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Neolithisation Processes in the Nordic Area

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Neolithisation processes and the character of the first agriculture are being discussed with increasing intensity in various parts of the Nordic area. Those discussions are concerned with archaeology, ecology and ethnography and a variety of theoretical approaches.

The growth of interest is reflected by the publication of more than 100 major and minor works since 1980. These seldom cover the entire Nordic area. Instead they deal with limited, variously sized areas which will be considered here under the headings of Southern Scandinavia, Central Sweden, Northern Sweden, Norway and Finland. The publications present a wide variety of emphases, ranging from descriptive archaeological analysis to ecology. The neolithisation process is viewed either from a hunter-gatherer perspective or from "the other side" and is often discussed with reference to different theoretical frames affording different explanatory possibilities. Selected publications will be discussed in the following pages. Earlier works are mentioned less frequently but recur in the reference lists of the newer publications.

Archaeological research into neolithisation processes has existed for different lengths of time in different parts of Scandinavia, and there is a similar variety in conditions attending the introduction of agriculture. Scandinavia is a large geographical area. Agriculture was introduced there at different times and can be associated with different "cultural groups". Consequently, neolithisation processes in the Nordic area occupy a very long period of time, from initial introduction to more permanent farming. The first elements of an agrarian economy will be discussed in the following pages. These can be roughly located within the different phases of the Stone Age and in the Early Bronze Age.

The growth of interest in neolithisation processes has been partly manifested by debates and a symposium in Oslo in 1980 on the subject of the introduction of agriculture in the Nordic area (Sjøvold 1982). A couple of debates have been published in the Norwegian Archaeological Review. Mark Zvelebil and Peter Rowley-Conwy opened a debate on "The Transition to Farming in Northern Europe" (Zvelebil & Rowley-Conwy 1984). Subsequently a debate also began concerning palaeo-ecological methods (Berglund 1985). In the Journal of Danish Archaeology, a debate was launched on neolithisation processes in the south of Scandinavia (Rowley-Conwy 1985; Jennbert 1985).

The Scandinavian material has also been discussed by several scholars outside the Nordic area (Jarman et al. 1982). Several studies dealing with Schleswig-Holstein also include the south of Scandinavia, which opens up perspectives for interpreting the south-

ern Scandinavian situation (Schwabedissen 1980; 1981; Meurers-Balke 1981, 1983).

The Nordic source material is distinguished by the frequent combination of archaeological sources with palaeo-ecological analyses. This co-operation, which is a longstanding tradition, already occurred in the first Danish Kitchen Midden Commissions and, among other things, helped to precipitate a discussion of the bifurcation of the Stone Age in the mid-nineteenth century. Both archaeological and palaeo-ecological studies in recent years have greatly broadened our knowledge of the introduction of agriculture and the character of the first arable farming. For this reason there are a number of new works shedding light, from various angles, on the course of events in different parts of Scandinavia.

One contributory cause of this wider knowledge is the growth of different types of source material. This may have been due to a development of field and analytical methods. Versatile field work has therefore made it possible to collect a variety of finds. There is, for example, the flotation method, which has improved the feasibility of collecting macrofossils. Laboratory techniques have been developed and, for example, now include methods of distinguishing trace and other substances in foodencrusted pottery fragments. The discussion of palaeo-ecological methods and of ways of interpreting pollen charts has led to the suggestion of alternative reconstructions of natural environments and alternative suggestions concerning the exploitation level of different types of environment.

Current research into Scandinavian neolithisation processes also reveals an interest in problems of change, theoretical frames and a variety of source material. As a result, the course of events can now be roughly outlined, but there are gaps in the source material which make it difficult to obtain an overall picture of the different processes occurring in different parts of Scandinavia. Although the riddle of the introduction of agriculture may therefore persist forever, Scandinavian research presents a number of ideas and thoughts on this classical topic of archaeological inquiry.

