

4 The origins and history of medieval wood-pastures

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Introduction

Rather than historical ecology, which is the study of what the environment was at a particular moment in time, this chapter presents an environmental history, which is the study of the interactive relationship between humans and non-human nature in the past. Chris Wickham (1994, p196) argues that, rather than a history of woodland itself, 'what is needed is a history of woodland use'. We have to understand the context in which wood-pastures arose and thrived to make informed management decisions about how they can be maintained. Exploring the multiple functions of wood-pastures and how those were integrated into historical social systems is a vital reference for conservation of wood-pasture remnants or restoration of wood-pasture ecosystems today. Thus, this chapter does not attempt to reconstruct the quantity, quality or composition of wood-pasture present at any given time at different places in Europe. Such an endeavour would be the remit of historical ecologists armed with pollen records, tree ring records and paleoarchaeological finds. Rather than approach the history of wood-pastures in that way, this chapter overviews how humans in pre-modern Europe historically interacted with wood-pasture, managing it as a mixed livestock-wood production system.

Wood-pastures are, for the most part, a human creation induced by grazing animals and selectively clearing trees on the land. This has been practiced for thousands of years. Wood-pastures are dynamic systems that change over both long- and short-term scales as trees sprout and die and shrubs try to encroach. Yet wood-pastures can be surprisingly stable, with the balance of trees, shrubs and grasses maintained over long periods of time in the right climates. Whether or not large herbivores created open savannahs from the ancient European woodland, the hypothesis put forward by Vera (2000), human silvopastoral practices over the last 2000 years most certainly have opened up the wooded landscape. This is an important legacy for future conservation.

This chapter overviews wood-pasture traditions in the pre-modern era, focusing on the European Middle Ages and early modern period, in essence AD 500–1700. The first section describes the role of wood-pasture in pre-modern society in general. This is followed by short geographical case studies showing the variety of historical wood-pasture use in Europe. The final section offers some suggestions for the recognition of relic medieval wood-pastures in contemporary landscapes.

The role of wood-pasture in pre-modern society

The products of wood-pasture systems were critical to every village: wood and livestock. In an age before fossil fuels, wood was indispensable for heating and lighting homes, shops and taverns. All kitchens needed one or more hearths fuelled by wood. Crafts such as dyeing, leather working and brewing required regular wood supplies to heat up huge vats of liquids. Iron working needed charcoal, which is a concentrated carbon residual created by slowing burning wood in the absence of oxygen.

Medieval wood management relied on the practices of coppicing and pollarding. In the former, trees were cut approximately just above ground level to create a sprouting stump; in the latter, the trees are cut higher on the trunk so that young sprouts were out of the reach of grazing animals. Coppice stands usually consisted of one species growing from regularly spaced stumps, with larger 'standards' grown for construction timber scattered among them. Oak (*Quercus* sp.), hazel (*Corylus* sp.), ash (*Fraxinus* sp.), hornbeam (*Carpinus* sp.) and maple (*Acer* sp.) were among the most commonly coppiced trees (Rackham, 1990). In more northern climates birch (*Betula* sp.), alder (*Alnus* sp.), elm (*Ulmus* sp.) and willow (*Salix* sp.) were likewise coppiced. Pollarded meadows likewise usually had only one or two tree species, most often oak or beech (*Fagus* sp.), but others such as holly (*Ilex* sp.) were also common and in northern areas, elm, ash and birch were often used to generate leaf-fodder (Emanuelsson *et al.*, 2009).

Both trimming practices greatly increase the amount of wood and leaves produced by the tree and prolong the tree's lifespan. Trees normally age because they reach a maximum height and branch size, which fixes the amount of leaves available to gather nutrients. As the tree continues to grow in diameter, eventually it cannot supply itself with enough water and nutrients to maintain the thick trunk, so the branches begin to die. Coppice stools and pollards, by contrast, are capable of living indefinitely because each time they are cut, the ageing process restarts. During the Middle Ages, the tree-cutting cycles varied widely, with anywhere from 4 to 35 years for one cutting cycle (see Rackham, 1990; Keyser, 2009; Szabó and Hédl, 2013 for examples). Because of the tree management techniques, a managed pasture does not require much natural recruitment of trees; however, seedlings could be established, typically under the protective cover of shrubs. Both coppicing and pollarding provide regular wood production for everyday consumption in heating and cooking.

