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# How the West Was Lost

## A Reconsideration of Agricultural Origins in Britain, Ireland, and Southern Scandinavia[1]

by Peter Rowley-Conwy

Post-processual views of the transition to agriculture in Northwestern Europe have sought to decouple ideology and subsistence economy as a means of protecting the status of ideology as the sole cause of change. Ideology (as reflected in material culture and monument building) changed abruptly. To achieve the required decoupling, subsistence is therefore portrayed as having changed slowly. This implies three things: (1) Mesolithic foragers were gradually intensifying their subsistence economy. (2) Neolithic people subsisted mainly on *wild* animals and plants and were nomadic. (3) Subsistence change across the ideological transition was slow, continuous, and seamless. Many other scholars, although not post-processualists, have come to accept these three points. But as the post-processual view has become the consensus, the data from Britain, Ireland, and southern Scandinavia have all been leading in the opposite direction: (1) There is no reason to think that Mesolithic foragers were intensifying economically. (2) Neolithic people subsisted mainly on cultivated plants and domestic animals and were fully sedentary. (3) The transition to agriculture was rapid and probably traumatic. The current consensus has yet to incorporate these data into its explanatory framework.

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The appearance of agriculture changed Northwestern Europe forever. In the past 15 years a new interpretation of the transition to agriculture, largely a product of the British post-processual school of archaeology, has been at least partially accepted by many scholars not normally considered post-processualist and, although contested in particular areas, achieved a status close to consensus. In this contribution I will argue that this interpretation is flawed. It arose in opposition to previous interpretations and as a result has taken up a problematic theoretical position. I will argue that the data have unequivocally moved in a different direction and that ignoring or overlooking these data renders the current consensus untenable. Northwestern Europe needs a new understanding of its Neolithic.

"Neolithic" has meant many things. As defined by Lubbock (1865:2–3), it was purely technological, referring to the polishing of stone artifacts. By the twentieth century it had broadened to include sedentary village life, cereal agriculture, stock rearing, and ceramics, all assumed characteristic of immigrant agriculturalists (e.g., Childe 1957). In the late 1960s, reflecting the ecological interests of the "new archaeology," it narrowed again to refer just to the agricultural mode of subsistence (e.g., Higgs and Jarman 1969).

In the late 1980s, with post-processual archaeology, the meaning shifted again. The Neolithic came to be considered an ideological phenomenon, a new "structure of ideas" (Thomas 1988:65; Tilley 1996:72) or "way of thinking" (Bradley 1998:20; Edmonds 1999:6) manifested as a change in material culture—principally the construction of ritual and funerary monuments from ca. 4000 BC (dates are calibrated). From this perspective, the subsistence economy is no more "fundamental" than other aspects of culture, and therefore ideology cannot be viewed merely as "superstructure" (e.g., Thomas 1991:7–8).

This approach creates an agenda which may be deconstructed as follows: If ideology and subsistence change at the same time, subsistence may still be the fundamental engine driving change. For many scholars the task is therefore to *separate* subsistence from ideological change: if material culture change is *not* synchronized with subsistence change, it must reflect a purely ideological change that outweighs anything economic. Subsistence change is portrayed as slow while change in

1. Earlier versions of this paper have been tested on audiences at universities in Fairbanks, Anchorage, Bergen, Canberra (Australian National University), Copenhagen, Exeter, Lund, Melbourne (La Trobe University), Newcastle upon Tyne, Poona (Deccan College), St. Louis (Washington), Sydney, and Uppsala, at Magdalene College (Cambridge), and at the National Museum of Denmark (Roskilde). I am grateful for the feedback these experiences provided. I also thank all those who responded to my requests for literature and information: Niels H. Andersen, Søren H. Andersen, Magnus Andersson, Jan Apel, Geoff Bailey, Göran Burenhult, Gabriel Cooney, Jon Gibson, Gitte Gotfredsen, Fredrik Hallgren, Brian Hayden, Jacqui Huntley, Per Karsten, Bo Knarrström, Lars Larsson, Mats Larsson, Finn Ole Nielsen, Poul Otto Nielsen, Rick Schulting, Becky Scott, Alison Sheridan, Mac Svensson, Peter Woodman, and Marek Zvelebil. Eva Koch and other referees made helpful suggestions. Pam Graves and Tim Murray offered me the benefit of their comments on an earlier draft. None of these should be held responsible for any of the contents.

material culture is abrupt (fig. 1). Subsistence cannot therefore have influenced material culture. This effectively insulates ideology from the taint of economic causation.

Slow subsistence change makes three things axiomatic in the current consensus: (1) Before the ideological change, the Late Mesolithic was intensifying economically towards domestication. (2) After the ideological change, the Neolithic diet still came mainly from nomadic hunting and gathering. (3) Across the ideological change, subsistence change was seamless as local Mesolithic groups gradually adopted agriculture. I will contest all three.

The current consensus is largely British in origin. British scholars from Lubbock (1865) to Whittle (2003) have, however, used evidence from Denmark to support their arguments because the Danish record is better-researched. More recently, Ireland and southern Sweden have also produced impressive archaeological records, and Scandinavian and Irish scholars have of course joined in the debate. This contribution will therefore consider evidence from Ireland, Britain, Denmark, and southern Sweden (fig. 2). All four are partly coastal and acquired agriculture at about the same time, ca. 4000–3900 BC—much later than the interior of temperate Europe at ca. 5500 BC.

## An Intensifying Mesolithic?

Axiom 1 requires subsistence intensification in the Late Mesolithic. Despite this, Mesolithic material culture did not change: no monuments were constructed. If Neolithic monuments resulted from ideas not economy, then the absence of Mesolithic monuments must similarly result from an idea—or lack of one.

The argument is developed as follows: Criticism is advanced of suggestions (e.g., those of Case 1969 and Legge 1989) that monument construction required a large agricultural population (see, e.g., Bradley 1993:9; 1998:10; Thomas 1997:60; 1999:8). Other cultural traditions are invoked to demonstrate that hunter-gatherers could build monuments if they chose to; the Poverty Point, Adena, and Hopewell monuments in North America are cited as built mainly by foragers (Bradley 1993:11–13), while even at Cahokia the role of agriculture is minimized (Thomas 1991:19–20; 1999:23). The upshot is the claim that Mesolithic monument construction was not demographically impossible but "literally . . . unthinkable" (Bradley 1998:34).

The North American analogues are dubious. Cahokia was undoubtedly based on intensive maize agriculture (Lopinot 1997). There was significant cultivation of native domesticated plants back to the early first millennium AD at least (Fritz and Smith 1988, Lopinot 1997, Simon 2000). At Poverty Point in the second millennium BC, agriculture played little or no role (Gibson 1998, Ward 1998), but the site lay in an area of tropical lakes, swamps, and watercourses which were hugely productive: its ca. 1,300-km$^2$ hinterland contained between 5 and 175 tons of fish per km$^2$ (Gibson 2000:166). The waterways were difficult to overexploit because they were restocked annually by the flooding of the Mississippi, and many other species of animals and plants were also available. This environment, aptly described as "cornucopian" (Gibson 2000:164), was unlike any in Mesolithic Europe. Even Danish Late Mesolithic people, settled on a productive coast, probably achieved nothing like the Poverty Point population density, while British and Irish densities were probably even lower. This seriously weakens the argument that because one group of foragers did build Poverty Point, all foragers could have.

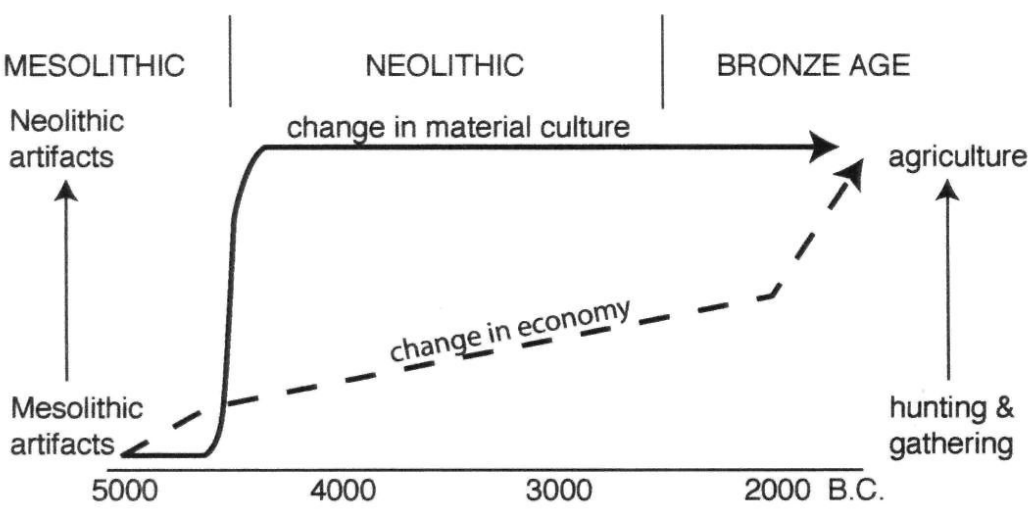


FIG. 1. *The current view of change in economy and material culture at the Mesolithic-Neolithic transition in Northwestern Europe (modified from Thomas 1997:fig. 1 and 1999:fig. 2.1). The change in material culture is more usually placed at or just after 4000 B.C.*

