ings enlarged by grazing cattle, but also by abandoned settlement sites that would also have been used as pasture.

Cattle of this period were hardy beasts, well able to survive on rough forest herbage. They benefited, however, from supplementary feeding in winter on leaf fodder cut from Ash, Hornbeam, elms, limes and other forest trees. Branches could be wrenched off or cut with stone axes, and the leaves dried for storage. Evidence for this practice comes from the trackways of hazel-hurdles and other wood laid across the Somerset Levels, some of which had been cut in summer, (the outer growth ring was unusually narrow).[9] The abrupt 'elm decline' in the pollen deposits that signals the start of the Neolithic is also cited as evidence for lopping, although disease seems a more likely explanation.

Grassland must have increased under this regime of lopping and grazing, but little if any would have been cut for hay before the Iron Age. Flint sickles were available earlier, but they were far better suited to cutting fodder from trees than from grass.[10] Pollen analysis, unfortunately, does not readily enable us to distinguish between pasture and meadow, but the grassland that was widespread before the Iron Age was more likely to have been pasture.

Two land types developed out of Neolithic farming: open ground extending to perhaps 30ha around each settlement, and a form of wood-pasture beyond. Pollards (or coppice) generated by lopping for leaf fodder were concentrated within the mosaic of currently cultivated ground and fallows around the settlement, for otherwise the efforts involved in carrying leafy branches back to base would have been considerable. As settlements spread to less favourable ground on thin soils studded with uncultivable outcrops and boulders, the land-use pattern would have become less concentric and more controlled by the lie of the land. Cultivation and fallows would be confined to the deeper soils, leaving trees mainly on the uncultivable ground.

Post-Neolithic use of leaf fodder

Trees continued to be lopped for fodder long after the Neolithic. Aristotle and the Roman agricultural writers both recorded the cropping of elm for animal feed,[11] and in France elm was even fed to children and used as a food of last resort by the starving. Medieval illustrations (including the Bayeux Tapestry) and post-Medieval landscape paintings depict trees as tall, spindly growths from which the lateral branches have been lopped, a practice known as shredding. And, in many parts of Europe, the tree-foliage harvest was combined with the mowing of grass hay in wood-meadows. The ancient origins and long continuance of pollarding is reflected in artistic images dating back to 1500 BC in Greece.[12]

One form of land management that evolved out of Neolithic exploitation was the wood-meadow, a curious combination of woodland and meadow in which some of the trees were pollarded for fodder and the rest were coppiced, while the herbage was mown and grazed (see Chapter 10). The evolution was, however, far from direct. For example, Richard Bradshaw & Gina Hannon[13] found that two Swedish wood-meadows (one of which, Råshult, was the birthplace of Linneaus), had both been formed about 1100-1200 AD out of woodland that had previously been burned and grazed. Both were maintained as wood-meadows for over 700 years, broken only by short periods of neglect and what appears to have been a marked increase in the intensity of grazing in the 18th century (when Heather increased considerably), before both fell into neglect around 1900, only to be restored in recent times. Save for the restoration, this sequence of events was probably the norm (see Chapter 10).

▼ Ash trees on the margins of a mead in the Dolomites at Fosca, Italy. The tree been both shredded pollarded.