Livestock were likewise critical in pre-modern society, as cattle, sheep and pigs were all regularly consumed as butchered meat. Cattle and sheep were additionally useful for dairy products. Although access to meat and dairy varied by location, both were prominent on tables of the nobility and grew in importance in the diet of common people in the later Middle Ages (Woolgar, 2006). In addition to serving as food resources, cattle provided needed hides for leather and sheep were the backbone of proto-industrial cloth manufacture.

Supplying both wood and livestock in medieval times required coordination of activities and mixed-use land management. This was best served through extensive use of wood-pasture systems. Wood-pastures served three purposes: (1)

shelter and grazing for animals, (2) timber, fuelwood and leaf-fodder, and (3) crops of acorns and/or beechmast for pigs (Szabó and Hédl, 2013). Management of the trees at regular intervals in conjunction with grazing livestock in the area kept the inherently dynamic wood-pasture system in a relatively stable open state.

The challenge was to provide for all of these products without damaging the trees. Pollarding was thus most appropriate if livestock was going to be continuously present on the pasture because the regeneration would be out of mouth's reach. Although livestock had to be excluded from coppice areas for several years after cutting, the long coppicing cycles in some areas meant that grazing was still a regular feature of coppice stands (for example Keyser, 2009). If timber was the desired tree product, a long cutting interval was required to allow the branches to grow thick enough; whereas intervals for cutting leaf-fodder could be much shorter, usually three to five years (Haeggström, 1998).

One of the most prevalent medieval silvopastoral practices was *pannage* (in Latin *pasnagium*), the feeding of pigs in the autumn on oak acorns or beech mast (Jørgensen, 2013). This food source was critical to aid in weight-gain just before slaughter at the end of autumn and beginning of winter. In the medieval period, pigs were allowed pannage in woodlands in exchange for a fee, usually an in-kind payment of a percentage of the herd. Fattening of swine on acorns followed by their slaughter was so important in the medieval agricultural cycle that it became the standard depiction in illustrations for the months of October/November or November/December (Henisch, 1999) (Figures 4.1 and 4.2).

Even before the medieval period, we have evidence of wood-pasture management in surviving ancient Roman agricultural treatises, indicating the long history of the practice in Europe. Palladius, who wrote in the 4th century, touted wooded pastures as particularly suitable for pigs that could feed on the grass and weedy plants as well as the nuts during autumn and winter (Schmitt, 1898). In addition to pigs feeding directly on fallen acorns, Palladius recommended that women and children gather acorns for later consumption. Pigs were also intentionally set out in vineyards to root up weeds. Wood-pasture practices in ancient times likely modified woodland structure considerably. Hughes (1994, 2011) stresses deforestation in his studies of Roman environmental history, but while the evidence certainly points to a loss of high forest, Hughes overlooks that much of the change is due to the increase of wood-pastures, which are not treeless fields, but rather mixed silvopastoral systems that retain some trees. This became a widespread system throughout Europe in the Middle Ages.

Case studies of medieval wood-pasture management

Although we can talk about wood-pasture management in Europe in a general sense, we must keep in mind the spatial and temporal variety of the system. Both the practices and the terms used for those practices and for wood-pasture itself were not consistent throughout Europe during the entire Middle Ages. Although modern scholars often read Latin terms as words with a fixed definition such as *silvae glandifera* meaning closed wood-pasture maintained for acorn production



Figure 4.1 The illustrations for the months of November and December, from the Queen Mary Psalter, England, between 1310 and 1320

Source: British Library Royal 2 B VII, ff. 81v and 82v. Images in the public domain, courtesy of the British Library.