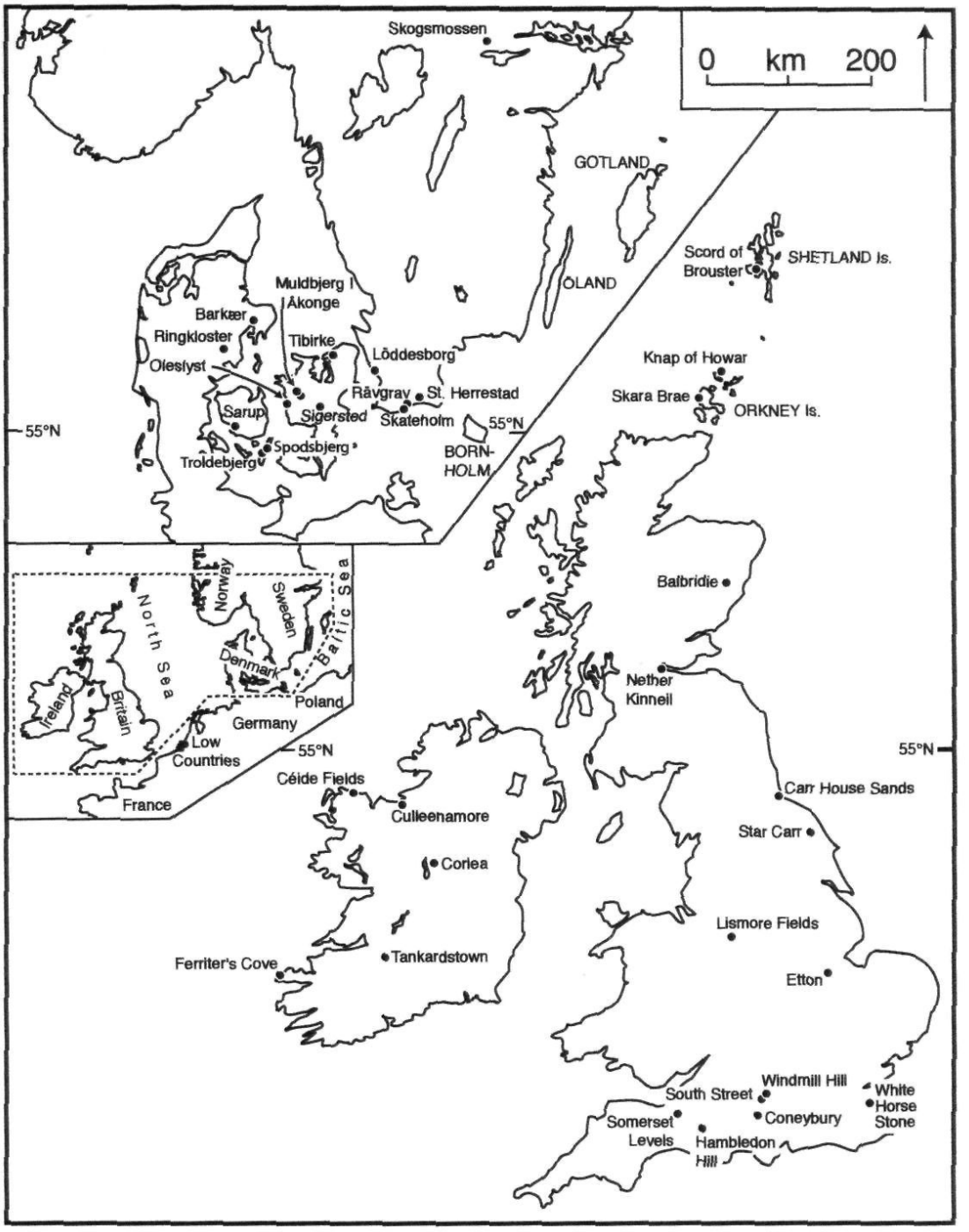


FIG. 2. *The Northwest European areas discussed, showing the locations of sites mentioned in the text.*

The uniqueness of the Poverty Point environment suggests that in Europe monument construction was indeed impossible without an agricultural population as Case and Legge suggested.

But was the Northwest European Mesolithic intensifying its subsistence economy? If so, population density may have been increasing towards the point where monuments were achievable. Many do favour Late Mesolithic intensification (e.g., Bradley 1998:23; Price 1996: 352; Thomas 1996*b*:315; 1997:59; and in Scandinavia Blankholm 1996:128–32; Grøn 1997, 1998; Nash 1998: 3–16). Some argue that domestication of indigenous wild animals and plants was occurring (D. L. Clarke 1976; Petersson 1997:184–85; Richmond 1999:7–9; Zvelebil

1994, 1995)[2] or that wheat was being cultivated on a small scale (Bradley 1993:19; Göransson 1995:62–64; Jennbert 1984; Price 2000:276; Tilley 1996:86).

The idea of Mesolithic intensification is part of a wider debate about hunter-gatherer intensification in general. Some hunter-gatherer variability may have an ecological context. For example, dense coastal populations would exploit local resources more intensively simply because of the larger human population (Rowley-Conwy 2004); this statement is probably uncontroversial. The debate is over whether intensification might occur *without* such an ecological context, for example, in the Late Mesolithic as a trend towards agriculture. This kind of intensification is argued to take place for two reasons: population increase or internal social development.

Population increase for non-ecological reasons relies on early hunter-gatherers' maintaining an artificially low population, increasing only much later—the "slow-track option" (Mulvaney and Kamminga 1999:132–33). Some argue that hunter-gatherers often do this (e.g., Hayden 1972; Lourandos 1997:15–17). However, Boone (2002) shows that contemporary hunter-gatherer fertility rates are similar to those of farmers. Long periods of apparent population stasis in prehistory therefore actually comprise alternating increases and crashes invisible to archaeology. Hunter-gatherer and farmer populations thus have equal capacity to increase; what differentiates farmers is the crash-buffering role of agriculture (Boone 2002). But hunter-gatherers below carrying capacity would be similarly buffered by plentiful resources. They *could* therefore increase their population just as rapidly as farmers—the "fast-track option." But *would* they? "Cultural controls" might keep population low, but this suggestion treats the group rather than the individual as the unit of selection. Individuals who ignored "cultural controls" would gain a huge evolutionary benefit by filling the underpopulated landscape with their descendants, and hunter-gatherers would probably not be able to police a slow-track demographic policy (Rowley-Conwy 2001:47). Population increase separated from ecological factors is therefore not a likely cause of intensification.

Internal social development is often invoked as the other non-ecological cause of intensification. Hodder advances the *domus* (Latin for "house") as "a metaphor for the domestication of society" in contrast to the *agrios* (from the Greek for "field") "which means wild, savage" (1990:41, 86). Before animals and plants could be domesticated, society itself had to become domesticated; "the domus provided a way of thinking about the control of the wild" (p. 39), and "it was through the domus that the origins of agriculture were thought about and conceived" (p. 38). The *domus* is thus a necessary intermediate stage between *agrios*-type hunter-gatherers and agriculturalists. *Domus* societies are characterized by sedentism, food storage, and hierarchy (Hodder 1990:37), also attributes of Woodburn's (1982) "delayed-return" societies. Hodder treats these societies *diachronically*, *domus*/delayed-return groups developing from *agrios*/immediate-return ones. His formulation can, however, be criticized as progressivist, implying unidirectional global cultural evolution, some societies just being ahead of others. One unavoidable outcome is the implication that contemporary *agrios*-type societies like the San, Hadza, or Aborigines are locked into a pre-*domus* state of irredeemable and archetypal "wildness," a suggestion with which many contemporary anthropologists might disagree. The archaeological and anthropological hunter-gatherer records in fact reveal flexibility rather than progress: societies may change rapidly towards either *domus* or *agrios* strategies, depending on local circumstances. It is therefore more useful to consider these strategies *synchronically*, emphasizing variability rather than directional change (Keeley 1988, Rowley-Conwy 2001). Social flexibility and rapid non-directional change make up a preferable non-progressivist alternative.

There are therefore theoretical problems with both population increase and internal social development as causes of intensification in the European Late Mesolithic, and certainly such intensification cannot be assumed. If it is to be accepted, it must be on the basis of the archaeological evidence. The British Late Mesolithic has actually provided very little relevant evidence of any kind; this is one of those cases mentioned above in which Northwestern Europe as a whole relies heavily on the evidence from Denmark and southern Sweden.

Intensification of the collection of wild plants has been suggested (D. L. Clarke 1976, Zvelebil 1994), but it is unlikely that any kind of indigenous agriculture was emerging as a result. Many of the plants discussed by Clarke are unsuitable for such treatment (Rowley-Conwy 1986:27–28). Acorns and hazelnuts occur on Mesolithic sites, but there is no evidence that their collection increased through time; they are not annual plants and are unlikely to form the basis for a quasi-agricultural system. There is very little evidence for the collection of appropriate small-seeded annuals and none for their cultivation (Rowley-Conwy 2004).[3]

Intensified exploitation and perhaps local domestication of animals is sometimes suggested, for example, for red deer (Jarman 1972). Cervids, however, are territorial during the mating season and do not form fixed-membership herds, which makes them behaviourally unsuitable for domestication (Rowley-Conwy 1986:26). Jarman's suggestion was based on sex ratios obtained from antlers at Star Carr, which indicated a cull heavily biased towards males. The antlers were, however, collected for working and did not reflect the actual sex ratio of the

2. I have been surprised to see myself quoted by Richmond (1995: 5), Thomas (1996*b*:314; 1998:47), and Zvelebil (1995:86; 1996:334). as claiming domestic cattle and/or pigs in the Danish Late Mesolithic. This appears to result from insufficiently close reading; I take this opportunity to stress that I have never made such claims and have indeed always argued against them (Rowley-Conwy 1995, 2003*a*).

3. A few grass species native to Europe, for example, *Elymus arenaria*, have pollen grains as large as those of cultivated cereals. This is, however, an intrinsic characteristic of these grasses and has nothing whatever to do with their being cultivated in the Mesolithic; cultivation would not have altered pollen size (contra Zvelebil 1994:50).

red-deer cull at Star Carr; males and females were killed in about equal numbers (Legge and Rowley-Conwy 1988: 48–58).

Cattle lived wild in Europe, but the domestic forms were probably imported rather than indigenously domesticated. Two significant sites have a few domestic cattle bones in a largely wild fauna: Ferriter's Cove in Ireland is Late Mesolithic (Woodman, Anderson, and Finlay 1999:90), while Åkonge on the Danish island of Zealand is transitional to the Early Neolithic (Gotfredsen 1998:96–97). These are significant because *wild cattle were present on neither island*; these specimens were definitely imported. In both cases the individuals were identified as small domestic rather than large wild animals. This pattern recurs in areas where wild cattle *were present*; the substantial size difference between wild and domestic argues against local domestication because there are no transitional ones (Rowley-Conwy 1995, 2003*a*). Initial results from ancient DNA support the import hypothesis: there is a considerable genetic difference between prehistoric British aurochs and modern domestic cattle (Troy et al. 2001).

Mesolithic control of wild boar has been suggested because "a tame pig or two would act as an efficient converter of surplus food" (Zvelebil 1995:86). However, wild pigs function in exactly the same way, with the added advantage that people do not have to feed them through times when no surplus food is available. It is rather difficult to see what niche a tame boar would have occupied in a Mesolithic society without agricultural plant waste or stubble fields. Zvelebil states that pig bone frequencies on Mesolithic sites increase through time, but no such trend is visible in his figure 8. He further suggests (p. 96) that winter killing and healed shot wounds indicate "close contact" between pigs and humans. The clearest Mesolithic winter site is Ringkloster in Denmark, which is a hunting camp from which joints of pork were exported—a classic logistic hunting strategy which has nothing to do with controlling the animals (Rowley-Conwy 1998*a*, Rowley-Conwy, Halstead, and Collins 2002). The healed shot wounds testify to close contact with arrows rather than with swineherds. Finally, Zvelebil (pp. 94, 95) states that there was selection for more juvenile pigs in the Late Mesolithic. Age data from numerous Mesolithic sites in Denmark and southern Sweden (fig. 3) show variability but no time trend; some of the highest proportions of juveniles occur in the Early Mesolithic, probably because the sites were occupied in summer when juveniles are particularly numerous (Rowley-Conwy 1993). Pigs were transported to Ireland in the Mesolithic, but this does not mean that they were domestic. The planting of wild animal populations on islands for hunting purposes is widely attested; in Neolithic Europe, red deer were taken to Corsica and Sardinia, fallow deer to Cyprus, and marsupials to New Britain as early as 19,000 years ago (Vigne 1988, Davis 1984, Flannery and White 1991). Metrical evidence suggests that domestic pigs were actually introduced at the start of the Neolithic (Rowley-Conwy 1995, 2003*a*).

