges and boathouses, and features such as temples, obelisks, mausoleums. From the 1700s onwards, new plants (species and varieties), particularly new tree species were imported and used, beginning a distinctive phase of the ecology of these park. Still with us today are the exotics and in some cases invasive *Rhododendron ponticum*, Giant Hogweed, Japanese Knotweed, and many others.

The designers of these landscapes became both rich and famous, and they left an indelible imprint on the remaining medieval parks. Lancelot 'Capability' Brown (1716-83) left a dramatic legacy of designed landscapes, especially parkland. Key features were the serpentine, grouping or dotting of trees, irregularity, and gentle landscape undulations. Water was manipulated through lakes, pools and canals or rivers, and partly wooded banks. Strategic clumps of trees, and isolated specimen trees carried the eye and mind into the distance. Winding ribbons of trees around the periphery of the park implied continuity (and ownership beyond), cleverly blotting out undesirable views. Brown's landscapes are typically impressive vistas viewed almost uninterrupted from the main rooms of the great house. He generally used long-established and native trees, plus and for special effect Cedar of Lebanon. However, Brown and many of successors were great destroyers of what went before, with implications for the survival of continuity of former parks subjected to his designs. From this period, we know of great avenues of lime and elm destroyed, as were formal gardens, but there was little written about the earlier landscape elements that were lost. Sometimes old trees and other features were saved, but much was removed, and not everyone appreciated Brown's work. Sir William Chambers for example described his landscapes as resembling: '*...a large green field, scattered over with a few straggling trees ... (where) he finds a little serpentine path, twining in regular S's along which he meanders, roasted by the sun, so that he resolves to see no more, but vain resolution! There is but one path; he must either drag on to the end, or return back by the tedious way he came.*' The Brown-style landscape superficially may have resembled an ancient deer park, but it was a synthetic landscape designed to please with simplified ecology. Many, if not all, of the productive features described earlier were swept away. These are significantly mown lawn and neatly trimmed trees. In the centre of this is sited the Mansion - isolated in time and in space and with views from within across the vistas without. When we see this landscape with its grazing deer and livestock, it may superficially resemble our image of an ancient medieval deer park. Lanhydrock in Cornwall is a magnificent example of this approach with a large park and massive boundary walls. Nevertheless, this is a synthetic landscape of the 1600s designed to please, and with a simplified ecology. It was disparked by around 1780 but is maintained as a grand landscape (Pett, 1998). The old parks were working landscapes with significant and complex elements of the semi-natural. Parks such as Lanhydrock have ancient and veteran trees, and it is important for both interpretation and management, to recognise their origins and therefore their distinctive forms from the wider working landscape and not from a park as such.

The Picturesque

Brown's successor Humphrey Repton (1752-1818), acquired Brown's reputation as 'an improver of landscapes'. He was less brilliant in water management than Brown, but imaginative with cattle grazing under mature clumps of trees, dotted individual trees, and a surrounding belt of woodland. Along with those of Brown, it is these landscape parks with which most people are familiar. Brown designed his landscapes to be seen *from* the House; Repton made his as settings for the House and those passing by, or approaching. They were intended to show the correct social status and wealth of the owner. This also included advice against improvement for mere financial gain, rather than measured statements in the landscape of status. In *Theory and Practice of Landscape Gardening* (1816) Repton used two views of a recently improved estate, and argued against improvement merely for profit suggesting sympathy for the past and its landscapes. Perhaps in his landscapes there was a chance for continuity and for survival:

'By cutting down the timber and getting an act to enclose the common, he had doubled all the rents. The old mossy and ivy-covered pale was replaced by a new and lofty close paling; not to confine the deer, but to exclude mankind, and to protect a miserable narrow belt of firs and Lombardy poplars: the bench was gone, the ladder-stile was changed to a caution about man-traps and spring-guns, and a notice that the footpath was stopped by order of the commissioners. As I read the board, the old man said 'It is very true, and I am forced to walk a mile further round every night after a hard day's work'.

It is perhaps to the emergence of the *Picturesque Movement* that we owe the survival of so many great trees. Recognition of the picturesque was important for the survival of elements of antiquity, and ecological continuity from medieval parks. Sir Uvedale Price (1747-1829) wrote of landscapes in a way that reflected the past but looked to the future. The picturesque was less obvious, less generally attractive, and had been neglected and despised by professional improvers. He suggested planting exotics in remote parts of landscaped grounds. *'There seems to be no reason against the familiarising our eyes to a mixture of the most beautiful exotics where the climate will suit them.'* He promoted the leaving of fine old trees, and the making of new plantations, to give an effect of natural vigour. *'...the rugged old oak, or knotty wyche elm,..... are picturesque; nor is it necessary that they be of great bulk; it is sufficient that they are rough, mossy, with a character of age, and with sudden variations in their forms. The limbs of huge trees, shattered by lightning or tempestuous winds, are in the highest degree picturesque; but whatever is caused by those dreaded powers or destruction, must always have a tincture of the sublime'* (Hayman, 2003). This advocacy of exotics was passed down to Victorian gardeners and now is a matter of concern for many conservationists.