and *silva pascua* referring to open wood-pasture (for example Luick, 2009), many words for woodlands were flexible and inconsistently used (for example Szabó, 2005; Arnold, 2013). Rather than attempting to define all the Latin and vernacular versions of terms related to wood-pasture, we think it is best to look to regional and time-specific practices to understand the functioning of wood-

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Figure 4.2 Calendar page for November, from the Dunois Hours, France, between 1440 and 1450

Source: British Library Yates Thompson 3, f.11. Image in the public domain, courtesy of the British Library

pasture in pre-modern Europe. The following short case studies give some flavour for the ways in which these silvopastoral areas worked in the medieval and early modern era.

The Frankish kingdom

The region comprised of north France, the Low Countries and north-western Germany were knitted together as a kingdom in various configurations from the 5th to 11th centuries under the Merovingian then Carolingian then Ottonian rulers. The extensive scribal practices in these kingdoms have left us with some of the earliest recording of European woodland management systems, including the earliest use of the word *forest* (Jørgensen, 2010).

Surviving 9th century estate inventories, known as polyptychs, measure large woodlands as their capacity to pasture swine, corresponding to the Roman agricultural manual term *silva glandaria*, which represents an area that supplied both timber and acorns for fattening pigs (Keyser, 2009). The polyptychs list the payments due from tenants, which included part of the wood gathered for their personal use, fees for pasturing pigs and labour for cutting firewood and lumber. Products of wood-pasture feeding are always included in these inventories. For example, the polyptych for the monastery of Prüm lists a wide range of pig herd sizes, from 10 to 1000, at its various holdings; the Prüm's estates had to send at least 875 adult pigs for slaughter to the monastery every year (Arnold, 2013). This extensive use of woods for pasturage is likewise attested in other types of documents, such as land grants. In the Ardennes region, for example, the dual

monastery of Stavelot-Malmedy held 'prime woodland in which a thousand pigs could be pastured' (Arnold, 2013: 70). Although other livestock such as cattle, sheep and goats were also grazed in wood-pasture, records seldom mention them by name.

From the 12th century, new regulations began to define rights more and more precisely, limiting the number of animals and timing of pasturage. The abbey of Vauluisant studied by Keyser (2009) successively restricted grazing rights: while in 1193 pigs could graze in all woods and pastures and cattle and sheep could graze in pastures except during hay season (March–July), at the beginning of the 1200s pigs were entirely excluded from pastures and livestock were ordered out of coppiced sections. It appears that there was an intensification of commercial woodland exploitation with a significant increase in the coppiced acreage over the 13th century, creating a long-lasting intensive silviculture system that replaced the more extensive silvopastoral one (Keyser, 2009).

In the Low Countries, communities began keeping *marke boeken* to record regulations on the use of wooded commons from the 14th century (Dirkx, 1998). *Marke boeken* rules were particularly concerned with grazing livestock and cutting wood. While limitations on the number of pigs to be acorn-fed are rare in *marke boeken*, limitations on cows and sheep are more common. When new coppices were made, livestock was generally excluded from the area for several years, only returning to graze after the shoots were well established. Even during regular years, sheep and cattle were excluded during the spring and summer months from some forests to avoid tree damage.

England

Wood-pasture within Anglo-Saxon England, from the 5th to 11th centuries, has been extensively studied by Hooke (2010). She argues that the Weald of south-eastern England, an undisputedly wooded region, was primarily wood-pasture dominated by oak and ash in the Anglo-Saxon period. The Weald was divided into units called dens, from the Anglo-Saxon word *denbera*, in which pasture rights were granted. Most of these dens were for swine pasture, but other animals including cattle and oxen are also named as pastured in the woods. For example, a 9th century charter grants 'pasture and grazing for pigs in Andred and for plough-beasts or goats in these places: Ewehurst, Sciofing den and Snodhurst' (Hooke, 2010, p145). A network of roads developed to link these woodland dens together and facilitate migration of herds. According to Hooke, droveways between wooded areas and more heavily developed estates allowed for regular transhumance patterns in south-eastern England.