There is, then, no good evidence for the intensified use of native plant or animal species. What of the claims for Late Mesolithic wheat cultivation? This non-native cereal would have to have been obtained from Neolithic farmers to the south. Grains of pre-Neolithic cereal pollen are occasionally found, but their identity and status must be treated cautiously (Innes, Blackford, and Rowley-Conwy 2003). Actual cereal grains have not been proven in Mesolithic contexts. Three grain impressions in "Mesolithic" pottery from Löddesborg in southern Sweden are often said to demonstrate Mesolithic cultivation (Price 2000:276; Tilley 1996:86; Zvelebil 1996:fig. 18.6), but the sherds all postdate a radiocarbon determination falling at the very end of the Mesolithic (Jennbert 1984:62–63). The Mesolithic and Neolithic potsherds were intermingled throughout the sequence and very hard to separate typologically (p. 49), while at other sites Neolithic pottery is always found stratified *above* Mesolithic pottery. Scandinavian scholars universally mistrust Löddesborg, considering it a deeply disturbed site (M. Andersson 2003:74; Kristiansen 1993:248; M. Larsson 1984:169; Malmer 2002:16; Madsen 1986:235; P. O. Nielsen 1985:121 n. 31; Persson 1999:45–46), something also suggested by the Iron Age $C^{14}$ dates it has yielded (Jennbert 1984:62–63).

In summary, the Late Mesolithic was *not* progressing towards agriculture. There are no theoretical grounds for intensification without an ecological context, and there is no archaeological evidence that intensification was taking place. Large permanent settlements actually appear in southern Scandinavia in the *Middle* Mesolithic, for ecological reasons: sea-level rise brought productive environments to the region (Rowley-Conwy 1999:137–40; 2001: 54–56). Therefore axiom 1 of the current consensus is not supported.

## A Foraging Neolithic?

Axiom 2 requires Neolithic subsistence to have been based mainly on wild resources. According to Thomas (1993:388), for example,

> Domestic resources, both animal and plant, had an importance in Neolithic Britain which was primarily symbolic. They were deployed in ritual, exchange and feasting . . . . Neither played a major part in feeding people from day to day, and these people were, from an economic point of view, still formally Mesolithic.

Domestic plants and animals are here portrayed as part of the Neolithic "idea" rather than of the Neolithic economy. The current consensus plays down the economic importance of cultivated plants and domestic animals. It also stresses settlement mobility and the absence of permanent domestic buildings.

### CEREAL AGRICULTURE

The limited importance of cereal agriculture in the British Neolithic is generally accepted (e.g., Bradley 1993:

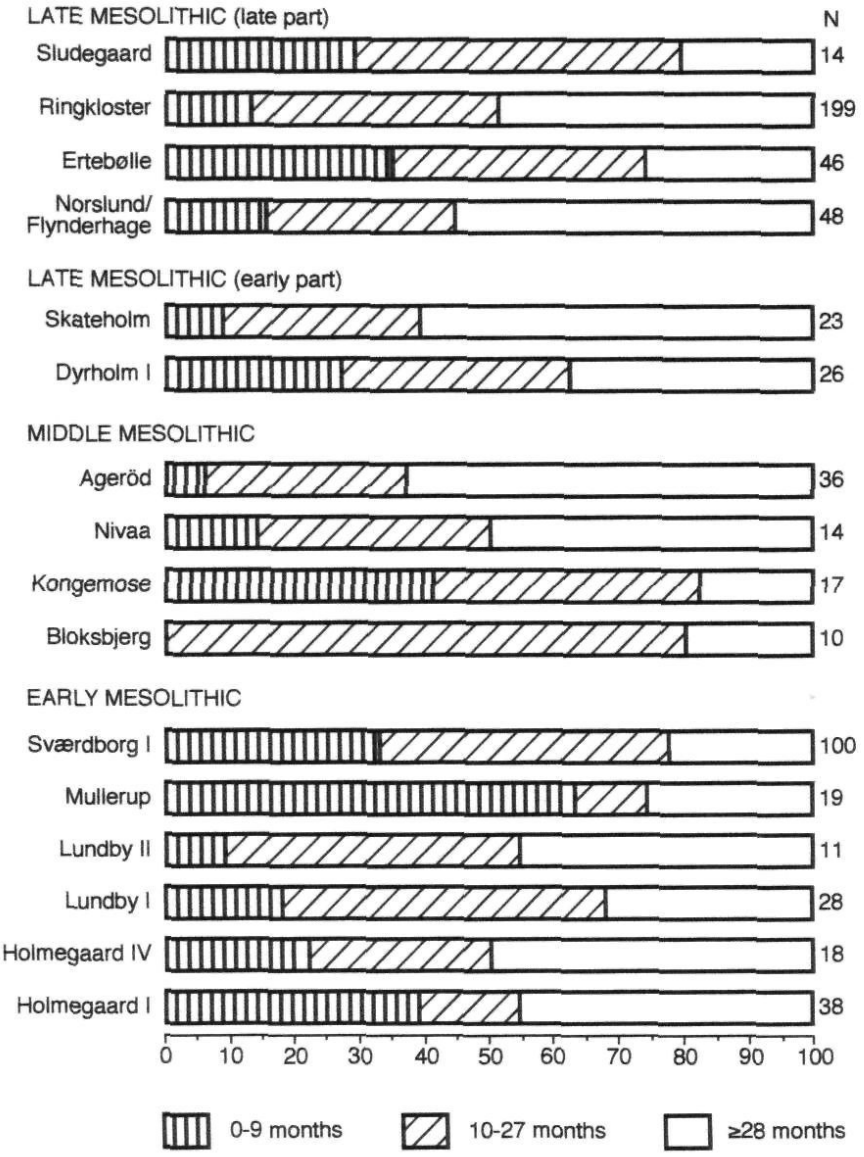


FIG. 3. *Age at death of Mesolithic pigs in Denmark and southern Sweden (see Rowley-Conwy 1993 for the method of ageing). Sludegaard, Nivaa, Kongemose, and Bloksbjerg data from Dobney et al. (in preparation), the rest from Rowley-Conwy (unpublished records).*

16; 1998:52; Edmonds 1997:103; 1999:16; Fairbairn 1999, 2000; King 2001:324; Pollard and Reynolds 2002:42; Richmond 1999:3–4, 32–34; Robinson 2000:89; Thomas 1991:20–25; 1993; 1996*a*:4; 1996*b*:318–9; 1997:59–60; 1999:29; 2003:71; Waddington 2000:41; Whittle 1999:59; 2003:40, 157; Whittle, Pollard, and Grigson 1999:348). Some Scandinavian scholars have agreed (e.g., Kaelas 1991:94–95; Petersson 1997:183–84), but most such arguments concerning Scandinavia have come from Anglo-Americans; for example, Price (1996:357) states that in southern Scandinavia "agriculture only became the primary subsistence regime" around 2300 BC, some 1,600 years after the start of the Neolithic (see also, e.g., Thorpe 1996:134; Tilley 1996:94–96; Whittle 1996:229).

Flotation for plant remains is more common in Britain than in the other regions considered here, so the arguments are based mostly on British material. Samples are often small and diverse, usually containing a minority of cereal grains; hazelnut shell is often more frequent, and wild apple/pear and weed seeds are also common (fig. 4, *A*). If these samples are interpreted at face value, cereal cultivation was indeed a minor aspect of British Neolithic diets. The situation is not so straightforward, however. Macrobotanical items go through a variety of pathways to reach the archaeological record, and consideration of this is essential before samples can be interpreted. Interpreting the activities that produced the archaeology is, however, an exercise in middle-range the-

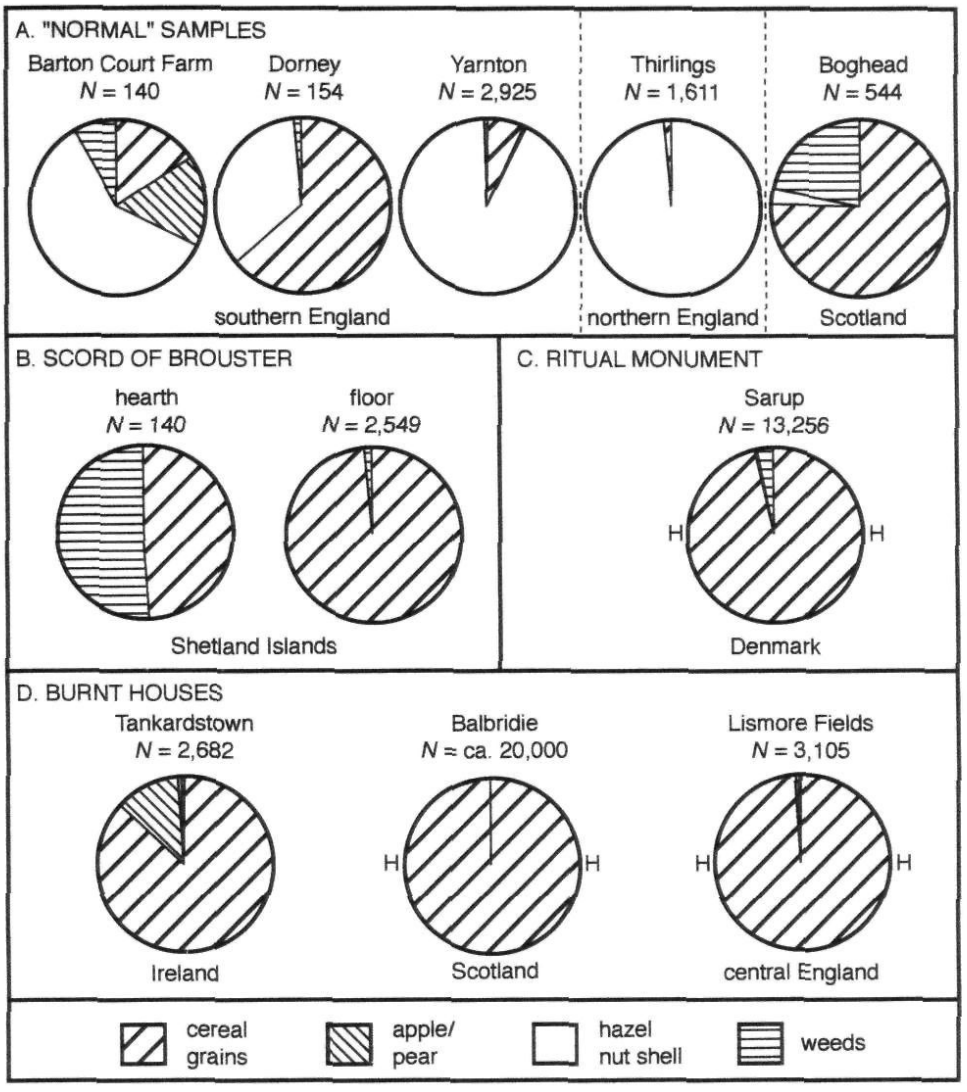


FIG. 4. *Proportions of cereal grains, apple/pear fragments, hazelnut shell fragments, and weed seeds in some Neolithic assemblages.* N, *number of items counted;* H, *hazelnut shell present but not quantified (does not approach cereal frequency). Barton Court Farm and Thirlings from Moffett, Robinson, and Straker (1989), Dorney and Yarnton from Robinson (2000), Boghead from Maclean and Rowley-Conwy (1984), Scord of Brouster from Milles (1986) ("floor" is sum of samples 79 and 82, "hearth" of samples 56–58), Sarup from Rowley-Conwy and others in N. H. Andersen (1999), Tankardstown from Monk (1988), Balbridie from Fairweather and Ralston (1993), Lismore Fields from Jones (n.d.).*

ory, and this makes it controversial. Middle-range theory is closely linked to the "new archaeology" and has been written off by post-processual archaeology because it ignores the uniqueness of each cultural context. "There can be no universal cultural relationship between statics [the archaeological record] and dynamics [the activities that created the record]" (Hodder 1986:116).

