Vale and Downland Museum – Local History Series

An Ecological History of the Upper Thames: The Development of Grasslands

by Patrick J. Dillon

Of the new ecosystems created in the late Prehistoric Period, the plagioclimax grasslands and heathlands are the most important. The ecologist defines vegetation in terms of plant formations - the great belts of vegetation which occur worldwide such as tropical rain forest, desert and tundra. They are climatically determined and, as we have seen, the 'natural' vegetation of the British Isles is a mixed deciduous woodland. Plant formations arise by a process of succession - progressive changes in the composition of plant populations during the development of vegetation until a climax community is established. The process is regulated by a complex of biotic factors. These may be altered by man's activities with the result that the succession is deflected away from its normal climax community and into a new course, a plagioclimax being the outcome. Grassland is a plagioclimax, and its community structure is maintained by grazing pressures from animals like sheep and rabbits.

The change from the hunter-gatherer way of life to a settled existence, which brought with it clearance of woodland, depended on the development of a mixed farming economy. The balance between livestock and arable has always been a matter of contention to archaeologists, and the precise structure of the relationship is impossible to work out, particularly as pastoralism makes a much less obvious impact on the archaeological record than crop production. One can only speculate, therefore, about the extent and permanence of early grassland development. However, clues are available from the vertebrate record (comprehensively summarised by A.J. Stuart in Pleistocene Vertebrates in the British Isles, 1982) since the transition from a woodland to an agricultural landscape implies major changes in man's control of herbivore populations in terms of extinctions, introductions and domestication.

Prior to the Mesolithic the major human influence on herbivore populations was reduction of individuals and species (the elk and aurochs became extinct in this period) due to hunting pressures. Grazing was thus influenced in a haphazard way and there could have been no permanent grassland beyond woodland glade, wetland fringe and possibly moorland in the Highland zone. The Neolithic farmers brought with them domestic sheep and goats derived from a south-east Asian ancestral stock; their domesticated pigs and cows could have originated from native wild boar and aurochs respectively, or they could have been introduced already domesticated. The horse, domesticated elsewhere, arrived in Britain in the Bronze Age. By this time large areas of maintained grassland around settlement sites are implied.

Studies on soils from archaeological sites confirm this pattern and give some indication of the nature of the agricultural economy. J.G. Evans (in D.D.A. Simpson, Economy and Settlement in Neolithic and Early Bronze Age Britain and Europe, 1971), from a detailed examination of sites in the Upper Thames region, recognised two types of soil treatment - one in which disturbance is confined to the soil surface and the other involving total

disturbance of the soil profile. These differences reflect a possible distinction between pastoral and arable farming and the evidence to date suggests that both practices were widespread in the region in late prehistoric times, although not necessarily side by side in a planned mixed economy. It could be that changes in soil structure, erosion and the reduction of soil fertility caused by clearance and early arable production led to the onset of pastoralism and thus a gradual evolution of the grassland system in response to changed economic factors.

Mechanisms of the development aside, by the Iron Age and Romano-British periods the pattern in the Upper Thames is clear. Biological remains, specifically insect, snail and plant, from excavations on the gravel terraces of the Thames at Farmoor and Appleford (see M.A. Robinson in S. Limbrey and J.G. Evans, The Effect of Man on the Landscape: The Lowland Zone, 1978) indicate that grassland, both meadow and pasture was predominant, the former for hay and the latter for grazing. In the Iron Age the farms appear to have been self-contained, set in open grassland, but possibly of a temporary nature; the Roman settlements were permanent. The chalk downs were also important in this pastoral economy; there is evidence that sheep were raised not only for meat but also for wool (D.W. Harding, The Iron Age in the Upper Thames, 1972), a pattern of husbandry which was to last until modern times.

The floristic composition of the swards so formed would vary according to the nature of the grazing, the time factor, aid the soil and climatic conditions. These factors operating together are complex and subject to much local variation, but it is possible to make generalisations. Grassland grazed by sheep has a neat appearance trimmed to within a few centimetres of the ground with no bare patches. Poorly anchored plants are pulled out of the ground so that small species, with low or prostrate flowers and horizontal rosettes of leaves are favoured. On the chalk, where the soils are warm and well drained, a very specialised and colourful flora develops. (For a detailed treatment of this subject see C.Smith, Ecology of the English Chalk, 1980.) Cattle pull at vegetation rather than biting at it, and they produce more urine and dung than sheep. These influences give rise to a coarser, floristically poorer, sward.

