Journal of Archaeological Science 1974, **1**, 291–296

The Possible Role of Ivy (*Hedera helix* L.) in the Mesolithic Economy of Western Europe

I. G. Simmons
Department of Geography, University of Durham
and
G. W. Dimbleby
Institute of Archaeology, University of London

Introduction

Ivy (*Hedera helix* L.) is an evergreen climbing plant belonging to the family Araliaceae, most of whose members live in warm climates. It is not unexpected, therefore, that ivy itself shows climatic preferences and indeed in northwestern Europe it is on the edge of its climatic range. For this reason it has been a valuable plant as an indicator of past climates. Iversen (1944) has studied the distribution of ivy in Denmark in relation to climatic parameters, and the application to palaeoclimatology has subsequently been usefully discussed by him (1960), van Zeist (1959) and Smith (1961).

Most of the evidence about the occurrence of ivy in the past comes from the pollen record. Ivy is an insect-pollinated species, flowering in October–November. Generally its representation in the pollen record is low, less than 1% of the tree pollen, though higher values have been recorded in Switzerland, especially in the Atlantic period (Troels-Smith, 1955). Godwin (1956) reports interglacial values of 8% and 37%, the latter coming from the scrapings of a rhinoceros tooth. He comments that this must be 'due to local over-representation of some kind', but uses both figures to sustain an interpretation of an Atlantic climate.

There are now, however, a number of analyses from the postglacial which greatly outweigh even these high figures, with values ranging up to several thousand per cent of the tree pollen. Clearly these are not to be interpreted in terms of natural pollen rain. A common feature of all such cases is that they come from archaeological sites; they are without parallel from normal sedimentary deposits. Examples come from the Neolithic, the Bronze Age and Mesolithic times.

Neolithic and Bronze Age

Troels-Smith (1960) has discussed at some length the importance of ivy as a fodder plant. It is evergreen, and in a deciduous forest environment offers a source of winter feed. If it were collected at the beginning of the winter it would be in flower and this would account for the concentration of pollen in a way that normal dissemination cannot. It is acceptable as a fodder for cattle, sheep and goats, provided that it is not fed upon to excess, and has been so used in historical times, though it tends to reduce milk yield in cattle and taints the milk (Forsyth, 1968). Troels-Smith points out that evidence from Switzerland indicates that human influence at first caused an increase in ivy, presumably due

to the opening of the forest canopy, but when it became more intense the ivy disappeared. He quotes pollen analyses of the Michelsberg cultural layer at Weiher where what appears to have been stable manure contained 39% of ivy pollen, whilst at Burgäschisee-Süd high values of the same order were recorded by Welten (1955) in a late Cortaillod culture occupation layer. It seems likely that a similar explanation accounts for high ivy counts that have been recorded from two Bronze Age sites in Britain. The most striking was at Portesham (Thompson & Ashbee, 1957) where the old land surface beneath the barrow and the turves that made up its core contained very high ivy concentrations (700–1800% of the tree pollen). At the time of the report on this barrow the identity of this ivy pollen was regarded as doubtful largely because the high percentages seemed inexplicable.

Another Bronze Age context, where again identification was regarded as uncertain for the same reason, was in a barrow at Shuttlestone, Derbyshire (Smith, 1957). This barrow was opened in 1848, producing *inter alia*, a bronze axe. This had excellent impressions of bracken (*Pteridium*) on the corroded surface, and a small amount of material scraped from its surface was examined for pollen. This yielded a total of 50 grains, of which 21 were of ivy.

High percentages of ivy pollen were again found beneath a round barrow at Minsted, Sussex (Drewett, in press), but here the main concentration was about 3 in (7·5 cm) below the old land surface and associated with a pollen suite of Boreal character. If this association is real then this is one more example of ivy pollen accumulation in a Mesolithic context (see next section).

Mesolithic

The most remarkable example of the dominance of ivy pollen in a Mesolithic setting was at Oakhanger (Rankine & Rankine, 1960) where at one level 269 grains of ivy were recorded in a total count of 309 pollen. In the report no satisfactory explanation of the *Hedera* concentration could be offered at that time. Sites showing such high ivy pollen percentages are the exception rather than the rule, even in very similar situations, but recently another example, also Mesolithic, has come to light at Winfrith Heath in Dorset (Palmer, in preparation) (Figure 1). Here the ivy pollen is occurring in a forest milieu which, although slightly more open than the preceding phase, was still predominantly forest. This suggests that the ivy pollen could hardly have come naturally from the surrounding vegetation, comprising as it does over 100% of the tree pollen.