The predominance of wood-pasture for grazing in England continued even after the Norman Conquest. Scribes creating the *Domesday Book*, a financial audit of royal properties undertaken in the 1080s, often recorded the size of woodlands according to how many pigs could be fed in them, stressing the continued importance of silvopastoralism (Jørgensen, 2013). Other livestock are also known to have grazed in wood-pasture through documents, such as a grant from King

Henry I to the nobleman William Mauduit allowing him to pasture cattle in Henry's royal forests in the early 1130s (Johnson and Cronne, 1956).

Wood-pasture in England served both as grazing for livestock and grazing for game such as deer. Parks, ostensibly for deer but in reality multiple-use woodlands and wood-pastures, proliferated in England from the 12th century (Rackham, 1990). Rackham (1990) suggests that there were two ways to maintain wooded parks over time: either replace underwood with scattered pollards in a pasture as an uncompartmented park, or set aside designated areas for coppicing and others for grazing in a compartmented park. In both situations, parks provided wood products (either through pollarding or coppicing) and grazing fields (either under the trees or in treeless plains). While we may associate medieval English parks with elite deer hunting, they were often more a combination of deer farming – managed grazing land with fences to keep deer in and intruders out – with livestock grazing, wood collection and space for other game birds and animals (Liddiard, 2007; Rotherham, 2007; Creighton, 2009).

Spain and Portugal

Wood-pastures in the Iberian Peninsula, called *dehesas* in Spain and *montados* in Portugal are a classic example of a long-lived mixed silvopastoral system (Costa *et al.*, this volume). The *dehesas* encompass 5 million hectares in Spain and 500,000 ha in Portugal of rangelands dominated by scattered oak trees (*Q. rotundifolia*, *Q. suber*, *Q. faginea*). The *dehesas* currently produce both wood for various uses and grazing animals, most famously Iberian pigs that are fattened on acorns (Joffre *et al.*, 1988).

Clément (2008) provides an extensive study of the historical development of the *dehesa* system. It has its roots in prehistoric times with forests transformed by transhumance. The Romans appear to have integrated wood-pasture into the rural economy, particularly for stockbreeding, but the invasions of the Early Middle Ages dramatically depopulated the *dehesa* region. After the Christian re-conquest of Spain in the 13th century, new settlers were attracted to the *dehesa* region, particularly for breeding livestock owned by the military orders. These quasi-religious military orders were granted significant territories by the king as a reward for their efforts in the re-conquest. Because the territories of the military orders were so large, a system of long-distance transhumance for sheep between summer pastures in northern Spain and winter pastures in the south developed. In response to this increased transhumance, local communities often fenced in their own wood-pasture designed for cattle grazing. Boundary surveys dated to the 14th century recorded the presence of both pollarded and coppiced holm and cork oaks and transhumance routes through the properties.

The longevity of the *dehesa* system is attributed to a fundamentally economic and political decision in 1273: King Alfonso X granted vast privileges to an association of transhumant breeders, Honrado Consejo de la Mesta, which included among its membership the military orders (Clément, 2008). With a monopoly over the highways of the sheep transhumance routes, the organisation

survived for six centuries, powerfully conserving the *dehesa* landscape through continued use. When the Mesta was finally abolished in 1836, the lands were sold into private hands and in many cases were repurposed for breeding bulls and Iberian pigs. The current *dehesa* system owes its start to this land reallocation.

Central Europe

Medieval records of woodland management for central Europe, notably current-day Hungary, Romania and Czech Republic, indicate the long-term presence of woodland pasture in the region.

Szabó (2005) studied the Bakony region in Hungary, which was reputedly particularly good for feeding pigs, including a local swine variety. He distinguishes two types of woodland pasture: large pollards of mostly beech with some oak, hornbeam and lime in the north; and unpollarded oaks dominating wood-pastures in the south. Pollarded trees were included in boundary clauses for property transactions because of their easily recognisable form. Fifteenth-century documents indicate that wood-pasture could be a site of conflict over rights to feed livestock: for example, in 1432 40 pigs owned by the monastery of Bakonybél were driven away from their feeding ground by a neighbouring nobleman.