It is one thing to criticize the theoretical underpinnings of middle-range theory. It is quite another to assume that the problems middle-range theory sought to address have therefore gone away. Yet this is the current British consensus position: denying itself a methodology for interpreting macrobotanical samples, it has no alternative but to "let the data speak for themselves." The inevitable outcome is the conclusion that hazelnuts were more important than cereals in the Neolithic diet. Others nevertheless do consider the complexities of the samples. Hazelnut shell is robust and survives charring well. It occurs in quite large fragments that are visible during excavation, which is rarely the case for cereal grains. The visible presence of nut shell is sometimes the reason a botanical sample is collected in the first place. For this reason alone, hazel is likely to be overrepresented, but there are others. Cereal grains were usu-

ally intended for consumption, so their preservation by charring happened only by mistake. Hazelnut shell fragments, however, had no further uses and could be disposed of—or may actually have been used as kindling. Hazel is thus much more likely to be preserved and recovered and hence to be overrepresented in the archaeological record (Jones 2000, Legge 1989, Monk 2000).

Wild apple and/or pear may be relatively common for a specific reason: the establishment of a forest clearing would in due course have created a "mantle vegetation" around its edges, a semi-natural hedge separating the clearing from the forest. Such a mantle would for ecological reasons have contained many fruit-bearing species such as apple and pear—and also hazel (Groenman-van Waateringe 1983, Monk 2000). These fruits may therefore be a by-product of agricultural settlement. (This of course assumes that the clearing was fairly long-lasting; this will be discussed below.)

Weed seeds may not have been collected for food but probably do result from the processing of crops for human consumption. Ethnographic studies of wheat and barley processing have revealed a multistage process. Each cultural context may be unique, but there is really only one way these crops can be cleaned. The process involves threshing, then winnowing to remove lightweight waste, coarse sieving to remove contaminants larger than cereal grains, fine sieving to remove smaller contaminants, and hand cleaning to remove contaminants of the same size. The crop is usually threshed, winnowed, and coarse-sieved before being stored; fine sieving and hand cleaning are often done on a daily basis, prior to grinding (Hillman 1981, Jones 1984). Fine sieving generates a waste product made up of small weed seeds and chaff fragments that in recent times formed ideal hen food—but there were no chickens in Neolithic Europe. There was no obvious use for this waste product, which would often have been thrown on the fire, where it was charred and preserved. Hearths are commonly sampled for macrobotanical remains, so it is not surprising that such waste products are common. Well-sampled sites may produce both waste products (burnt deliberately) and cleaned grain (burnt by accident), as at Scord of Brouster (Milles 1986) (fig. 4, *B*). (This site is in the Shetland Islands, too far north for hazel or apple/pear.)

Taphonomic considerations thus suggest that hazel, apple/pear, and weeds may all be overrepresented compared with cereals. The observed pattern is in fact consistent with a cereal-based economy represented largely by its inedible waste products, supplemented by wild fruits and nuts. This would be a legitimate conclusion regarding the samples in figure 4, *A*, even in the absence of major cereal finds. Major cereal finds have, however, turned up. Some of these are from ritual monuments, for example, Hambledon Hill in Britain (Legge 1989) and Sarup in Denmark (N. H. Andersen 1999; fig. 4, *C*). These indicate the symbolic use of cereals proposed by Thomas and therefore *might* not mirror the domestic economy. One other category is, however, very important: cereal finds from burnt buildings. Three are currently known (fig. 4, *D*). They probably represent material in store when the building was burnt, because the roof space of such structures would have formed an ideal storage environment (Rowley-Conwy 2000).

The current consensus does not, however, reflect the evidence of these important samples. Some have sought to separate this evidence from the domestic sphere and locate it entirely in the area of ritual. Thomas (1999:25) argues that the structures "represent specialised storage, consumption or redistributive locations for a very special kind of food, rather than simply farmsteads" (see also 2003:71). Richmond (1999) seeks to exclude cereals from domestic contexts entirely: pollen sites suggestive of cultivation are "special areas within the social and economic framework of crop utilisation"; the burnt structures indicate "food storage rather than occupation"; cooking evidence "comes from sites which were not used for occupation"; and ceramics with cereal impressions may have been "imported, indicating that the grain imprints are foreign to the sites" (pp. 32, 12, 33). Richmond's conclusion is that "the available data indicate cultigen presence, but not necessarily actual cultivation. Upon the majority of sites where crops have been suggested there is little or no proof of agriculture" (p. 33). The conclusion derives mainly from the a priori assumption that Neolithic diets were based mainly on wild foods and that agricultural products belong in the ritual sphere. Cultivation, storage, and cooking are, however, classic domestic activities, and the evidence is best interpreted as such. Domestic activities may be ritualized, but cereals are equally nutritious whether or not their consumption has ritual overtones. Ritual is best re-embedded in the cultural totality, not used as a denial of domesticity.

The argument for mostly wild foods is a particularly English one. Few Scandinavians have joined in the discussion (perhaps because plant remains receive less emphasis in Denmark and Sweden). Objections have been voiced in the Celtic regions, both Scotland (Barclay 1997: 141–44) and Ireland (Cooney 1997:27; 2000:40–41), and among archaeobotanists, both dismissable as peripheral. But the archaeobotanical evidence is persuasive, and the Irish and Scottish cereal stores (Tankardstown and Balbridie respectively) date from the beginning of the Neolithic, suggesting a major role of cultivation from the start of the period. The English evidence is similar: the Lismore Fields cereal store is likewise *Early* Neolithic. Cereal cultivation was probably predominant everywhere in Northwestern Europe from very early in the Neolithic.

## DOMESTIC ANIMALS

The current consensus also plays down the role of domestic livestock. It is certainly true that major faunal samples are rare for the first few centuries of the Neolithic. Large samples dating from around 3300 BC come from Windmill Hill in Britain (Grigson 1965) and Troldebjerg in Denmark (Higham 1967). Both are dominated by domestic animals, but both are ritual monuments.

The earliest major faunal sample from a settlement is from Rävgrav in Sweden, also dating to ca. 3300 BC. Of the large mammals, 97% are domestic and only 3% wild (Jonsson, cited in L. Larsson 1992). Samples from earlier centuries are smaller; in Denmark, however, they suggest a predominance of domesticates from the start of the Neolithic (Aaris-Sørensen 1988; Koch 1998:243–51). Only at Muldbjerg I is there a predominance of wild fauna, but this site was on a floating peat island in a lake and was probably an outlying hunting camp (Noe-Nygaard 1995:67–69). The situation is similar in Britain: with one exception, none of the Neolithic samples plotted by Thomas (1991:fig. 2.4) has over 15% wild animals. The exception is a single Early Neolithic pit from Coneybury containing the remains of some ten domestic cattle, seven roe deer, two red deer, and two pigs. The sample accumulated rapidly and may represent a single butchery episode (Maltby 1990), and when meat weights are calculated the two deer species provide only 20% (Rowley-Conwy 2003*b*). This is the nearest to a deer-dominated Neolithic fauna that Britain can provide.

Domestic animals were probably predominant from very early on; as with cereal agriculture, there is no sign of a lengthy transitional period. Small-scale but intensive cattle management has long been argued by Legge (1981), who uses the animals' age and sex parameters to argue for dairy production in Britain and for meat production in Denmark. Dairying in Early Neolithic Britain has recently been supported by the demonstration that some ceramics contained dairy products (Copley et al. 2003). Manure may also have been important as a fertilizer. A cow produces between 9 and 14.5 tons of manure per year (McConnell 1897:116–17), and Neolithic cultivators would surely have recognized its efficacy.

## STABLE ISOTOPES IN HUMAN BONE

Stable isotope analysis is an increasingly useful way of examining prehistoric diets independently of the animal bone and plant evidence. Stable carbon ($\partial^{13}C$) in bone varies with the ratio of marine to terrestrial foods consumed (C4 plants are similar to marine foods in this respect, but there were none in Neolithic Europe). Early work undertaken in Denmark (Tauber 1981, 1982) showed a remarkably rapid shift from mainly marine foods in the Late Mesolithic to mainly terrestrial foods in the Early Neolithic, suggesting a rapid shift to an agricultural diet. This rapid shift conflicts strongly with the slow subsistence change currently envisioned, and therefore doubts have been raised about the technique (Whittle 1996:229). A potential source of error is that most of Tauber's Mesolithic individuals were coastal while his Neolithic ones came from the interior, with the result that the shift could be geographical rather than chronological (Bailey and Milner 2003). Several recent studies have addressed this problem by sampling coastal Neolithic individuals, and they uniformly show that even in coastal regions people ate a mainly terrestrial diet from early in the Neolithic. This is true for the coasts of southern Wales (Schulting and Richards 2002*a*), western Scotland (Schulting and Richards 2002*b*), Ireland (Woodman n.d.), eastern Denmark (Richards and Koch 2001), and western Sweden (Sjögren 2003). The complex history of the Baltic Sea makes determinations in this area more problematic, but there is a clear shift towards a terrestrial diet in southern Sweden and Öland (Lidén 1995) and on Gotland (Lindqvist and Possnert 1997).

Thomas (2003) seeks to cast the dietary change in Britain as part of the Neolithic cultural package by arguing for a "cultural prohibition on marine foods . . . or taboo" (p. 70). This goes beyond what the isotopic evidence can show, however: *predominance* of marine or terrestrial foods can be demonstrated, but total dietary *exclusion* of either cannot. Conventional archaeology reveals that marine foods certainly were exploited in the Neolithic. In the Orkneys, marine molluscs and offshore fish were exploited at Knap of Howar (Evans and Vaughan 1983, Wheeler 1983) and Skara Brae (D. V. Clarke 1976). Farther south in Scotland there are large Neolithic shell middens at Nether Kinneil and elsewhere (Sloane 1986), as there are at Culleenamore in Ireland (Österholm and Österholm 1984). Ireland has other evidence for Neolithic marine exploitation (Woodman n.d.), and in Denmark there are both large marine fish traps like that at Oleslyst (Pedersen 1997) and settlements with fish bones (Enghoff 1991). These are all far from southern England, but they are the regions from which the isotope data come. The case for a total taboo in Britain is therefore not strong; a predominantly terrestrial diet is as much as we can currently demonstrate.