Sheep and cattle were the major biotic influence on grassland from the late prehistoric to Medieval times. Then, with the Normans, came the introduction of the rabbit, a species managed intensively for meat in enclosed warrens. Throughout the Middle Ages many escaped from warrens and established themselves in the wild, but numbers remained low until changes in land-use associated with the agricultural revolution created the right conditions for a population explosion. From the 19th century until the introduction of myxomatosis in the 1950s, the rabbit was a serious agricultural pest.

Rabbits are extremely efficient grazing animals, eating with a close and concentrated bite, and were thus responsible for overgrazing and erosion of grasslands throughout the country.

The post-war transformation of agriculture (a subject which will be examined in future articles) has reduced the traditional grassland which once characterised the region to a fraction of its former area. What remains is of great conservation value and, in the Upper Thames region, can be classified according to the underlying soil conditions. Chalk grassland occurs on the shallow, alkaline, dry and calcium-rich soils of the Downs. It is usually dominated by the two Fescue grasses, red (Festuca rubra) and sheep's (Festuca ovina) which when grazed make a very fine turf. Associated with it is a rich and specialised flora, including many calcicoles (calcium-loving plants). Limestone grassland, which occurs in the Cotswolds, is similar to chalk grassland, but the dryness of the soils is

a particular feature as limestone is very permeable to water. In the past both of these types of grassland were given almost entirely to sheep grazing.

The fertile clays and loams of the river valleys support a different plant community known as neutral grassland. There are a number of concomitant grasses, including cock's foot (Dactylis glomerata), meadow fescue (Festuca pratensis) and perennial rye-grass (Lolium perenne), which have a fine growth and when grazed interweave to form a grassy mat. Neutral grassland is traditionally managed either as 'pasture' - grazing for sheep, cattle or horses, or 'meadow' when it is grown as a crop for mowing and hay production. Both forms are species rich; many are waterlogged for part of the year and have associated with them a number of wetland rarities, the Upper Thames being best known for the snakes head fritillary (Fritillaria meleagris). Ancient grazing and commoners' rights have meant that a number of these habitats have survived in the region, particularly around Oxford. The susceptibility of the river valley grasslands to flooding has been exploited to good effect in the past: water flow over the meadows in the winter months has been artificially controlled to keep the frost off the grass and lay down river sediments and their associated nutriments with the aim of encouraging an early bite for stock (figure 1). Such 'water meadows' were a characteristic part of the traditional landscape tapestry of the Upper Thames downland tributary river valleys.

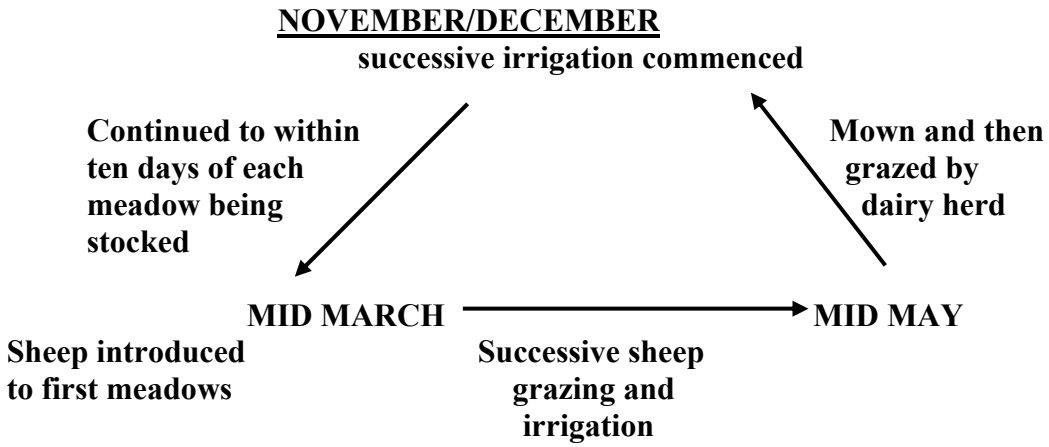

Fig 1. A typical nineteenth century water meadow cycle

So far we have considered the development of plagioclimax communities dominated by grasses on alkaline and neutral soils. On poorer, acid soils derived from geological outcrops such as the Upper Greensand and superficial deposits such as clay with flints, a different type of plant community occurs. This is heathland, the lowland equivalent of moorland. Both communities are floristically poor and tend to be dominated by one species over large areas, Calluna in the case of heathland, giving rise to a characteristic uniformity. These well-drained, sandy soils with plenty of gravel which occur widely in the Vale of White Horse, are agriculturally poor and have traditionally been left as common grazing. Periodic burning is an important element in the management of this plagioclimax and many commons today are overrun with scrub through lack of traditional management.

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