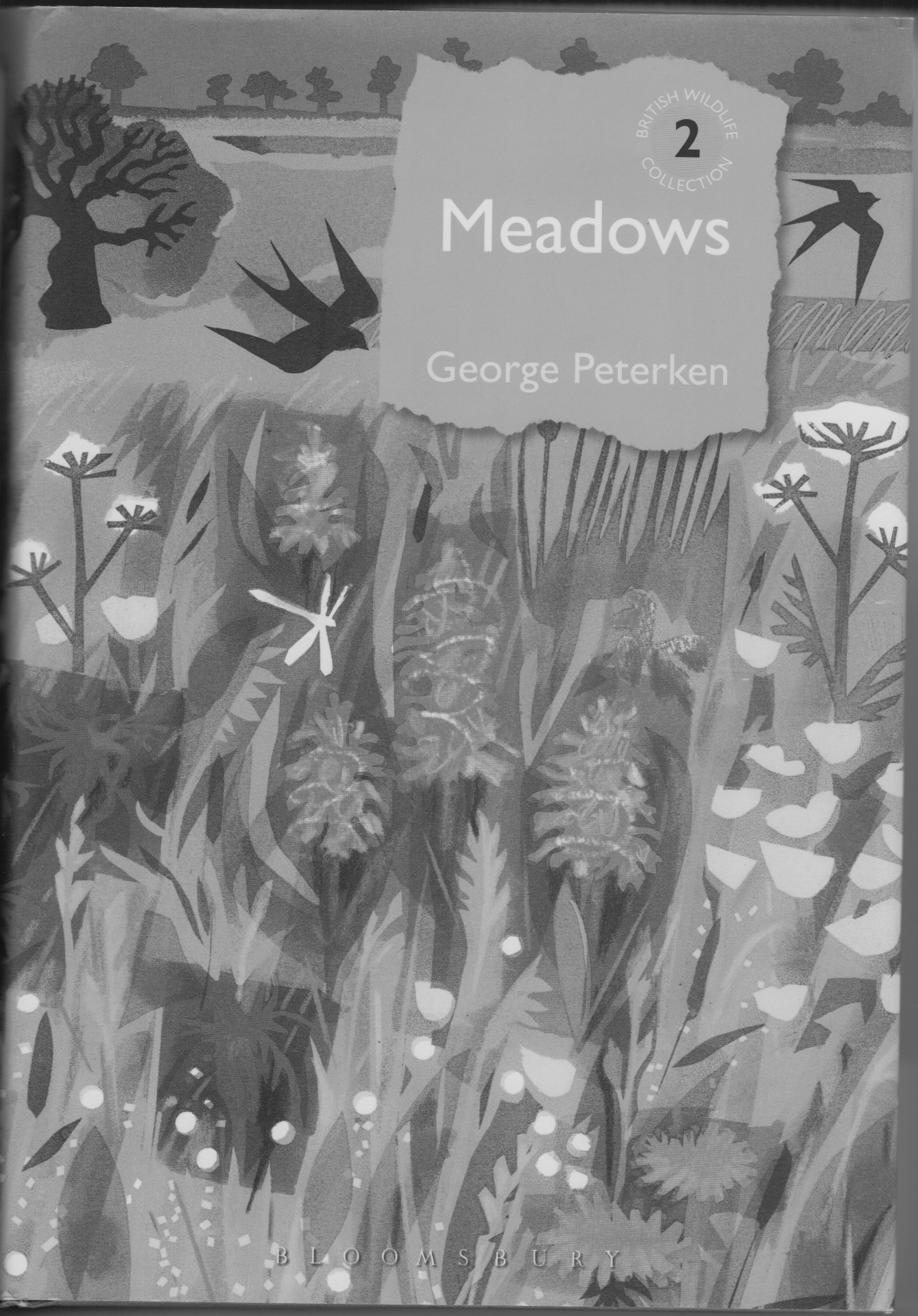
Wood-meadows were never strictly part of the British scene, but they were often approached. Rides in coppices were sometimes mown for hay. While trees were lopped in wood-pastures, along boundaries and within villages, grass was mown wherever it was not used for pasture, and this included any kind of rough ground as well as small patches and strips of grassland in gardens, along roadsides and beside arable fields. We even have a personal claim to a wood-meadow on our land in the Wye Valley. Our tiny fields were formed out of a lime, Beech and oak wood-pasture 200 years ago, leaving many stubs and pollards in the clearance cairns and boundary walls. The fields are now used as meadows; the trees are still there, so although lopping stopped around 1900, we bring pollards and meadows into contact, much like any Scandinavian wood-meadow.

Pollarding for fodder continued well into modern times. Thus, in the 1980s Austad found 15 farmers still lopping in the Sogn district of western Norway,[14] and in Bulgaria Haeggstrom noted that lopping continued in the hills close to Sofia.[15] Even outside wood-meadows, the use of trees as fodder depended partly on how much grass-hay was available. Thus, in a small (5.9ha) livestock farm in the Agno valley of northern Italy, where the farmer harvested one-third of his fodder from Ash, Alder, poplar and Hazel trees from the 1920s until 1992, the best land was arable, the next best was meadow, the rough ground was pasture, and the amount of leaf fodder, grass-hay and fresh grass that was cut varied from year to year. If, for example, grass growth was limited by summer drought, more green foliage was cut from trees. Trees and grass were always linked, in the sense that fodder trees were retained as scattered groups in pasture and as boundary trees, partly to shield the grass from the sun but also to maximise total production. If the grass grew well, two hay crops were taken from the meadow, before it became pasture.[16]

Another late-surviving example also demonstrated close integration. In the village of Plikáti, high in the Pindos Mountains in northern Greece, close to the border with Albania, the balance between leaf fodder and grass-hay, stored to overwinter the sheep and goats, varied from year to year. Grass-hay came from species-rich meadows on lower ground, from sown plots of Lucerne, from the borders of arable fields and from steep, uncultivable slopes, but harsh winters and wet summers reduced the yield. Leaf-hay was far more reliable, for tree-growth was less affected by weather and defoliators, and the fresh-cut branches were immediately carried to the village for drying. Originally, most leaf-hay was cut from Beeches high above the village, but in the 1920s a plot of mixed oak scrub closer to the village was set aside instead. Here, the Turkey and Sessile Oaks were reserved for lopping, and the Hornbeams, Sycamores, pines, firs and shrubs were cut back. Although Hornbeams made the best fodder, oaks and Beech were preferred because the dried leaves remained on the twigs, and Beech was easier to store because its branches naturally grew flat. In late summer, branches were cut with a small axe or billhook, bundled up and carried by mules to the village, where they were laid out to dry, then stored in the upper storey of barns or outside in ricks. In winter, they were fed to stock and the twiggy residue was used as kindling. Individual trees were lopped on a 3- to 5-year rotation, and after several loppings they assumed a variety of grotesque shapes, with tall trunks and stubby branches. Evergreens also had their place, for Kermes Oak and fir were also cut fresh in winter to feed directly to the stock. The whole procedure demanded endurance and athleticism, but the effort was worthwhile, for some stock could be overwintered in the village. Without leaf fodder, the stock would have had to be transported out of the mountains.[17]