SOUTHERN SCANDINAVIA

The southern Scandinavian source material – both archaeological and palaeo-ecological – is extremely voluminous, due partly to a long research tradition focussing on the neolithisation process. The long research perspective has led to the formulation of several different hypotheses concerning the introduction of farming, from "Mesolithic" and "Neolithic" horizons respectively, and using an archeological and/or a quaternary-geological perspective.

Two alternative interpretations of the neolithisation process are classical in southern Scandinavian research. One of these maintains that the Ertebølle culture, preoccupied with fishing and hunting and the early Neolithic agrarian Funnel Beaker culture are two distinct cultural and economic phenomena where agriculture was brought to southern Scandinavia by immigrant groups (Becker 1955, p. 155 et seq.; etc.). The second hypothesis implies that the preconditions of an agrarian economy existed within the local late Ertebølle culture (Troels-Smith 1953, p. 156 et seq.;

etc.). Investigations during the past 20 years have modified one or the other interpretation and endowed it with new arguments. This will be enlarged on in the following pages, above all with reference to works published since 1980. First of all, though, there are a number of basic problems which have to be discussed, viz the origins of the Funnel Beaker culture, the relationship between the Ertebølle and Funnel Beaker cultures, similarities or dissimilarities of material culture between the two groups and the concept of settlement.

One classical issue of southern Scandinavian research is the origins of the early Neolithic Funnel Beaker culture. More recent works point out that this culture does not have a common European background (Madsen & Petersen 1984, p. 105). Poul Otto Nielsen argues the same and maintains that the early Neolithic pottery tradition of southern Scandinavia was formed through the acquisition of technical know-how by near-by Neolithic communities, and that it was shaped in response to local needs and with local stylistic elements (Nielsen 1985, p. 118).

Nielsen also writes that 14C datings and the character of the material culture suggest that Ertebølle and early Neolithic tradition are cultural phenomena in the process of evolution and that they constitute one and the same population group (Nielsen 1985, p. 115).

Another recurrent problem of southern Scandinavian research is this very relationship between the Ertebølle and early Neolithic Funnel Beaker cultures. The debate on the connection between Mesolithic and Neolithic is a classical one and has been going on ever since the first Danish Kitchen Midden Commissions in the nineteenth century. 14C datings, quaternary geological investigations, revaluations and additional archaeological source materials, combined with the individual scholar's view of people and their way of life, have prompted various interpretations.

Several Danish scholars maintain that there is no reliable evidence of a certain overlap between the Ertebølle and early Neolithic traditions. They refer, for example, to 14C datings, according to which the Ertebølle settlements antedate 3100BC (conventional 14C years) while the early Neolithic settlement is found to post-date 3100BC (Madsen 1982, p. 200; Nielsen 1985, p. 115).

The description and interpretation of "mixed" settlements in Skåne, however, can shed a different light on the relationship between Mesolithic and Neolithic. There are several dwelling sites where Ertebølle and early Neolithic pottery have been found in the same cultural layer. Instead it is argued, with reference to settlement areas and anthropological and quaternary-geological analyses, that the more or less sharp boundary imposed between the Mesolithic and Neolithic should be relaxed. The Ertebølle and early Neolithic pottery traditions occurred simultaneously for a brief period and the different pottery designs may have come from the same population group. What is more, imprints of grain have been found in both Ertebølle and early Neolithic pottery. This emphasises an overlap of the two "cultural groups". Complete continuity between Mesolithic and Neolithic times and a slow, gradual transformation of material culture can therefore be verified in connection with the introduction of agricul-

ture (Jennbert 1983, 1984, Göransson 1983, Meurers-Balke 1983).

That the continuity of Ertebølle and early Neolithic tradition has also been shed with the aid of other categories of material and by other researchers. The connection is attested by an elaboration of traditions in flint technology (Nielsen 1985, p. 113; Jennbert 1984, p. 42), evidence of territorial and settlement continuity (Nielsen 1985, p. 114; Jennbert 1984, p. 101 et seq.) and by the occurrence of lamps and a similar pottery technology (Meurers-Balke 1983, p. 90; Jennbert 1984, p. 45 et seq.).