The Victorian Landscapers

By the time of Victorian gardeners and municipal parks, many ancient parks were faded memories or fragments of ecology and landscape. Sometimes swamped by urban sprawl, or agricultural improvements, some survived in whole or in part, incorporated into the final great phase of parkland creation. Sir Joseph Paxton (1801-1865) was one of the major figures famed for Crystal Palace and Chatsworth. Generally considered the finest of the Victorian group, his most beneficial and permanent influence was on public parks and their planting as boundaries between parks and gardens blurred (Lasdun, 1992). William Robinson (1838-1935) was hugely influential with his publications such as *The Wild Garden* (1870) and numerous books advocating the *Gardenesque Style*. He emphasised the strong use of 'wild', naturalised, exotic species. A pioneer of what are now local authority parks, he generally held to have had a positive influence on landscape design. One of his main legacies to park ecology was his advocacy of naturalised exotic herbs, shrubs, and trees alongside natives, in 'wild' landscapes. These are often amongst the most striking features of parklands today,

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imposed and imposing on earlier palimpsests. The Victorians continued the process of subsuming older parks and crating new features. These might be in a grand rural setting, or in the suburbs of expanding urban centres such as London, Manchester, Birmingham, or Sheffield. Even into the core of a modern city such as Sheffield, it is possible to find elements of the earlier park heritage or ecology, surviving through all these changes to the twenty-first century. These became important components of many great public parks of the later Victorian period and through into the twentieth century. By the late 1900s with local authority funding decimated by central government cuts, these same parks were easy targets for the budget minders. The recognition that this was massive mistake and a hugely false economy was growing by the 1990s, and there has been a significant move to rejuvenate the urban parks. However, the unique ancient elements are often now sadly overlooked, unrecognised and neglected to the point of terminal decline.

Conclusions: the Decline, Fall, and Re-emergence in the Twentieth Century

The question is then what became of the thousands of medieval parks, large and small, that dotted the landscape. For some there are tantalising glimpses of their fate. Ecclesall Woods in Sheffield is the region's premier conservation woodland today. However, its origins are as a medieval hunting park, for in 1317, Robert de Ecclesall was granted a licence to impark, and this is reflected in modern place names such as Parkhead, Warren Wood, Park Field, and Old Park (Hart, 1993). An overview of the issues of interpretation of the landscape here are presented by Rotherham & Ardron (2006). As noted by Hart (1993) there is further evidence of the use of the Woods for hunting, with a set of depositions taken on October 2nd 1587. These were from George Sixth Earl of Shrewsbury. He stated that he, his father and his grandfather '*used sett and placed Crosbowes for to Kyll the Deare in Ecclesall Afforesaid and to hunte at all tymes when it so pleased them there.*' Thomas Creswick noted that '*.....ye said Erle George grandfather to ye said now Erle of Shrewsbury hath sett Netts & long bowes to kill deare in Ecclesall and hunted dyvers tymes there and he thinketh that ye said Erle ffrancis father to ye Erle that now is did the lyke.*' Richard Roberts confirmed that '*....he hath sene the lord ffrancis hunting in Ecclesall byerlow and that said lords officers sett decoers there at such places as they thought convenyent.*' (Hart, 1993). In the early 1700s, there were also livestock pastured in the woods with horses, mares, foals, cows, heifers, calves, and sterks recorded. Gelly's map of 1725 shows a 'laund' in the centre of the Woods and this was planted up in 1752 (Jones & Walker, 1997). In the 1587 deposition (Hart, 1993), it is also clear that wood and underwood are also being taken, and it was this use that was to dominate the former deer park for the next few centuries. It seems perhaps that the hunting use is falling from fashion by the late 1500s, with references to deer hunts certainly from the late 1400s and early 1500s. Was this the reason for the deposition? Excitingly, in the late 1990s, Paul Ardron, working with the author, located the western boundary bank of the medieval park (Rotherham & Ardron, 2001). Here we have some insight into the evolution of a wooded landscape, for which the medieval imparkation was probably the critical moment in it becoming woodland today.

By the late nineteenth and early twentieth centuries many houses, parks, and gardens were subject to neglect or became financial liabilities. In the 1950s, even famous and now highly valued locations like Chatsworth Park in Derbyshire were seriously considered for demolition. Many smaller houses and their parks have long since gone. Other imposed parks on farming landscapes, such as Oakes Park at Norton (formerly North Derbyshire), are now amongst the richest ecological sites in their region. However, despite the well documented conservation value, they lie uncared for and neglected, a social misfit in the landscape of urban sprawl. The losses and severance of the landscape lineage is beyond calculation, and the more so for genuinely medieval parks. The loss of Ongar Great Park, Essex, and a pre-Conquest survival was possibly the worst loss of a visible Anglo-Saxon antiquity in the