A third example in the Mesolithic period has been published by Leroi-Gourhan & Girard (1971), dealing with a rock shelter at Baulmes in Switzerland. The pollen record goes back to about 8000 BC, and the deposits are sterile until the Boreal period. Then a Mesolithic industry appears and the curve for ivy pollen, which previously had been only a trace, rises steeply. It fluctuates considerably from about 6500 BC to 2500 BC, reaching a peak of over 40% of the tree pollen at about 5000 BC. At 2500 BC it stops abruptly, at the point where the grass curve starts to rise steeply. The authors of this paper, however, do not relate these very high percentages of ivy pollen to the occupation. They see them as showing how a terrestrial site favours the accumulation of pollen of insect-pollinated species in contrast to a peat-bog, to which such species would not be carried. Against this interpretation must be set the fact that in some hundreds of pollen analyses of terrestrial sites the senior author has never found abnormally ivy percentages *unless the site was an occupation site*. Certainly ivy pollen does occur, but in percentages comparable with aquatic and telmatic deposits. However, Sims (1974) records a peak of *Hedera* pollen in lake deposits at Hockham Mere (Norfolk) at precisely the level at which he interprets the pollen curves as showing forest clearance in Mesolithic time.

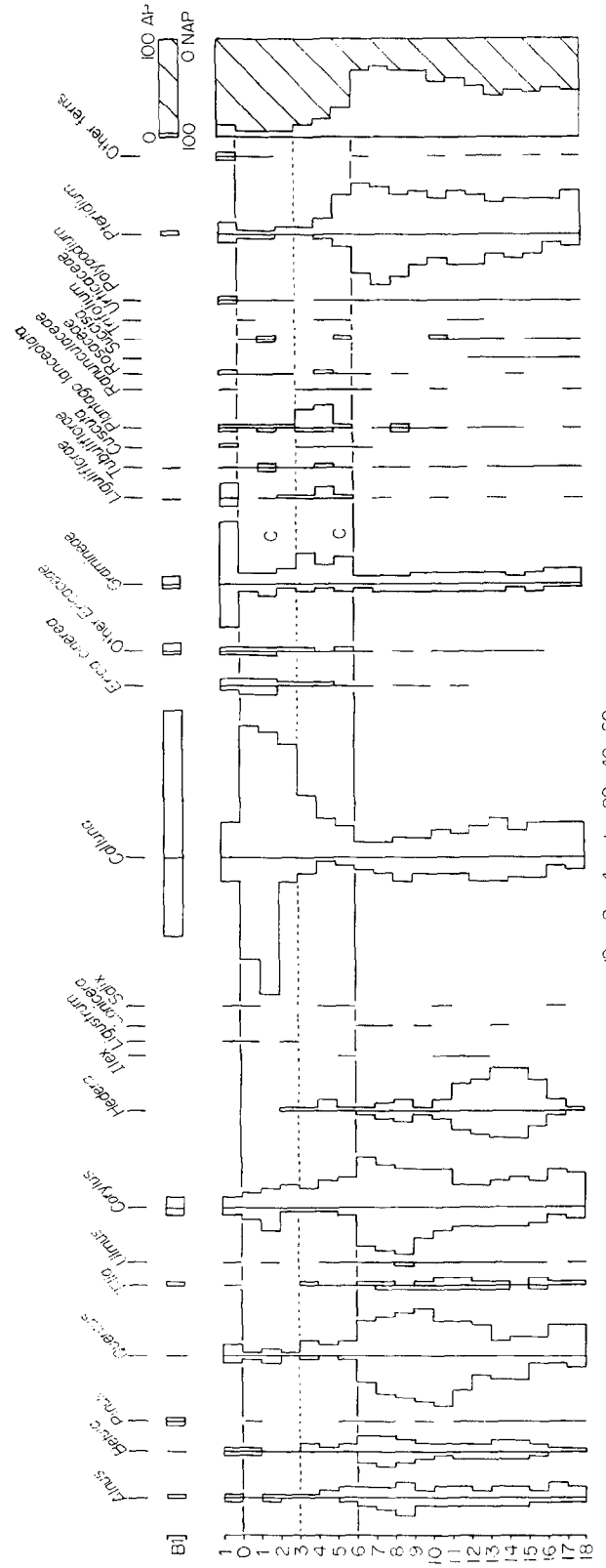

Figure 1. Winfrith Heath, 1972. Pollen analysis.
APF = Absolute Pollen Frequency in grains/g.
% = Percentage of total pollen + fern spores.
C = Cereal.

Discussion

The explanation of remarkably high ivy pollen concentration as the result of the use of the plant for fodder put forward by Troels-Smith (1960) gains strength from the additional evidence of the Swiss sites of the Neolithic and Bronze Age. Fragments of ivy stem and fly puparia leave little doubt that the humic material in which the pollen occurred was the remnant of a manure which had been formed by stalled animals.