As regards the character of the material culture within the southern Scandinavian region, more recent works have demonstrated regional differences in the Ertebølle and early Neolithic traditions. There are distinct variations in the distribution of different find categories within the Ertebølle region. These "idea maps" are not regarded as distinct regional groups or as reflecting any definite chronological difference (Andersen 1973, p. 34; Vang Petersen 1982, p. 188; 1984, p. 15, Jennbert 1984, p. 138 et seq.). The difficulties involved in applying Becker's chronological period divisions (A, B and C) to the Funnel Beakar culture throughout the region have prompted a new nomenclature which has also made it possible to distinguish regional and chronological groups (Ebbesen & Mahler 1980, Madsen 1982, p. 96; M. Larsson 1984).

Southern Scandinavia, then, was not a homogeneous cultural region but was made up of local groups having specific characteristics of material culture. The regional tendencies indicated by characteristic features of design and different types of implement therefore have a bearing on our understanding and interpretation of the relationship between the Ertebølle and early Neolithic Funnel Beaker culture and of the neolithisation process as a whole. In this way the discussion concerning the introduction of agriculture has taken on further dimensions, viz consideration of the social sphere. Economic, ecological and archaeological analyses have therefore been amplified to include ideas concerning the societies.

The adoption of this standpoint has heightened the importance of investigations concerning the character of Ertebølle and early Neolithic settlements. The concept of "settlement" has been made more nuanced by contributions from ethnographic descriptions and analyses and studies of fauna and flora. The view is now unanimously taken that permanent base settlements and seasonal settlements of different kinds were integral parts of both the late Mesolithic and early Neolithic pattern of settlement.

The existence of different types of settlement during the Ertebølle period has been pointed out before (Andersen 1983, p. 30 et seq.). Demographic, ethnographic, ecological and archaeological analyses have substantiated the occurence of different types of settlement in both Denmark and Skåne (Rowley-Conwy 1981, 1983; L. Larsson 1981; Jennbert 1984). Studies concerning Funnel Beaker settlements have similarly confirmed the existence of a variegated pattern of settlement with various typs of dwelling site (Skaarup 1973, p. 133; Madsen 1982, p. 210 et seq.; M. Larsson 1984, p. 201 et seq.). Areas dedicated to special activities have been distinguished

within the dwelling area at the early Neolithic dwelling site of Mosegården in Jutland (Madsen 1983, p. 75 et seq.; Madsen & Juel Jensen 1982).

Analyses of different settlement environments from the Ertebølle and early Neolithic period respectively thus point to the existence of similarities and dissimilarities in material culture within the southern Scandinavian region. Consequently the connection between Mesolithic and Neolithic times can no longer be disregarded. The more recent arguments concerning the introduction of agriculture are therefore based on the necessary preconditions existing within the local Ertebølle culture and on the new economic activity not being solely attributable to immigration. In this connection, two alternative possible explanations have been formulated, both presupposing that the existence of permanent base settlements was one of the essential prerequisites.

One hypothesis maintains that farming and cattle-herding were necessitated by a crisis of resources connected with pressure of population (Rowley-Conwy 1983, p. 125, 1984, p. 300, 1985. p. 193 et seq; Zvelebil & Rowley-Conwy 1984, p. 110 et seq.; Mahler et al. 1983, p. 82; Fischer 1974). The other hypothesis departs from the ecological determinist explanatory model by more emphatically including the social sphere in the problems of change. This hypothesis regards exchanges of gifts and the social relationships of differentiated societies as overwhelming factors connected with the introduction of agriculture (Fischer 1981, p 12; 1982, p. 11; Vang Petersen 1982 p. 188 et seq.; Jennbert 1984, p. 128 et seq., 1985, p. 197), and agriculture is not initially ascribed with any great importance where human survival is concerned (Jennbert 1982, 1984, p. 147).