In another study, Szabó and Hédl (2013) compare two large ancient woods in southern Moravia, one managed as coppice and the other as wood-pasture in spite of the similarities in size, location, climate and vegetation. The authors found that higher soil fertility favoured the establishment of coppices to grow firewood rather than wood-pasture. Once a site was converted to either coppice or wood-pasture, it tended to remain in that management regime unless there was a radical shift in economics and ideology. Szabó and Hédl discuss the case of Hodonínská Důbrava, an oak and hornbeam woodland was used as year-round pasturage and for fattening pigs during autumn, for firewood collection, and for collection of wild foods including strawberries and honey. The wood-pasture system may have existed as early as the 14th century and it lasted until the late 1780s when new owners decided to separate the estate's woodland and pasture functions. In this shift, the estate's traditional silvopastoral system came to a close.

Scandinavia

In Scandinavia, wood-pastures are less well documented in the medieval period than continental Europe, primarily due to the types and amounts of written records kept at the time and still preserved today, but there are some exceptions such as Bråbygden, Sweden, where records are more numerous (Aronsson and Ritter, 2011). Most animals were pastured on wooded lands during some part of the grazing period, roughly from the beginning of May until late October. Meadows for grazing close to a farm, termed infields, were dominated by broadleaved trees, typically pollards; whereas outfields contained denser mixed deciduous and coniferous forest also used for livestock grazing (Aronsson and Ritter, 2011).

Pollarded trees on meadows appear to have been maintained with cutting intervals less than 5 years, even down to 1 or 2 years, to produce leaf-fodder for livestock (Haeggström, 1998). At Bråbygden, infield meadows typically had ash and lime pollards whereas outfields had birch pollards (Aronsson and Ritter, 2011). Pollarding practices on the infields attempted to balance the sunlight and shade requirements for hay grown as winter fodder (Eliasson and Nilsson, 2002).

Emanuelsson and Segerström (2002) investigated 14th century agricultural practices in mid-Sweden, revealing a complex slash-and-burn system in which forest was replaced by rye that was then converted to meadows for grazing or haymaking. The meadows were subsequently re-afforested by birch and willow, which were then eventually cut and burned again. The pollen record indicates that cattle were also grazed on herbs and grasses of nearby semi-open canopy forest. Even after the slash-and-burn practices were replaced by permanent agricultural fields around the beginning of the 18th century, woodland grazing continued as before.

Recognising relics of medieval wood-pastures in the field

Historical evidence demonstrates that wood-pastures were once an important and widespread land use throughout Europe. However during the early modern period, at a time coinciding with the industrial revolution, improvements in agriculture, the development of the predictable yield ideal in forestry, and sometimes dramatic changes in land tenure, meant that the simultaneous production of wood products and livestock from the same land became outdated (Warde, 2006). Huge areas of previous wood-pasture were converted to the suite of separate land uses, like arable land, permanent pasture or closed woodland, which have remained as distinct land uses ever since.

So one could ask whether any previous wood-pastures have continued through to the present day, and if so how would they be recognised? Historical map evidence is particularly powerful in identifying past wood-pastures, which may be depicted as more widely-spaced tree symbols, and usually unenclosed on hill land, or only enclosed by a wider encircling park pale. Coppices and managed woodland are by contrast normally depicted as enclosed by woodbanks or fences on 18th- and 19th-century maps. Even though historical map evidence may indicate past land use as a wood-pasture, once converted to arable land within new straight-sided fields, there may be little or no evidence visible on the ground that that place had once been wood-pasture. Place names survive however, and it can be common to find that farm and hamlet names associated with the old park continue in use to the modern day.