It has been postulated that the Neolithic terrestrial foods might have been wild rather than domestic (Tilley 1996:96; Thomas 2003:69), but this is very unlikely: the interior supported relatively few Late Mesolithic hunter-gatherers and would not have been able to sustain the much larger Neolithic population without a predominantly agricultural economy. The isotope evidence thus supports the argument that there was a rapid transition to agriculture at the start of the Neolithic.

## SETTLEMENT PATTERNS

Most Late Mesolithic coastlines round Britain and Ireland are now underwater, so a comparison between Late Mesolithic and Early Neolithic settlement patterns cannot be effectively undertaken. In most of Denmark and southern Sweden, however, coastal areas are now above water, and settlement patterns across the transition can be examined. Throughout this area, settlement pattern shows an abrupt shift to the interior at the start of the Neolithic. In southern Sweden, "the settlement pattern was radically altered, and the emphasis shifted from the coast to the inland areas" (M. Larsson 1986:244); the pointed butted axe, characteristic of the earliest Neolithic, has a markedly inland distribution (M. Andersson 2003:fig. 10). Major settlement shifts also occur in Denmark (P. O. Nielsen 1985:115) and on the Baltic islands of Bornholm (F. O. Nielsen 1997) and Gotland (Österholm 1989). The shift is rapid, and the earliest Neolithic phase is not in any sense transitional; earliest Neolithic

find spots are generally less numerous than those of later periods, but their distribution is the same. This agrees with the isotope evidence and suggests that the transition to an agricultural economy was rapid.

### FIELD SYSTEMS AND WATER CONTROL

Field systems and water control are clear signs of commitment to agriculture. Richmond (1999:33) states that there is "an almost total absence of field system or water control evidence" in the British Neolithic. Early field systems are, however, unlikely to survive, because later cultivation will usually erase the earlier traces. One Neolithic field system does, however, survive—a 2.5-ha arrangement in association with the settlement at Scord of Brouster, well-sampled for its botanical remains (Whittle et al. 1986). This site is not exactly in the breadbasket of Britain, so other areas may be expected to have had larger systems which have not survived.

One much larger system is known, the Céide (formerly Behy-Glenulra) field system in western Ireland. This system comprises co-axial stone walls covering in excess of 12 $km^2$ and has survived because blanket peat grew over it, protecting it from later depredations. The larger fields were probably for livestock, although smaller enclosures could have been for arable and contained settlements (Caulfield 1983). If such a huge system was Neolithic, it would demonstrate the importance of agriculture and threaten the current consensus. There has therefore been a tendency to suggest that the Céide fields are poorly dated (Thomas 1996*a*:4), belonging to the end of the Neolithic (Richmond 1999:33). There has never been any good reason to suggest this. The earliest publication quotes a $C^{14}$ determination older than ca. 3000 BC (Caulfield 1978). More recently a series of dates has shown that the peat had already covered the fields by ca. 3100 BC (Caulfield, O'Donnell, and Mitchell 1998). How much earlier than this the fields were originally constructed is unknown, but they certainly date from early in the Neolithic. Cooney (1997:28) mentions several other Irish cases that may be similar. Field systems are likely to have been widespread across the better agricultural areas of Britain and southern Scandinavia as well, but they have not survived the subsequent millennia of tillage.

Water control systems are not known in Britain or Ireland. Spodsbjerg in Denmark, however, has a Neolithic dam some 12 m in length surviving to a height of 60 cm. It consists of four parallel log walls held between retaining posts; its construction is dated by dendrochronology to just after 3000 BC. It was next to a large settlement and created a substantial pool probably for watering cattle (Sørensen and Bech 1998).

### ARD FURROWS

Ard furrows have been found on the original land surface below burial monuments. The earliest British find comes from beneath the South Street long barrow, dated to ca. 3500 BC (Evans, cited in Ashbee, Smith, and Evans 1979). Many cases are known from Denmark; Thrane (1989:fig. 4) plots 12 (and one more in Sweden) from the period 3200–3500 BC. Earthen long barrows are older than this, but ard furrows have not been found beneath them (Thrane 1989), a conclusion which still holds good today (P. O. Nielsen, personal communication). Ard furrows under burial mounds could have been part of funerary ritual (Rowley-Conwy 1987); if so, the ard *might* have been present earlier but not used in such rituals, but at the moment an Early Neolithic pre-ard phase a few centuries long is plausible. It has been suggested that such ard furrows played a purely ritual role and need not indicate cultivation (Thomas 1999:24). This, however, removes them from the broader Neolithic context: whatever the status of the furrows beneath the mounds, they reveal that the ard was present, and it is inconceivable that it was used *only* for funerary rituals. The ard testifies to a considerable commitment to agriculture. Oxen must be fed and trained over a long period, a substantial investment. Use of the ard indicates that fields of some size were being cultivated, which in turn suggests substantial arable production.

### NOMADIC SETTLEMENT

Part of the argument for a mainly foraging Neolithic is that settlement was nomadic not sedentary. Whittle (1997:22) argues for a nomadic settlement pattern until the Middle Bronze Age (see also, e.g., Bradley 1998:53; Edmonds 1999:17–19; King 2001:327–30; Pollard 1999; Pollard and Reynolds 2002:31; Richmond 1999:10–15; Thomas 1991:14–19; 1999:29; Whittle 2003:40–43). Once again, fewer Scandinavians have concurred, and the arguments for Neolithic nomadism there have come mostly from outside (Hodder 1990:184; Price 1996:349; Whittle 1996:229; 1997:22), although shifting cultivation has been suggested by Scandinavian scholars.

In Mesolithic studies, settlement seasonality has been a major topic. Mesolithic analyses involve detailed consideration of as many types of organic evidence as possible. Northwest European examples include Mount Sandal in Ireland (Woodman 1985:156–68), Star Carr in Britain (Legge and Rowley-Conwy 1988, Mellars 1998), Ringkloster in Denmark (Rowley-Conwy 1998*a*), and Skateholm in Sweden (Rowley-Conwy 1998*b*). Such analyses have not been undertaken for the Neolithic, partly because suitable samples are scarce. As a result, the Neolithic discussion is based on less satisfactory arguments. Three aspects will be considered here: shifting cultivation, houses and settlement, and coppicing.

*Shifting cultivation* is commonly suggested for both Britain (e.g., Whittle 1999:64) and southern Scandinavia (e.g., Jensen 2001:258). The suggestion is based on the agricultural typology of Boserup (1965), which assumes that the earliest agriculture will be a "long-fallow" type with forest clearance and burning, one or two years' cultivation, and then some decades of forest regeneration; intensification involves progressively shortening the fallow and increasing labour input (e.g., by ploughing, manuring). Ard furrows imply longer-lived fields, but, as

mentioned above, evidence for the ard does not go back to the earliest Neolithic. It is sometimes assumed that shifting cultivation is the only alternative to permanent ard-based agriculture (Barrett 1994:143). However, permanent and intensively managed fixed plots can be cultivated with hoe and digging stick (Barclay 1997:142; Jones 2000:83), and such agriculture has recently been demonstrated for the Early Neolithic of central Europe by a close consideration of the associated weed floras (Bogaard 2002*a*).

In Britain, shifting cultivation is proposed without the citation of much evidence in support as an incidental aspect of the nomadic subsistence system based on wild species. In Denmark the suggestion is based on the detailed pollen analyses of S. T. Andersen (1992, 1993), which reveal that the soil forming Neolithic burial mounds contains burnt tree pollen and unburnt cereal, grass, and herb pollen, argued to indicate burning followed by cultivation. However, any stratigraphic contexts in the old soils were lost when they were heaped up to form the mounds, and therefore the sequence of activities that gave rise to the pollen is not clear. There is no indication that the clearances were cultivated only for a year or two or that there were repeated clearances in the same area as would be the case for shifting cultivation. The main problem facing shifting cultivators in Northwestern Europe would have been the seasonal distribution of rainfall, which makes it very difficult to burn felled forest at any time except midsummer—but cereals would have been planted in either spring or autumn, and burning at these times of year is rarely possible (Rowley-Conwy 2003*b*). It is much more likely that Neolithic cultivation was in fixed plots worked with digging sticks.

*Houses and settlement* are a vexed problem. Many settlements consist of just scatters of pits. In Britain pits have been adopted as evidence for nomadism (e.g., Edmonds 1999:18; Richmond 1999:11), but the information return from a pit is limited—in Denmark, excavators of similar pit scatters have no problem in regarding them as sedentary fully agricultural sites, as at Sigersted (P. O. Nielsen 1985). Houses are almost universally said to be rare. "It appears that across a large area of northwest Europe . . . timber houses represented only a minor (if recurring) element of neolithic culture" (Thomas 1996*a*: 6; see also Whittle 1996:233–34). This argument appeared first in Denmark (Eriksen and Madsen 1984). Bradley (1998:3–9) discusses the Danish Early Neolithic site of Barkær, which produced two structures each 90 m long. Originally interpreted as longhouses (Glob 1949), they were later shown to be earthen long barrows (Madsen 1979). Bradley treats this reinterpretation of Barkær as the symbolic starting point for his discussion of a monument-rich but largely house-free Northwest European Neolithic. For Britain, Thomas (1999:18) mentions "the absence of substantial domestic architecture . . . until well into the Bronze Age" (also 1991:8–9; 1996*a*); Pollard and Reynolds (2002:31) describe Neolithic structures as "light, impermanent affairs" (also, e.g., Bradley 1993:8; 1998:3–9; Evans, Pollard, and Knight 1999; King 2001:324; Pollard 1999; Richmond 1999: 10–15; Whittle 1999:63).

The current consensus has dealt with the few houses it does recognize in the same way as with other conflicting evidence by writing them out of the domestic context. We have seen that burnt cereal stores like Balbridie are argued not to have been permanently occupied. Others are similarly dealt with for even more tenuous reasons. For example, Richmond (1999:13) doubts the domestic nature of Lismore Fields because next to the structures are two lines of posts with no obvious function; Thomas questions one house because it has too few stone tools (1996*a*:7), another because it has too many (pp. 9–10). The plain fact is, however, that Neolithic houses in Northwestern Europe are neither flimsy nor rare. Recent excavations have revealed a very large number of structures; reviews may be found in Artursson et al. (2003) for Sweden, Darvill (1997) for Britain, Grogan (2002) for Ireland, and P. O. Nielsen (1997) for Denmark, and even these do not list them all. Many houses have received only preliminary publications, while others are discussed in reports with limited circulation.