Thus the southern Scandinavian material from the transitional period between the Mesolithic and the Neolithic can be made to fit various explanations. Archaeological, ecological and ethnographic studies are yielding an abundant source material. It has therefore been impossible to formulate various explanations, depending on one's theoretical assumptions and, to some extent on the region investigated.

CENTRAL SWEDEN

The earliest traces of agriculture in Central Sweden are associated with the Funnel Beaker culture. Sten Florin's work from 1958, dealing with early agricultural settlements in Södermanland, known as the Vrå culture, has formed the basis of our understanding of the beginnings of agriculture.

Archaeological and quaternary-geological investigations during the 1970s in Närke, Västmanland and Södermanland augmented our knowledge (Welinder 1980, 1984, Hulthén & Welinder 1981). Studies of the Anneberg site in Uppland (Segerberg 1986) and several settlement studies forming part of the work of The Central Board of National Antiquities in Södermanland (Olsson & Åkerlund 1983, Olsson & Hulthén 1986) have further expanded our source material for the beginnings of agriculture in central Sweden. Quaternary-geological analyses in Östergötland have revealed early traces of crop-growing and grazing (Göransson 1982, 1983).

Stig Welinder maintains, on the strength of archaeological, ecological

and ethnographic studies, that the first agriculture in central Sweden was introduced by immigrant groups represented, among other things, by Funnel Beaker pottery (Welinder 1980. p. 159). In addition to the archaeological and ecological analyses, Welinder has used simulated pollen charts to outline economic activities and land use in early agriculture (Welinder 1982 a, b, 1983). Following a recession of the agrarian economy, a hunting economy, associated with the Pitted Ware group of cultures, predominates. Later this co-exists with the second introduction of agriculture, associated with the Battle Axe culture (Welinder 1980, p. 162).

Central Sweden has a variable topography which has facilitated different food strategies in different periods. The source material cannot be directly linked with south Scandinavian chronology. The knowledge base, which has grown rapidly in recent years, will provide opportunities for shedding more light on the relationship between Mesolithic and Neolithic times. This will mean new research angles on neolithisation processes in central Sweden. The complicated relationship between Mesolithic/Neolithic and technology/economy has been accentuated by the conditions which have now become known to us in regions further north. There are gaps in the archaeological source material which, for the time being, cannot be bridged whatever the approach used in analysing periods of change. Ecological determinism, interest in the social sphere or the theory of immigrant groups can provide points of departure for interpreting the neolithisation process. The last mentioned explanatory possibility is perhaps, at present, the most readily accessible, when a new economic activity and a different technological base are introduced in a region where the relationship between Mesolithic and Neolithic times has yet to be properly cleared up.

NORTHERN SWEDEN

There are also considerable regional differences in the north of Sweden which have a bearing on the introduction of agriculture. The first traces are found along the coast of southern Norrland in Meso-Neolithic times. These have been associated with either the Battle Axe or the Pitted Ware culture. In other parts of northern Sweden one finds agriculture first appearing during the Bronze and Iron Ages respectively.

Archaeological evidence from a small number of sites shows the earliest agrarian economy to be connected with south Scandinavian material culture. The botanical surveys show, however, that knowledge of crop-growing antedates the Battle Axe culture along the southern coast of Norrland. A few datings, widely distributed, lead Evert Baudou to suggest that small crop-growing groups from southern Scandinavia settled on various occasions in regions which were still being used by groups with an economy based exclusively on hunting (Baudou 1982 a, pp. 164–166).