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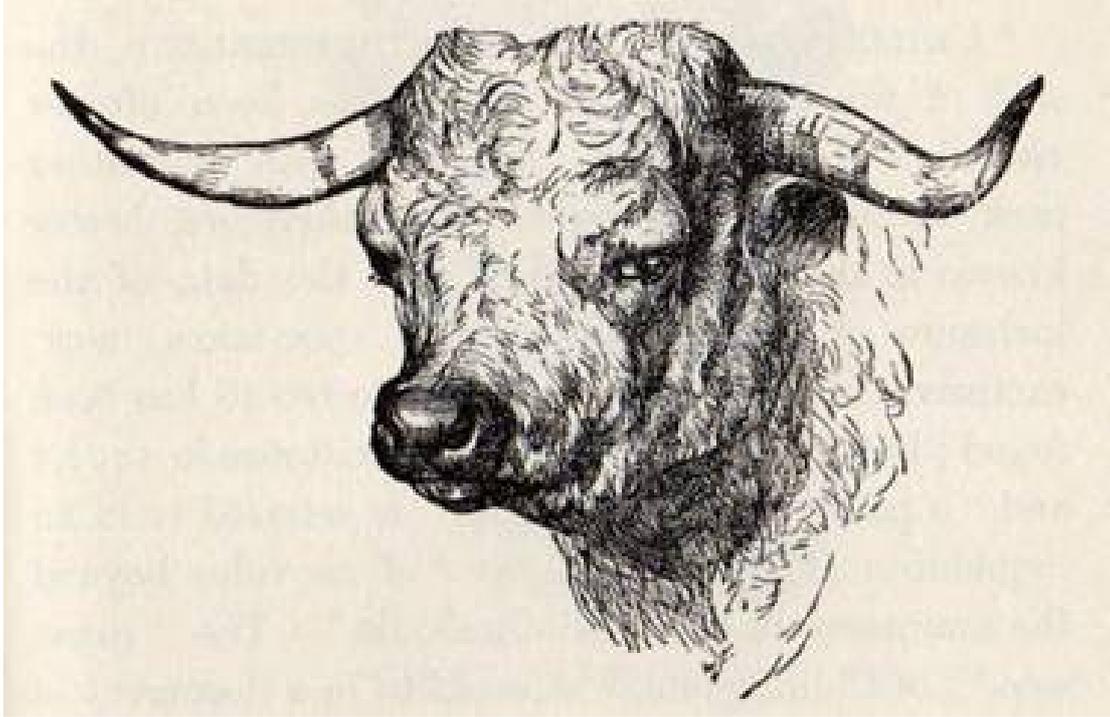
twentieth century (Rackham, 1986). So what have we left? The nineteenth-century clergyman and diarist, the Revd Francis Kilvert gives some idea, describing the ancient oaks of Moccas Park, Herefordshire:

‘.....grey, gnarled, low-browed, knock-kneed, bowed, bent, huge, strange, long-armed, deformed, hunchbacked, misshapen, oakmen with both feet in the grave yet tiring down and seeing out generation after generation.’

Parks and great trees may ‘*survive*’ in new landscapes, housing or agriculture, but most are erased from land and memory. Even if the trees survive, there is no means to replace them as time and nature run their course; so the remaining sites are conservation icons, often isolated in time and space. They possess a unique resource of ecology: lichens, bryophytes, insects, spiders and more, enmeshed with a cultural lineage from the great forests of northwestern Europe.

How we find, preserve, and conserve this heritage is a huge challenge. There is no single approach and correct answer. Involving local people and engaging with local communities must be a key. There is a further issue too. It is now suggested and accepted, at least in part, that remnants of medieval parks are vestiges of very ancient landscapes; albeit transformed and manipulated by human hand over the centuries. These may precede human domination and agriculture, with Vera’s vision of forested savannah indicates a lineage to great primeval origins of the European forest. Harking back evocatively to the past, this view also informs the future. The vision of landscapes is freed from anthropogenic constraints of medieval agricultural and pastoral scenes, setting new challenges for deeply embedded precepts of nature conservation. The best working examples are in the remains of once numerous and great, medieval parks, a powerful lineage. Individual case studies prove hugely rewarding and informative and the recent seminal volume on the Duffield Frith in Derbyshire (Wiltshire *et al.*, 2005) is a wonderful example of what can be achieved.

For the wider public, their gaze is often upon a landscape that is not what it seems. The apparently ancient such as much of Chatsworth, is in reality an eighteenth century imposition. The twentieth century public park of Graves Park in Sheffield is really Norton Park, and an eighteenth century grand landscape embellished by deer, but overlaid onto a medieval deer park with early ponds and other features. Much of this is unrecognised, with maybe more than a thousand years of history and historical ecology locked into this landscape palimpsest. It seems sad that such a major and rich resource is so misunderstood and there is little to engage or to inform the visiting public. If we are to unlock the imaginations and the financial resources to safeguard and conserve these unique blends of heritage and ecology, then it is necessary to engage a wider public and to relate their everyday experiences of say Graves Park in Sheffield, to Moccas or Windsor Great Park at a national scale. I fear that we are still a long way off.



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