My own list of houses (fig. 5, *A*) is based on the following three criteria: (1) They must be *Early* Neolithic; in Denmark and Sweden this includes structures dated to the Early/Middle Neolithic boundary and earlier but not definite Middle Neolithic ones even if firmly dated to phase Ia or ones with vaguer dates such as "Early or Middle Neolithic." This effectively means that the houses probably date to ca. 3300 BC or earlier, and this cut-off point is used for Britain and Ireland as well. (2) They must have reasonably clear plans, so that at least one dimension can be estimated; uninterpretable posthole scatters are excluded. (3) Minimum size must be 5 m. The list has no fewer than 175 houses (Rowley-Conwy 2003*b*:table 1); Ireland has 44, Britain 31, Denmark 48, and southern Sweden 52. If the entire Neolithic had been included, it would have contained several hundred more. They range in size from the 5-m threshold up to 20 m or more in length. Barkær makes a symbolic reappearance not because of the two long barrows but because the post holes of the underlying settlement represent at least two substantial houses (Liversage 1992:pl. 4).

Northwest European archaeology has a history of failing to find houses in a certain period, assuming nomadism, and then finding numerous houses after all. For example, the first Bronze Age settlement in Denmark was recognized in 1909, but no house was discerned. For half a century Danish Bronze Age people were assumed to have been tent-dwelling pastoral nomads; the first longhouse was recognized in 1957 (Thrane 1985), and hundreds are now known. When the dates of publication of the Early Neolithic houses are plotted, it is clear that the same thing is currently happening for this period (fig. 5, *B*). After decades of nervousness and uncertainty, excavators have become confident in their recognition of these houses.

There are other factors too. Fowler (1981) suggested that many Neolithic landscapes might lie buried beneath erosion deposits caused by later agriculture. Thomas

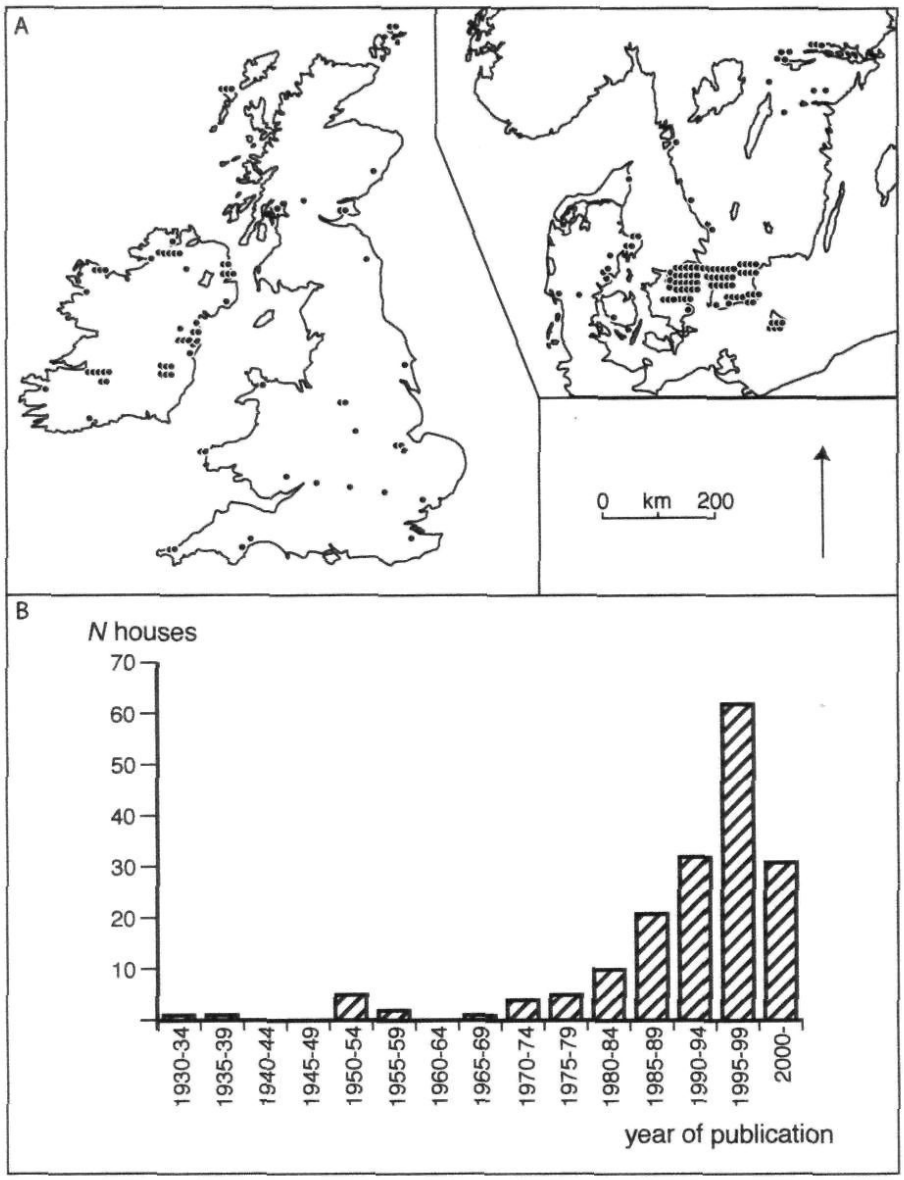


FIG. 5. A, *locations of Early Neolithic houses in Ireland, Britain, Denmark, and Sweden.* B, *year of first publication of individual houses (see Rowley-Conwy 2003b:table 1 for details).*

finds this suggestion "astonishing" (1991:9), but it is perfectly plausible. One of Britain's largest Early Neolithic houses, White Horse Stone, was in fact found under several metres of hillwash (Oxford Archaeological Unit 2000:453).

Even more telling is method of excavation, as recent work in Sweden shows (Artursson et al. 2003). Research excavations tend to employ long, narrow reconnaissance trenches; these are widened when a site is encountered, but this widening ceases when artifact density decreases. A few Early Neolithic houses have been discovered by this means, but sites generally consist of small scatters of pits and artifacts. From this has come the impression that Neolithic settlements are small, around 400–800 $m^2$, and houses are elusive. In Britain too, archaeologists are optimistic that Neolithic settlements can be understood by this method (e.g., Evans and Knight 2000:94).

The antidote to such optimism is Stora Herrestad in Sweden (fig. 6, *A*). A research project tested the area in 1984 using 3-m parallel trenches with 10-m spaces in between, widened when houses were encountered; no Early Neolithic structures were found (Tesch 1992:fig. 11). Yet when electrification of a railway necessitated area excavation in 1995, a 17-m longhouse of transitional Early/Middle Neolithic date was revealed adjacent to two of the earlier trenches (T. Andersson 1997). Area excavation also reveals that Early Neolithic settlements may consist of several functionally distinct areas, each

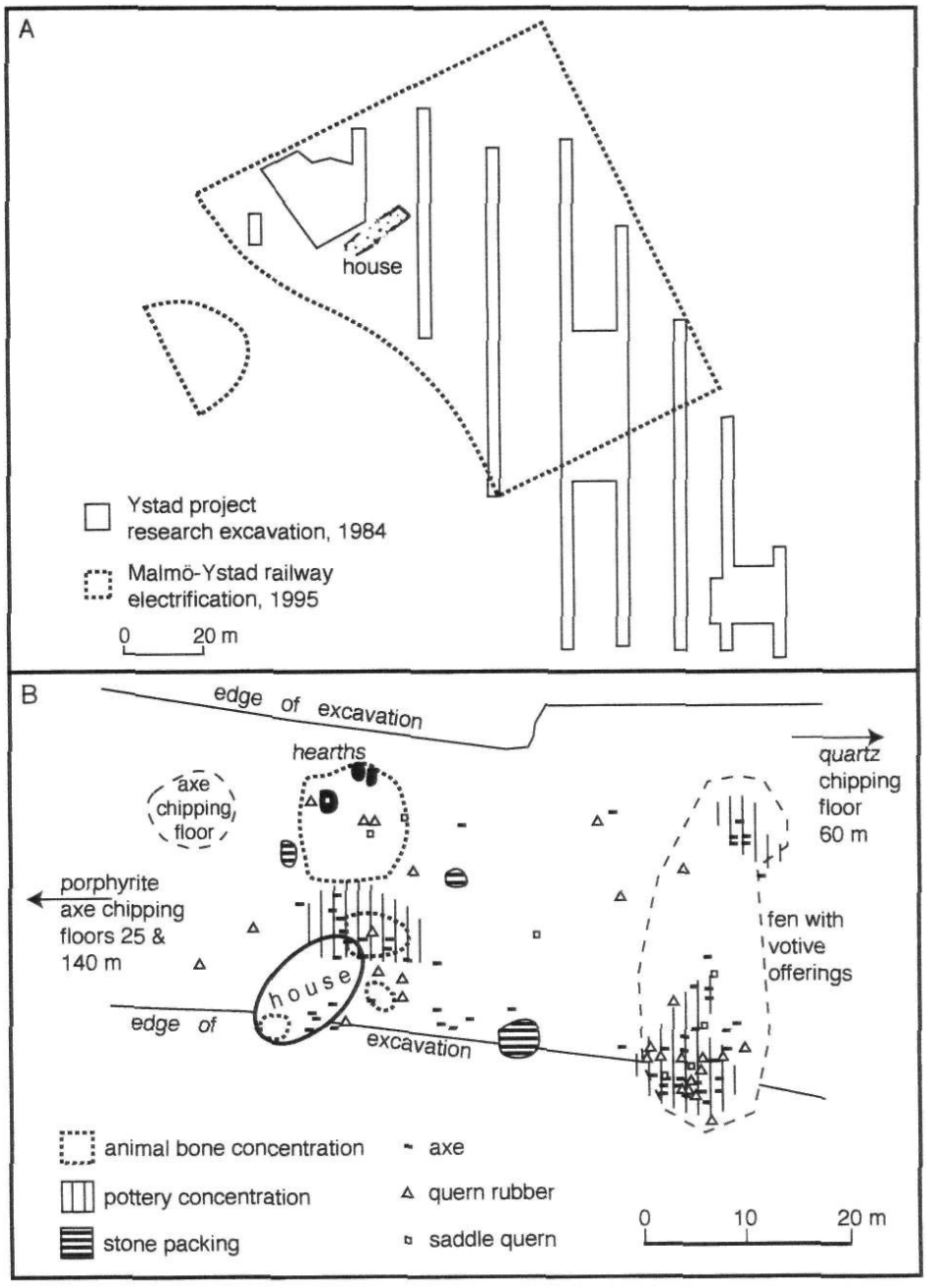


FIG. 6. A, *Stora Herrestad, showing the position of the transitional Early/Middle Neolithic house and the excavation trenches (combined and redrawn from Tesch 1992:fig. 11 and T. Andersson 1997:figs. 3 and 4).* B, *plan of the Skogsmossen settlement, showing the various activity areas (combined and redrawn from Hallgren et al. 1997a:figs. 2a, 9b, 11a and b, 17; Hallgren and Possnert 1997:fig. 1; Hallgren et al. 1997b:fig 4.17).*

creating an artifact scatter of limited size, and therefore some settlements are much larger than is normally supposed (Artursson et al. 2003). Skogsmossen, from the northern edge of Early Neolithic farming in Sweden, is a good example (fig. 6, *B*). An open-air cooking area of hearths and bone debris lay north of a 12.5 × 6-m house; three areas of stone packing formed an arc within which all but two of the axes were recovered, though all the saddle querns lay outside it; to the east was a small fen containing votive offerings, and various stone-working areas were encountered. The excavators estimate the total area of the settlement at between 30,000 and 45,000 $m^2$ (Hallgren et al. 1997*a*:100).