Noel Broadbent takes the view that the prerequisites for adopting agriculture existed in well-established maritime sub-Neolithic groups. Sealing and maritime resources contributed towards the establishment of permanent settlements. The economic and social structure encouraged trade and contacts, which were important components of

the change towards an agrarian economy (Broadbent 1980, p.173). Broadbent is critical of the ecological determinism which has traditionally provided the starting point for explaining the introduction of agriculture (Broadbent 1985).

Pollen surveys show that natural conditions on the first farming settlements resembled those prevailing in southern Scandinavia and central Sweden. Agricultural technology and the range of species could therefore be the same as further south (Engelmark 1982, p. 154). Roger Engelmark also rules out depletion of natural resources as a possible cause for the establishment of an agrarian economy, and he envisages crop-growing being brought to northern Sweden by immigrants (Engelmark 1982, p. 157).

Baudou (1982 a, p. 167), Broadbent (1980, p. 173, 1985) and Engelmark (1982, p. 157) entirely agree that the agricultural economy was only a minor source of livelihood. Hunting and fishing remained the basis of the economy.

As Baudou points out (1982 a p. 164), there are many questions which remain unanswered where the introduction of agriculture is concerned. For this reason, causal connections founded on ecological and archaeological evidence have yet to be elucidated.

NORWAY

Norway has a long tradition of archaeological research where processes of neolithisation are concerned. Surveys of vegetation history have been contributing ever since the 1950s towards reconstructions of environments and of the landscape exploitation rates in hunting and agrarian economies respectively. Palaeo-ecological studies have also helped to trace and date cattle-herding and grain cultivation in areas without corresponding archaeological source material. (Mikkelsen 1984, pp. 88–89). The investigations shed light on early agriculture in different parts of Norway. As a result, interpretations of causal relationships have acquired new approaches for the further discussion of processes of neolithisation.

These processes have mainly been dealt with by Egil Mikkelsen, with reference to eastern Norway (Mikkelsen 1982; 1984). Archaeological and ecological analyses of late Mesolithic and early Neolithic groups of finds are tested against the two principal models – immigration and local acculturation respectively – which have previously put forward to explain the introduction of agriculture in Norway.

Mikkelsen revises the earlier view that the Nøstvet culture was followed directly, in a chronological sense, by the early Neolithic Funnel Beaker culture; he does this by distinguishing a "late flint-arrow phase". This continues, with modifications, into the Neolithic. As regards the Mesolithic economy, it is observed that no small amount of plant gathering went on during the Mesolithic, which is one of the traditional links with Neolithic plant cultivation.

Analyses of thin-butted flint axes, polygonal axes, clubs, dagger handles, graves, depot finds, Funnel Beaker pottery and pollen analyses lead up to arguments concerning the immigration and acculturation models. This in turn leads to a presentation of two alternative explanatory models for the introduction of agriculture (Mikkelsen 1984).

Model 1 – local acculturation
The late Mesolithic population utilised coastal, forest and mountain areas. An investigation of differences in soil and types of vegetation, in connection with changes in the wild animal population due to climatic variations, may have had an important bearing on the introduction of agriculture (Høeg 1982, p. 243 et seq.).

For this reason, pressure of population on the existing resources, coupled with the growth of the permanent settlement structure during the late Mesolithic may have influenced and caused neolithisation. An acculturation model is corroborated by the existence of a traditional continuity in flint objects and by the same settlement locality having been used during the late Mesolithic and early Neolithic periods. Pottery, fragments of polished flint axes, associated with the Funnel Beaker culture, are new features of material culture found in the early Neolithic hunting settlements. The agrarian economy is characterised by cattle-herding and the gathering of wild plants combined with hunting and fishing. The first cattle-herding could be a means of supplementing food resources to offset growing pressure of population, closely integrated with the hunting population's rhythm of life, as was also to be the case with the first cultivation of grain.

The population of areas with traces of more intensive plant gathering and a more stable pattern of settlement leaves to a growth of population and in this way can explain why graingrowing was first introduced in these areas.