In Britain, many trees were lopped for fodder, particularly the more succulent species, such as Ash, elms, limes, willows and maples. The Neolithic is marked in the pollen record by a sharp decline in elm, attributed by many to the widespread adoption of elm fodder for livestock, but Rackham puts forward convincing evidence that disease was more likely,[18] and this is confirmed by the abrupt reduction in the elm pollen rain around Diss Mere, Norfolk, where the forest had recently been opened up by early farmers.[19] John Evelyn, in 1664, said 'The very leaves of [elm]…will prove a great relief to cattle [sic] in winter, and scorching summers, when hay and fodder is dear they will eat them before oats, and thrive exceedingly well with them'.[20] Numerous pollard trees in hedges and wood-pastures still bear witness to lopping, and some still bear the marks of shredding, i.e. the lopping of side branches while sparing the leader, thereby generating distinctively tall, thin trees with a 'fuzz' of new growth. Medieval and later records are full of mentions of such 'shred and dotard' trees, but the practice lapsed in the 18th and 19th centuries, leaving a few local survivals in rural Essex and elsewhere.

Britain also had hollins. These were concentrations of Hollies stand-


BRITISH WILDLIFE
2
COLLECTION
Meadows
George Peterken
BLOOMSBURY

ing in pasture and in hedges that were regularly lopped for fodder at the 'back end' of winter, just when grass-hay might be running short. Fodder made from Holly sounds harsh, but the leaves higher up the tree are generally less prickly than those lower down and, having just taken a break from writing this chapter to cut Holly branches from around our snow-covered fields, I can confirm that sheep immediately desert their hay bales and consume all the leaves, butting each other out of the way in their eagerness.

Hollins were particularly frequent on the upland fringes of the Pennines and the Welsh borders, but seem to have been rare in the Midlands, where heavy soils and sharp frosts inhibit growth.[21] Understandably, these Holly parklands were highly valued in medieval times, when they must have made all the difference on farms with a large stock of sheep and cattle and a limited supply of hay. Holly pollards were also common in forests and parkland, such as the New Forest, Hampshire, the Forest of Dean, Gloucestershire, and Staverton Park, Suffolk, where they were used to feed both commonable stock and deer (and latterly to supply berried Holly at Christmas). Hollins continued into the 18th century, but by then they were in decline, presumably because fodder was becoming available from other sources. Some idea of the importance of Holly fodder can be gained from Needwood Forest, in Staffordshire, where, on disafforestation in 1803, some 100,000 mature Hollies were sold for their wood to the bobbin factories of Lancashire. Holly pollards are still common in the New Forest, where some have been re-pollarded in recent years, but they have almost gone from the Forest of Dean, and have grown out into tall trees in Staverton Park. The best survival of a true hollins used to be in Shropshire, on the Stiperstones, at The Hollies, which survived as a source of fodder for the smallholders of a mining community and then as a farm for rehabilitating prisoners from Shrewsbury jail, but this, too, is now growing out. Smaller, and still just recognisable remains of hollins can be seen in the Olchon Valley, in Herefordshire.

◀(Above) **A hollin in the Olchon Valley, Black Mountains, Herefordshire.** Now a sheep pasture, this h is degenerating, but s old lopped trees still st amongst the younger growth.
(Below) **Sheep eager eating freshly cut ho** in our fields during the weather of December

Prehistoric, Roman and Anglo-Saxon haymaking

Neolithic farmers sustained their herds with pasture and leaf fodder, but they could hardly have converted much herbage to grass-hay. They had sickles made of long, shaped flints set into wooden handles, which could cut any kind of vegetation, but for a given harvesting effort far more tree foliage would have been harvested than grass. Realistically, haymaking from grass and the creation of meadows awaited the invention of metal blades.

The Romans were familiar with haymaking and meadows. When Pliny the Younger (61-113 AD), one of Trajan's consuls, wrote to his friend Domitius Apollinaris, he described his estate in Tuscany in some detail:

> 'Next you have meadows and the open plain. The arable land is so stiff that it is necessary to go over it nine times with the biggest oxen and the strongest ploughs. The meadows are bright with flowers, and produce trefoil and other kinds of herbage as fine and tender as if it were but just sprung up, for all the soil is refreshed by never-failing streams. But though there is plenty of water, there are no marshes; for the ground being on a slope, whatever water it receives without absorbing runs off into the Tiber. This river, which winds