On rougher terrain unsuited to agricultural improvements, wood-pastures may have been converted to plantations, and if carried out rigorously, evidence of the wood-pasture origin may not be visible. However in many woodlands there are scattered veteran trees with wide spreading crowns and large branches which do not seem to have grown up in a dense plantation. These are the best evidence for past wood-pasture on that land, and may be found even in dense semi-natural woodlands that today are regarded as of mature, even primeval, origin.

Even that paragon of wild nature, Białowieża Forest in eastern Poland, often called a primeval forest, was used as a hunting forest for the kings of Poland during the late medieval and early modern period. Local inhabitants had the right to collect timber, pasture cattle on a limited scale, gather forest berries and honey, and even make charcoal (Samojlik, 2005). The many scattered huge old wood-pasture oaks within the dense forest testify to a former open character. Livestock grazing was at its strongest during the period 1795 to 1915 (Samojlik and Kuijper, 2013), and this has left a legacy of wood-pasture features. However those authors demonstrate that this grazed phase was for only a brief period in the much longer history of this remarkable historic woodland.

The presence of huge open grown veteran trees within otherwise normally structured dense woodland is invariably a sign that the land was once partially open woodland and probably a grazed pasture woodland, at least for a period. Certain characteristic features of wood-pasture trees also help identify them. Open-grown trees tend to be heavily branched, with a rounded crown reaching to near ground level and with a tapered main stem. Basal burrs and even complete 'skirts' of burr tend to develop only under the influence of heavy livestock browsing in open situations. The basal skirts of burr are a response by the tree producing numerous basal shoots that livestock or deer constantly bite back. These skirts are characteristic of wood-pasture and parkland trees and generally do not develop within plantation woodland.

Certain species of trees found in wood-pastures, like hawthorn and crab apple, are rare within woodlands, so their presence within woodland may indicate a wood-pasture history. Oaks likewise have difficulty regenerating in closed forests, so their presence often indicates prior open conditions. Even pines can develop the typical features of wood-pasture trees when grown in the open, and especially if browsed and cut for firewood. These old gnarled pines can survive within dense regenerated woodland that has grown around them.

Even more convincing evidence for a wood-pasture origin is worked trees, which often retain the tree form created by past working, even after centuries. Frequent branch pruning or shredding for leaf-fodder creates a distinctively shaped tree that is tall with short side branches and a lopped top. However this shape is lost over time if the cutting ceases and new branches develop, and so long-abandoned shredded trees are not as easily recognised, as are old pollards. Either way, both pollarded and shredded tree forms are absolutely characteristic of previous wood-pastures (Figure 4.3).

Previously coppiced trees also retain a distinctive tree form, but coppiced trees are only sometimes associated with wood-pasture. Old coppice is also hard to distinguish from the multi-stems that arise from grazing pressure when the trees were young, but coppice is normally found within protective woodbanks, whereas grazed multi-stems are mostly found in open unenclosed woodland.

Trees within a long abandoned wood-pasture often develop characteristic natural features as a response to their being long-lived and stable structures in a well-lit environment. For example, so-called 'air trees' are very common in wood-pastures, being bird-sown or wind dispersed tree seedlings that grow into the



Figure 4.3 Shredded wood-pasture in Transylvania, Romania

Source: T. Hartel

humus found in hollow veteran wood-pasture trees, particularly those with pollarded crowns, and eventually the air trees root right through the hollow host tree into the soil. So today, rowan air trees are very common in upland wood-pastures in the UK, mainly in veteran alder trees (Figure 4.4). Air trees may also be of birch, holly, hawthorn, blackthorn, yew, bird cherry and many other species growing inside long-lived host trunks of alder, oak or pine. Veteran wood-pasture trees also make excellent hosts for epiphytic flowering plants, ferns and mosses. The rot hollows make very suitable nesting holes for birds, bats and small mammals.