Knowledge of Neolithic technology and economics must have been transmitted from farmers in neighbouring areas. Mikkelsen puts forward marital relationships as an explanation for the introduction of agriculture and the similarity of material culture throughout large areas.

Model 2 – immigration and local acculturation
Pressure of population may also have arisen due to a group of people encroaching on the area and creating imbalance. This model presupposes that farming groups needed to colonise new land and that marginal geographical areas such as eastern Norway received farming immigrants (Binford 1968).

Mikkelsen points out that, in such a large region as eastern Norway, the two explanations are not mutually exclusive (Mikkelsen 1982, p. 134 et seq.). In his view, however, the neolithisation process was probably due to an ecological change in the relatively increased pattern of permanent settlement during the late Mesolithic period, resulting in a pressure of population (Mikkelsen, Johansen 1985, p. 135).

The Hardangervidda investigations make an interesting companion piece till Mikkelsen's discussion. Archaeological analyses and pollen analyses widen the perspective concerning early Neolithic food strategies and the interaction between the mountain regions and the lowland of eastern Norway during the early Neolithic.

14C-dated finds of early Neolithic Funnel Beaker pottery, fragments of polished flint axes (Indrelid & Moe 1983, p. 40, fig 2) and the presence of plants indicative of grazing (Indrelid & Moe 1983, p. 53, fig 10) suggest that Hardangervidda was being used in the early Neolithic period. The oldest traces occur mainly in the eastern and south-eastern parts, the youngest on the west-

ern side of Hardangervidda.

Pottery and axe fragments occur during the same period of use and the same period of deposition as in southern Scandinavia, which suggests that there were close links between the two regions at the beginning of the late Neolithic. The Hardangervidda investigations corroborate the previously propounded cattle-herding model (Mikkelsen & Høeg 1979), implying that the eastern and south-eastern parts of Hardangervidda were used as grazing lands during the early Neolithic.

Further north in Norway interesting signs of early agriculture have been discovered at the Stiurhelleren dwelling site in Rana (Hultgren et al. 1985). Flotation, panning and mechanical sorting of materials from a small excavated area revealed charred seeds and bones, the commonest fish species proving to be herring. Finds of corn and livestock bones confirm pollen studies of cattle-herding and grain cultivation in northern Norway during the late Neolithic. Stiurhelleren can be dated between 4170 ± 40 and 4380 ± 40 BP (14C years).

In northern Norway, similarly, the bulk of knowledge concerning early agriculture is derived from palaeobotanical studies (Johansen 1982, p. 195 et seq.). Evidence of cattle-herding and arable farming during Meso-Neolithic and late Neolithic times can be found as far up as 68–69°N. Unfortunately there are no dwelling sites which can be related to the palynological studies. There is no archaeological evidence for the early Neolithic cattle-herding registered in pollen charts. Johansen, referring to discussions of imported objects, prefers the immigration model to the acculturation model as the most likely explanation for the introduction of agriculture into northernmost Norway (Johansen 1983, p. 202).

Different types of material base are beginning to emerge in different parts of Norway. The archaeological and ecological studies, however, convey a relative picture of the different environments and preconditions accompanying the introduction of agriculture.

Co-operation between archaeology and ecology provides a foundation on which our knowledge of early agriculture can be given a broader perspective. In the Norwegian material one can also see different types of possible explanation which, as a result of Mikkelsen's argumentative analysis, have now been expanded to also include the social sphere. Previous explanations concentrated either on the immigration model or on the acculturation model in a narrower ecological context, emphasising an ecological crisis combined with pressure of population.

FINLAND

The introduction of agriculture into Finland has by tradition been associated with the Battle Axe culture. Comprehensive palynological investigations and a vigorous debate concerning man's impact on nature have made special contributions to our knowledge of the earliest agriculture.