The distribution of houses (fig. 5, *A*) is largely an ac-

cident of research. Irish gas pipelines and motorway construction have produced many. Southern Swedish railway and pipeline construction and urban development round Copenhagen have supplemented major research projects to produce a high density of finds. Central and southern England, the "home ground" of much of the current consensus, has a reasonable scatter. There are fewest in northern England and southern Scotland, perhaps symptomatic of the lack of modern economic development and construction in this region. Early Neolithic houses are now so common that claims of their rarity and non-domestic nature can no longer be sustained; they cannot all be unoccupied stores for ritual use. Middle and Late Neolithic houses are even more common. The residential house must be restored to the centre of our understanding of Neolithic settlement in Northwestern Europe. These houses are not Central European–type longhouses, and more than two or three are not usually found together, but their ubiquitous domesticity cannot be denied.

*Coppicing* is a form of woodland management: a tree is cut down, and from the stump several new shoots rapidly grow. The aim is to produce timber of uniform growth. Shoots up to 6–8 years old are suitable for non-supporting house walls and partitions (the "wattle" of wattle and daub), for hurdles to construct fences and animal pens, and for items like fish traps. Some poles may be left to grow for 20–30 years if intended for house construction. If coppiced wood is preserved archaeologically, it can be recognized by a series of characteristic features (Coles 1987:152–54).

Several finds are known from Neolithic Northwestern Europe. In the Somerset Levels, the Sweet Track is a wooden trackway some 1,800 m in length. Its construction has been dated by dendrochronology to 3806 BC (Hillam et al. 1990), very early in the Neolithic. In addition to larger timbers, its construction required some 6,000 pegs 3–8 cm in diameter and 60–210 cm in length (Coles and Orme 1984:13). Eleven-year old hazel was favoured, and this and other species were coppiced, albeit rather unsystematically (Morgan 1984). Many coppiced hazel rods were found at Etton (Taylor 1988), and an Early Neolithic hurdle from Carr House Sands was probably made of coppiced hazel (Huntley 1997). In Denmark, coppiced hazel was used for a Middle Neolithic trackway at Tibirke (Malmros 1986) and for a fish trap at Oleslyst dated to 3200 BC (Christensen 1997). In Ireland, Early Neolithic and later trackways at Corlea were made of coppiced hazel (Moloney 1996).

Coppicing is important because it implies sedentism (Tomii 1996). Browsing mammals find the young shoots tasty, so areas of coppice must be fenced (requiring even more coppice) and patrolled to keep out deer and wild boar. A group returning after an absence would be unlikely to find its coppices intact. The potential depredations of animals and other people require continuous presence that cannot be reconciled with a nomadic settlement pattern.

In summary, the Neolithic was neither nomadic nor dependent mainly on wild foods. There must have been local variability in settlement and subsistence, but the archaeological record remains rather coarse-grained and reveals surprisingly little variation; there is at the moment no reason to single out any one area, for example, southern England, as different from the others. The various lines of evidence presented above reveal a sedentary Neolithic that acquired the majority of its food from agriculture. Agricultural clearings were probably small and scattered but must have represented substantial infrastructural investment. Quite apart from the felling and clearing of forest, each would have contained one or more houses and small but intensively cultivated fields. In time, mantle vegetation would have grown round the edge, providing nuts and fruits. Animals were kept close to the settlement. Cattle, probably in fairly small numbers, were intensively managed for dairy products in Britain and for meat in Denmark. Pigs foraged on and around the settlement; because little interbreeding with wild boar took place, it is apparent that they were not extensively run in the forest (Rowley-Conwy 2003*a*). This required yet more infrastructure: fencing to keep them out of the cultivated fields, an important feature in contemporary societies keeping pigs like this (Steensberg 1980: 111–23). Substantial areas of coppiced woodland were needed. The ard, requiring dedicated oxen, soon supplemented the digging stick; field size and agricultural production increased. Wild animals and plants were exploited but only as minor supplements. Axiom 2 of the current consensus is therefore not supported.

## A Seamless Transition?

Axiom 3 is that local Mesolithic groups chose gradually to adopt agriculture. The slow economic transformation was thus an internal development within a cultural continuum.

Indigenous agricultural adoption is almost universally accepted. The slow economic change envisaged by the current consensus implies unbroken cultural continuity, the only rapid change being the start of monument building. According to Thomas (1996*b*:317),

> Areas such as Britain, Ireland and southern Scandinavia were not "acculturated" by existing agricultural populations: their mesolithic groups actively chose to engage in new networks of contact and new social and economic practices . . . [so agricultural origins consisted of] judicious adoption of aspects of what the neolithic had to offer.

This empowers local Mesolithic groups, making them the determining factor in the appearance of agriculture. This view goes back farther than just the past 15 years, however: local development was a major tenet of the "new archaeology" (e.g., Higgs and Jarman 1969), and the view can be traced to an epoch-making paper by Grahame Clark (1966). It may not be a coincidence that this view arose while Britain was divesting itself of its imperial colonies, a process which was empowering indig-

enous peoples and re-emphasizing their cultural continuity and autonomous choice.

The empowerment of the local group as the decisive factor in agricultural origins has questionable implications, however. The arguments for Late Mesolithic intensification towards agriculture imply that these groups were economically progressive. They were not yet agricultural, however, although other groups in Europe were. Thus all groups are seen as progressing in parallel, but some are ahead. Exotic agricultural items such as sheep and wheat are passed on when the next group has entered the *domus* stage of development and can take them on. This is the essence of seamless continuity.

But, as we have seen, the change in subsistence economy did in fact happen very rapidly. This can be elucidated using the model developed by Zvelebil and Rowley-Conwy (1984, 1986), which identifies three phases in the transition: the availability phase, in which agriculture is available to hunter-gatherers but plays little or no role in their economy; the substitution phase, in which agriculture provides 5–50% of the diet; and the consolidation phase, in which agriculture provides over 50% (see fig. 7, *A*). The substitution phase is the actual transition, and it is this that was so rapid in Northwestern Europe. This is not unexpected, however. Hunn and Williams (1982) chart the economic practices of 200 ethnographically known societies. The percentage dependence on gathering (fig. 7, *B*) shows that many societies do not depend on gathering at all. Some societies depend on it for moderate proportions of their diet, while very few are highly dependent. The result is a regular fall-off curve. Hunting, fishing, and herding show similar patterns. Dependence on agriculture reveals a completely different pattern. Some societies make little or no use of it; these are the hunter-gatherers. Many others depend upon it for 45% or more of their diets, but remarkably few societies depend upon agriculture for between 5 and 45% of their diet. "Apparently people either depend upon agriculture to a negligible extent or they depend heavily upon it" (Hunn and Williams 1982:5). This suggests that, other things being equal, the 5–50% zone of the substitution phase is an unstable intermediate area through which transitional societies are likely to move rapidly. The data may even exaggerate the frequency of groups in the 5–50% zone; many are hunter-gatherers in contact with farmers and acquiring some agricultural practices from them (Blumler 1996:36), and therefore their numbers have probably been inflated in the past two or three centuries.

The scale and rapidity of the economic transition force us to reconsider the idea of seamless cultural continuity. The whole economic change took at most a century or two, and it was the biggest single upheaval that Northwestern Europe has ever undergone. Agriculture was an economic juggernaut moving fitfully across Europe and overwhelming previous ways of life. Sometimes it stopped for centuries at a time, and sometimes it moved so fast that we cannot track it with current dating methods, but ultimately it proved unstoppable until it reached the Atlantic.

For the Mesolithic, the arrival of agriculture was an unforeseeable contingency, and the upheaval it caused must have been huge. For the successful reproduction of local forager descent groups, agriculture must have been a catastrophe. It is almost inconceivable that any socioethnic groups survived intact across the transition. Major movements of people were probably frequent. This is not to suggest a return to the demic "wave of advance" suggested by Ammerman and Cavalli-Sforza (1971:687); movements were probably much shorter and less directional. Several scenarios can be envisaged, among them "leapfrog" migration, taking a group or subgroup just beyond its neighbours into available space, "trickle" migration, involving movement by individuals, not necessarily of one ethnic group, over periods of a generation or more, and "creep" migration, so slow that it may scarcely be discernible within a human generation. Work on the DNA of modern Europeans has shown that most of us are descended from Mesolithic hunter-gatherers, leaving room for only a modest immigration from Asia in the Neolithic (Sykes 2001). But this work cannot focus closely enough to reveal the type of movements suggested here. Most of these movements would have been by hunter-gatherers or the descendants of hunter-gatherers. European mtDNA lineages would thus remain largely intact, but nothing else would.

Migrations of the kind considered here are in fact making an explanatory comeback in various parts of Europe. The agricultural expansion round the West Mediterranean coast is a good example (Binder and Maggi 2001, Zilhão 2001), and population movements have been suggested in Britain (Sheridan 2003) and southern Scandinavia (Skak-Nielsen 2003). For Ireland, Cooney (2000:13) points out that the domestic cattle at Late Mesolithic Ferriter's Cove are unlikely to be there because of "a [Mesolithic] propensity to take on the importation and management of unfamiliar domestic animals"; the people who owned the cattle seem more likely carriers (unless the bones arrived in joints of preserved meat).

The appearance of agriculture was thus not a demic "wave of advance" but rather a rapid and massive socioeconomic "wave of disruption." Axiom 3, the seamless transition, is not sustainable.