For Mesolithic times, the evidence is restricted to high concentrations of pollen but even so we may consider whether these might result from man's relationships with animals for which ivy might have been a suitable foodstuff. In continental Europe, the possibility of the husbandry of domesticated animals in the Mesolithic cannot be dismissed altogether. Roux & Leroi-Gourhan (1965) have drawn attention to the scattered evidence in western Europe of clearings dated pollen-analytically to the Atlantic period, some of them associated with bones of domesticated cattle, sheep and goat. In Britain, however, such osteological accompaniments are not found, although the clearings appear in pollen analyses both from soils (Dimbleby, 1962) and organic deposits (Simmons, 1969; Smith, 1970). There remains the possibility that some form of relationship with an animal more intimate than hunting might be implicated not only in the clearings but in the *Hedera* pollen concentrations also.

Jarman's (1972) tabulation of bone finds in Europe emphasizes the importance of red deer in the Mesolithic economy and he raises the possibility that this animal may have been herded as well as, or instead of, hunted. The palatability of ivy to red deer is mentioned by Troels-Smith, and the red deer of Exmoor are known to turn to ivy as a diet supplement when snow is on the ground (Coleman-Cooke, 1970). Its palatability to other wild animals is less well known: for *Bos* we cannot at present tell, and for pigs no relevant observations are available. We can envisage the possible relationships between man and red deer (or indeed other large mammals such as *Bos primigenius*, or wild pig) being at one or more points along a spectrum of closeness, ranging from sporadic, random hunting at one end, and complete domestication at the other, although this latter condition was not, so far as we know, achieved for red deer in Neolithic times. Intermediate points along the spectrum might include habitat manipulation to favour a chosen prey species and practices could have ranged from the use of fire to encourage browse (also suggested by pollen analytical evidence) to the gathering of fodder plants for use as feedstock. The season of use was most likely to have been winter, since ivy flowers in November and only if gathered when it was flowering would it shed the large quantities of pollen which have turned up in the quoted investigations. If ivy was a fodder plant then it could have been used in several ways:

(i) the animals were stalled on the sites in the same ways as Neolithic and later domestic animals;

(ii) dung was collected and brought to the settlements, perhaps as fuel. This seems implausible in a woodland environment;

(iii) animal carcases were cleaned regularly on the same site;

(iv) ivy was collected as fodder, stored within the settlement and put out into the forest, possibly in clearings and by water sources, to attract wild animals in winter.

The evidence does not allow us easily to differentiate between the various possible relationships, but it is perhaps significant that at Baulmes the Mesolithic occupation was 3500 years long and was accompanied throughout by high ivy counts, suggesting the long continuance of whatever process gave rise to the high ivy counts. This constancy, together with the admittedly ambiguous evidence of the grooved red deer antler

quoted by Jarman as possible evidence of tethering, might allow the tentative inference that red deer herding was practised during the Mesolithic.

If a red deer herd was kept, the calculations based on assumptions about the average size of red deer, the calorific value of the venison and the energy needs of the population (Appendix) suggests a herd of about 180 animals would be needed to feed five people. The natural territory of such a group in woodland terrain is difficult to estimate but might well be in the order of $7{\cdot}2\text{–}13{\cdot}0 \times 10^3$ ha. At the lower limit of this range, herding could be probably carried out from a permanent camp, but at the upper limit and beyond, migrating settlement (as is practised by recent and contemporary reindeer herders) would be a necessary feature of the way of life. It is usually supposed that in upland Britain in Mesolithic times migration took place, with upland hunting camps in summer; there is nothing in the somewhat sparse evidence to preclude the inference that such camps were also for herding purposes.

Although the chances of confirmation are smaller than with red deer, the possibility that pig or *Bos* were involved must not be forgotten. Finds of bones or seasonally relevant coprolite might well allow us to consider them also, although if pig were being herded, the probability is that acorns would be collected rather than ivy. Whatever the eventual state of knowledge, it now seems that the door is open to consider possible, and to seek corrobative evidence for, the herding of mammal herbivores in the Mesolithic period.

Appendix—Deer Meat Yields

Using statistics on the deadweight: meat proportion of red deer; their probable size in Mesolithic times, and the calorific value of the meat, given by Clark (1972) the following estimates of possible herd sizes of red deer can be made.

5 people (2 adults, 3 children) require 10·9 kg/day of meat.
Meat $=60\%$ of deadweight; 1 stag averages 190·5 kg deadweight.
So 1 stag $=$ 114·3 kg meat
$=$ *c.* 10 days' supply of meat.
So for 1 year 36 animals needed
At 1/6 cull—180 animals
At 1/5 cull—216 animals.
For herd of 180 animals, the normal (i.e. wild) territory might be
At 1 animal 40 ha: 7200 ha
At 14:1000 ha: 13000 ha
(derived from contemporary E. European deciduous forests).