The palynological studies reveal agricultural indications connected with the Battle Axe culture (Huttunen 1982, p. 210 et seq.; Siiriäinen 1982, p. 217 et seq. and references). There is, however, no direct archaeological evidence for agriculture being connected with the

Battle Axe culture (Siiriäinen 1982, p. 218; Zvelebil 1985, p. 119).

Concerning the livelihood of the Battle Axe culture, Zvelebil discusses there models. 1. An immigrant, agrarian Battle Axe culture from Sweden and Estonia. Due to the difference in natural conditions, the agrarian economy was abandoned in favour of hunting and fishing (foraging). 2. The Battle Axe culture, not immigrants. Local groups in the inland adopted cultural idiosyncrasies and existed contemporaneously with the Corded Ware hunting peoples on the coast. 3. The Battle Axe culture in Finland represents a hunting environment on the margin of the agrarian communities. Zvelebil regards this model as the most plausible. It does not preclude a limited amount of agriculture (Zvelebil 1981; 1984, pp. 118–119).

Direct archaeological and palaeobotanical evidence of agriculture, however, does not occur until the Bronze Age (Vuorela 1982, p. 255 et seq.; Carpelan 1982). Contrary to the traditional view that agriculture and cattle-herding were introduced during the Stone Age, Zvelebil also maintains that the earliest agriculture cannot be substantiated until the Bronze Age. In a comprehensive work on resource utilisation, population density, and ethnographic data based on site catchment analyses of Stone Age and Bronze Age settlements, he mainly analyses south-western Finland. Zvelebil relates the introduction of agriculture to a crisis of resources and a growth of population (Zvelebil 1981; 1984, p. 120 et seq.).

Just as with other parts of Scandinavia, Finland presents great regional differences which imply various preconditions for the introduction and establishment of agriculture. In addition, western and eastern influences respectively impart a special character to Finland, with several more opportunities of reconstructing prehistoric chains of events, not least in connection with processes of neolithisation.

The numerous and comprehensive palynological studies give Finland a distinctive starting point for discussing the introduction of agriculture. The difficulties of finding direct archaeological evidence for agriculture having begun in the Meso-Neolithic or in the Bronze Age have given rise to an interesting discussion of fundamental problems concerning immigration, acculturation, ecological determinism and pressure of population as causes of the neolithisation process. In this respect the Finnish material provides a good insight into the dilemma of synthesising processes of change and into the difficulty of linking up palaeobotanical with concrete archaeological evidence.

SUMMARY AND CONCLUDING REMARKS

The archaeological source material, time scales, character and preconditions concerning the introduction of agriculture vary a great deal from one part of Scandinavia to another. In addition, the introduction of agriculture has proved to be a complex issue (Baudou 1982 b, p. 279 et seq.). Different states of research (history) but also different methodological aspects have the effect of imparting distinctive characteristics to different parts of the Nordic area. It is possible, however, to comment in a number of respects on problem complexes of common concern and the different potential

explanations put forward in Scandinavian research for the introduction of agriculture.

No general characteristics can be discerned from the Scandinavian source materials. Period names or "cultural groups" and attitudes towards period transitions all vary. The view taken of the connection between "Mesolithic" and "Neolithic" communities is fundamental. In several parts of the Nordic area, unfortunately, the source material does not facilitate any closer analysis of the situation. When source material appears in some quantity, it is argued, depending on one's theoretical approach, that the hunting and agrarian communities either constitute completely different population groups or else indicate a slow, gradual transformation of material culture and economic strategies within a single population group.

Sufficiently "close meshed" dating possibilities and source-considerations when appraising finds, find contexts and "cultural group identity" impedes studies within and between regions. The balance and choice between archaeological and palaeo-botanical methods is also important in this connection, because it has a bearing on the dating and interpretation of the degree of human impact on the natural environment. It is not always possible, within a single locality, to find places where both archaeological and ecological source materials are amply available. In certain regions, therefore, knowledge of the earliest agriculture is founded on either archaeological or palaeo-botanical studies (cf. the debate in Norwegian Archaeological Review; Berglund, Madsen, Welinder and Vuorela 1985).