## Conclusions

The three axioms of the current consensus have been examined and found to be incorrect: (1) The Mesolithic was *not* intensifying towards a native agriculture. (2) The Neolithic was *not* mainly dependent on wild foods and was *not* nomadic. (3) The transition was *not* seamless but highly disruptive. Deconstruction of the post-processual agenda has revealed that subsistence economy and ideology had to be decoupled. In the claimed absence of abrupt subsistence change, ideology thus became the default explanation for abrupt cultural change—the building of monuments and the emergence of the Neolithic "structure of ideas." As noted in the foregoing, objections have been raised by Scottish and Irish ar-

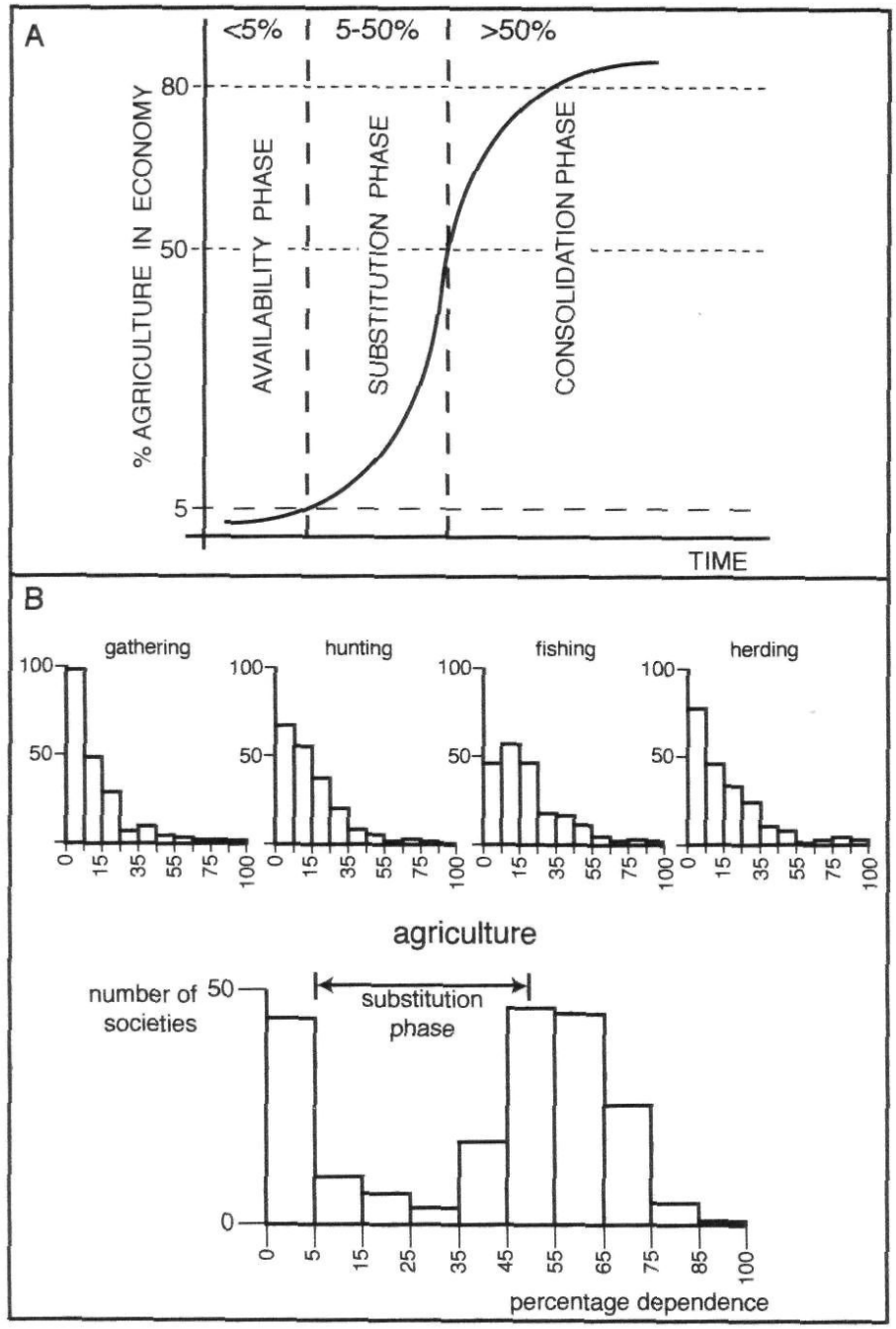


FIG. 7. A, *phases of the transition identified by Zvelebil and Rowley-Conwy (1984); the S-shaped curve represents the proportion of agriculture in the subsistence economy.* B, *economic reliance on gathering, hunting, fishing, herding, and agriculture in a sample of 200 ethnographic societies (modified from Hunn and Williams 1982:fig. 3).*

chaeologists, by archaeobotanists, and by isotope specialists, but these voices from the Celtic and scientific fringes have not had a great impact on this notion.

The need to decouple subsistence economy and ideology is, however, the central fallacy of the current consensus. The overarching theoretical claim is the primacy of ideology, which permeates and contextualizes all aspects of life—and yet the economy is dealt with in a completely contrary way. The domesticity of cereal cultivation, domestic livestock, ard marks, and houses has been denied. It seems that if settled agriculture can be lifted out of the domestic context and placed in a ritual

one instead, this somehow makes it "different"; but of course the nutritional value of bread and cheese does not change as a result. A further implication is that the claimed (but archaeologically invisible) wild subsistence base is the "real" domestic economy because no ritual context is argued for it. Ideology has thus been taken out of the domestic social context—a remarkable achievement for an approach that sometimes labels itself "contextual archaeology."

Advocates of the current consensus have painted themselves into a corner from which there is no escape by theoretical means. Richard Bradley once memorably remarked that writings on the Mesolithic and Neolithic gave the impression that "successful farmers have social relations with one another, while hunter-gatherers have ecological relations with hazel nuts" (1984:11). This oft-quoted thought-byte tells only part of the story, however. In essence, the Mesolithic has been treated as a way of life and livelihood, the Neolithic as a way of death and ritual. We must, however, accept that the Neolithic too had a domestic way of life and that we have many data casting light upon it. We must reincorporate these data into our thinking and make them the starting point for our theorizing. As demonstrated above, this generates a very different picture of the past. Until this is accepted, Neolithic studies will remain in the theoretical limbo in which they currently languish.

# Comments

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Research on the introduction of the Neolithic into Europe seems to be entering a Kuhnian phase of collapse of a consensual model because of its inability to integrate new data. As Rowley-Conwy stresses, the radically indigenist narrative developed in the 1980s and '90s (see Ammerman 2002), in which subsistence is considered as almost irrelevant compared with ideology, needs profound revision.

Curiously, a central point in the discourse of this post-processual approach is in fact a legacy of the New Archaeology (especially of its British branch): the understanding of domestication as just one option from among a broad range of relationships between human society and animal or plant species. This is undoubtedly one of the bases of the idea of a gradual change from foraging to primitive agricultural systems. If the differences between the economic systems fade and are finally considered irrelevant, it is logical to look for the source of the Neolithic elsewhere. While the post-processual approach inverts the causal agent, the basic concepts are provided by the New Archaeology—which, incidentally, may help to explain the apparent paradox of the success of this model among scholars hardly suspected of affection for post-processualism.

Therefore, a key point is whether intermediate situations between foraging and agricultural systems really exist or are simply wishful thinking. This is not, however, a simple question to answer. It may be easy to establish whether cereals were cultivated, but it is difficult to understand their importance in the diet and in the economy as a whole and their articulation with other aspects of social life. Similarly, the issue of the mobility of Neolithic groups may not be resolved by a somewhat simplistic nomadic/sedentary dichotomy. Furthermore, because of the contingency of material culture the interpretation of the data may not be as straightforward as is often assumed. The only possibility of a way out is independent verification. Paleodiet studies, for example, are currently providing data that will probably produce a major change in our knowledge of the transition to the Neolithic in Atlantic Europe. From Denmark to Portugal, stable isotope analyses show a consistent pattern of association of the beginning of the Neolithic with a sharp and rapid change in the diet (Richards, Price, and Koch 2003; Richards, Schulting, and Hedges 2003; Schulting and Richards 2001, 2002*a*, 2002*b*; but see Lidén et al. 2004 for a different situation in southern Sweden).

Rowley-Conwy wisely combines these new data with an extensive analysis of more conventional archaeological information (including firsthand familiarity with the Scandinavian record) and a sharp methodological critique of some of the excesses of the post-processual view. The result is, as a whole, extremely convincing, and I think that this paper will be an important reference for a long time. Yet, it would have been interesting to see him exploring the implications of his view of the introduction of agriculture a little further.

The new scenario that he proposes for the northern part of the Atlantic fringe of Europe may in fact have occurred at the opposite end as well. On the Atlantic façade of the Iberian Peninsula, it has frequently been argued that the introduction of domestic species (especially cereals) was very late, but the results of the research of the past ten years seem to be highly consistent with Rowley-Conwy's proposal for the northern Atlantic in its three main points.

Hunter-gatherer intensification has not been clearly demonstrated, even in regions such as the central and southern Portuguese coast (Araújo 2003); the clearest shifts seem to be related to territoriality rather than to complexity (Arias and Alvarez n.d.). In any case, the "broad-spectrum" Mesolithic economy seems to have been more a response to shortage than an ecologically sustainable adaptation. Moreover, there are now signs pointing to a rapid and profound change even in areas less well-suited to cereal-based agriculture such as the Cantabrian region and Galicia. The application of flotation techniques has revealed the generalized presence of cereals since the early Neolithic (sixth or early fifth millennium, depending on the region), although some data (on harvesting without sickles [Ibáñez et al. 2001]) suggest that it was on a small scale. At the same time, archaeo-

static boundary north of the Bandkeramik mentioned by Louwe Kooijmans. All kinds of events were evidently taking place, and "stop," "slow," and "fast" were all clearly options. Despite announcing himself as a post-processualist, Jones agrees with the claim of house-based sedentary settlement, possibly because he works in the Orkney Islands. Any Neolithic inhabitant of these islands trying to live in an ephemeral structure would probably have found that the wind rendered it much more ephemeral than he desired! I agree with Jones that the "Wessex" model of transitory settlement does not apply here; I also doubt whether it applies to Wessex.

Where I disagree with Jones is when he asks, "How were the first domesticates understood?" I think this is a nonquestion because it is one that the archaeological record is fundamentally unable to answer. Furthermore, to expect a single answer to this question is an oversimplification: even had there been a single unitary "understanding" within one small community on the day the first cereals arrived (which I doubt), it would have changed almost immediately when the first bread or beer was consumed, again when the first plot was planted, again when it was harvested—and how different all of these would have been from an "understanding" in a local community in which cereals had been cultivated for three human generations. Yet our dating methods would not allow us to separate these local communities, even if we could ever discern the "understandings" in the first place.

Such problems emerge yet more starkly when one compares the comments of Straus and Thomas. Straus argues for middle-range theory and the use of archaeological data and against unfounded speculations about prehistoric belief systems, etc., expressing himself refreshingly succinctly. Thomas, in contrast, wants us to "evaluate the contexts" from which cereal remains come. I disagree with his suggestion that the fact that some timber buildings burnt down in some way invalidates their domestic nature. He cannot demonstrate whether the burning was a symbolic act deeply imbued with cultural meaning or merely a catastrophic accident. How, then, can we ever "evaluate the context"? He considers the paper a "blast from the past" and uses the indictment that is most damning in the relativist world of post-processualism: that it is "outdated." But in a world where competing interpretations are evaluated against imperfect data this indictment has no force; the only criterion is how well an interpretation accords with and explains those data. In that spirit I hope that the paper will indeed be judged a "blast from the past"—the prehistoric past.

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