Of course many farmers in the early modern times may not have had legal access to extensive wood-pastures, which were often on common lands, and yet they needed supplies of wood products and leaf fodder. They could however cultivate pollards and shredded trees in other locations on their land, for example in the farmyards and on hedgerows, woodbanks, tracksides, the banks of water courses, stony land and clearance cairns. So in regions where for various social reasons old working trees have survived in the landscape, like parts of the Lake District, Cumbria, ancient pollards can be found today in all these locations. These are all places where pollarded trees do not compete with the main crop growing activities on better soils. Austad and Hauge (2006) describe rocky slopes in western Norway where productive and valuable pollarded woodlands were created



Figure 4.4 Alder pollard with rowan air tree at Loch Katrine, Scotland
Source: P. Quelch

on land too rocky for agriculture or indeed for regular forestry. Pollarded woodlands gave the farmer wood products and leaf-fodder from ash and elm trees growing on land of little other potential use. Numerous pollarded trees also survive today on old field boundaries and on isolated clearance cairns, yet they hardly constitute a wood-pasture as such. They certainly however form part of a remarkable surviving cultural landscape. Surprisingly, such places are often not recognised and valued, perhaps because of their humble working origins, yet to the authors at any rate they are an important and rare biocultural heritage.

Wood-pastures often contain relatively undisturbed archaeology, especially settlement ruins and field systems. They may also contain traces of past wood utilisation such as charcoal hearths, furnaces and kilns. However old coppiced woodlands are more likely to contain large numbers of charcoal hearths, as coppiced woods were specifically managed to produce wood for charcoaling. Any sort of archaeology tends to be well preserved within wood-pastures due to the fact that these are unimproved land of relatively low value, often too rocky to cultivate and usually the soils have not been disturbed. This lack of disturbance combined with long continuity can also explain their high biological values. The veteran trees within wood-pastures are excellent resources for saproxylic insects and old-growth lichens only found on the bark and lignum of mature trees. In our

modern landscapes wood-pastures are often the only refuge for these presumably once more-common specialists that depend on old-growth woodland. It could be said that in many countries ancient wood-pastures constitute the only old-growth forest surrogates.

Today, some of the best-preserved wood-pastures are within previous medieval parks, and often contain many veteran trees still growing in pasture and heathland, and unaffected by later plantation forestry or arable improvement. Wood-pastures with continuity from medieval parks are real gems and should be conserved if at all possible, recognising them as valuable biocultural heritage.

Conclusion

Medieval wood-pasture, as a multiple-use space, provided a myriad of resources from one plot of land. The examples above reveal that while wood-pasture practices were integrated across medieval European cultures in slightly different ways, they provided multiple goods: grazing lands, wood, hunting and subsidiary woodland products such as berries and honey. Wood-pastures were not ecosystems that existed on their own. The documentary sources show that regardless of where they were located in Europe, they were highly cultivated and regulated spaces with deliberate tree management through selection, coppicing and/or pollarding and restrictions on where and when livestock were permitted to graze. Human practices were crucial to maintaining the open character of wood-pastures, as these areas relatively quickly will become afforested if grazing and regular shrub clearance ceases.

As the medieval economies moved from subsistence to exchange, there was a move away from multiple-use land to blocks of single-use plots. This rationalization of land use, which sped up from the 18th century, separated woodland for tree production from agricultural land, as two distinct land-use types. Enlightenment ideology condemned common use rights and multiple functions of the same plot of land (Rackham, 2006). Tree management practices such as pollarding were seen as destructive and unaligned with agricultural modernisation (Petit and Watkins, 2003). When this happened, traditional wood-pastures tended to either become treeless grasslands or heavily forested, depending on the new livestock pressures.

This separation of woodland from pastoral land has only recently been questioned. Now wood-pastures are being valued as key ecosystems, but in order to maintain or restore their character, contemporary management may have to mimic historic practices. The historical evidence indicates that wood-pastures were most often managed for multiple products at the same time. If these systems are desirable again, managers may need to replicate or replace multiple pressures, particularly both tree management and livestock grazing on the same property. How the wood-pasture systems functioned as social and economic spaces had direct consequences for their function as ecological spaces. The longevity of wood-pasture practices in medieval Europe is worth studying as an example of how multi-use woodlands could function again.

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