One essential factor when trying to understand the process of neolithisation is the importance one assumes the earliest agriculture to have possessed as a factor of human survival. Opinions on this point are influenced by palaeo-botanical studies and also by the individual scholar's view of people and societies.

The view has been generally taken that the earliest agriculture was a matter of slash-and-burn practices and that the first traces date from subboreal times (Iversen 1941; Steensberg 1982; Troels-Smith 1982, Madsen 1982; Hulthén & Welinder 1981; M. Larsson 1984; etc). A different opinion is founded on an alternative interpretation of pollen charts. Advocates of this approach point out that the climatic forest was transformed into a man-made forest by ring-barking. Clearance-fertilisation effects and the increased admission of light make this coppice forest highly suitable for forest agriculture, which may already have existed during the late Atlantic period (Göransson 1982, 1983).

The importance attributed to agrarian production is connected with the explanatory model on which one bases one's understanding of neolithisation. An ecological explanatory model based on the immigration theory makes agriculture heavily responsible for human food production (Madsen 1982, p. 222; Skaarup 1982, p. 42; M. Larsson 1984), even if this attitude is not always stated in so many words (Rowley-Conwy 1982).

Another viewpoint is derived from less preoccupation with ecology and with a crisis of resources having necessitated agriculture. The idea of corn and cattle coming to Scandinavia through

exchanges of gifts implies a view of agrarian production as luxury output, gifts in this sense being neither functional nor rational (Jennbert 1984, p. 147).

Problems of source criticism and method make it difficult to judge "objectively" the nature and degree of the first agriculture. The character and importance of agriculture constitute a fundamental problem in the interpretation of neolithisation processes. The examples which have been briefly outlined here show that Scandinavian research is influenced by a variety of explanatory models. Immigration, ecological determinism and cultural interaction respectively also imply assumptions governing one's qualitative and quantitative evaluation of the importance of agriculture to human survival. Such is the variety of source materials, preconditions and the state of research in Scandinavia, that one would like to see more discussion of the interaction between food strategies, natural environment and human culture. This would improve the structure of discussions concerning the neolithisation processes and facilitate inter-regional comparisons.

The long tradition of research concerning neolithisation processes in Scandinavia has generated various possible explanations. New combinations of finds and a general discussion of theoretical frameworks in recent years have broadened our attitudes and working methods. Scandinavia can be termed a marginal area in relation to the introduction and establishment of agriculture elsewhere in Europe. The delay of several hundred years in the introduction of agriculture to Scandinavia is attributed by Rowley-Conwy and others to the existence of favourable natural conditions within the local Ertebølle culture. For a long time, forager adaptation remained a good alternative to agriculture (Rowley-Conwy 1983). This approach is perhaps applicable to most regions of Scandinavia.

Favourable natural conditions and stable social hunting societies may have characterised conditions in Scandinavia before the introduction of agriculture. Zvelebil and Rowley-Conwy have presented a three-stage model for studying the introduction of agriculture in three phases; an availability phase, a substitution phase and a consolidation phase. These three phases have been studied with reference to conditions in Denmark and Finland (Zvelebil & Rowley-Conwy 1984). It may also be interesting to test this model on wider areas of Scandinavia, as hinted by the commentaries on the three-stage model (Becker 1985; Broadbent 1985; Mikkelsen & Johansen 1985; Moe 1985).

The predictions previously formulated by Welinder have come true where Nordic research is concerned (Welinder 1983. p. 34). In future one would like to see a growth of interest in the social sphere. Ethno-archaeological studies of the archaeological source material can provide additional dimensions for the exploration of the neolithisation processes which took place in Scandinavia. New empirical data and the various possible explanations which have already been presented in Nordic research, however, are providing stimulus and inspiring receptivity towards new ideas and other suggestions concerning the enigma of the introduction of agriculture.

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