References

Clark, J. G. D. (1972). *Star Carr: A Case Study in Bio-archaeology.* Addison—Wesley Modular Publications in Anthropology No. 10. Boston, Mass.

Coleman-Cook, J. (1970). The Red Deer herds. In *Exmoor.* National Park Guide No. 8. London. H.M.S.O., pp. 41–44.

Dimbleby, G. W. (1962). *The Development of British Heathlands and their Soils.* Oxford Forestry Memoir No. 23.

Drewett, P. L. (in press). The excavation of a turf barrow at Minsted, West Sussex, 1973. With a pollen report by G. W. Dimbleby. *Sussex Archaeological Collections.*

Forsyth, A. A. (1968). *British Poisonous Plants.* Bulletin No. 161. London: Ministry of Agriculture, Fisheries and Food.

Godwin, H. (1956). *The History of the British Flora.* London: Cambridge University Press.

Iversen, J. (1944). *Viscum*, *Hedera*, and *Ilex* as climatic indicators. *Geologiska Foreningens i Stockholm Forhandlingar* **66** (3).

Iversen, J. (1960). Problems of the early post-glacial forest development in Denmark. *Danmarks Geologiska Undersøgelse*. Series IV. **4** (3).

Jarman, M. R. (1972). European deer economies and the advent of the Neolithic. In (E. S. Higgs, Ed.), *Papers in Economic Prehistory*. London: Cambridge University Press, pp. 125–147.

Leroi-Gourhan, Arl. & Girard, M. (1971). L'Abri de la Cure à Baulmes (Suisse). Analyse pollinique. *Jahrbuch der Schweizerische Gesellschaft für Ur- und Frühgeschichte* **56,** 7–15.

Palmer, S. (in preparation). A Mesolithic habitation site on Winfrith Heath, Dorset. Analyses of pollen samples by G. W. Dimbleby. *Proceedings of the Dorset Natural History and Archaeological Society*.

Rankine, W. F. & Rankine, W. M. (1960). Further excavations at a Mesolithic site at Oakhanger, Selborne, Hants. Part II. Fossil pollen and charcoal (by G. W. Dimbleby). *Proceedings of the Prehistoric Society* **26,** 255–262.

Roux, I. & Leroi-Gourhan, Arl. (1965). Les défrichements de la période atlantique. *Bulletin de la Société Préhistorique Française*, 309–315.

Simmons, I. G. (1969). Evidence for vegetation change associated with Mesolithic man in Britain. In (P. J. Ucko & G. W. Dimbleby, Eds), *The Domestication and Exploitation of Plants and Animals*. London: Duckworth, pp. 111–119.

Sims, R. E. (1974). The anthropogenic factor in East Anglian vegetation history: an approach using APF techniques. In (H. J. B. Birks & R. G. West, Eds), *Quaternary Plant Ecology*. Oxford: Blackwell, pp. 223–236.

Smith, A. G. (1961). The Atlantic Sub-boreal transition. *Proceedings of the Linnean Society*, 172nd session, 1959–60, 38–39.

Smith, A. G. (1970). The influence of Mesolithic and Neolithic man on British vegetation. In (D. Walker & R. G. West, Eds), *Studies in the Vegetational History of the British Isles*. London: Cambridge University Press, 81–96.

Smith, M. A. (1957). The Shuttlestone Barrow, Parwich (Derbyshire). *Inventaria Archaeologica* 4th. set. G.B. 19.

Thompson, M. W. & Ashbee, P. (1957). Excavation of a barrow near the Hardy monument, Black Down, Portesham, Dorset. III. Pollen Analysis (by G. W. Dimbleby). *Proceedings of the Prehistoric Society* **23,** 130–136.

Troels-Smith, J. (1955). Pollenanalytische Untersuchungen zu einigen Schweizerischen Pfahlbauproblemen. In (W. U. Guyan, Ed.), *Das Pfahlbauproblem*. Monographien zur Ur- und Frühgeschichte der Schweiz, 11. Basel, pp. 9–58.

Troels-Smith, J. (1960). Ivy, Mistletoe and Elm: climate indicators—fodder plants. *Danmarks Geologiske Undersøgelse* Series IV. **4** (4).

Welten, M. (1955). Pollenanalytische Untersuchungen über die neolithischen Siedlungsverhältnisse. *Monographien zur Ur- und Frühgeschichte der Schwiez* **11.** Basel, pp. 59–88.

van Zeist, W. (1959). Studies on the post-Boreal vegetation history of south-eastern Drenthe (Netherlands). *Acta Botanica Neerlandica* **8,** 156–184.