

E. Archaeological Research

1. Palaeolithic and Mesolithic Periods

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With 1 figure

This paper is based upon the following classification of the cultures of the Pleistocene and Postglacial period:

Archaeolithic

Palaeolithic

Lower Palaeolithic

Middle Palaeolithic

Upper Palaeolithic

Early Upper Palaeolithic

Middle Upper Palaeolithic

Late Upper Palaeolithic

Final Upper Palaeolithic

Mesolithic

Proto-Neolithic

The Archaeolithic encompasses the period of the oldest recognizable man-made tools before the appearance of the true handaxes. As far as the typification of the tools is possible, they are partly pebble tools. The division of pebble tools into choppers and chopping tools is not very satisfactory; one should rather speak of unifacially and bifacially worked pebble tools. In those areas where pebbles were not available, tools of different types were made from slab-like or irregularly shaped stone material. One could include all the tools of this early phase under the heading "Coarse Tools", or even better, "Elementary Tools". Geologically, the Archaeolithic period occupies a long and not yet sufficiently defined period between the end Tertiary and the Mindel Glaciation.

The Lower Palaeolithic is the period from the first appearance of the true though partly crude handaxes up to the beginning of the Levallois technique in the evolved Acheulian. The "Clactonian" also belongs to this same period. It has already appeared in certain areas at the same time as the oldest handaxes. Whether it is merely an accompanying industry of the early handaxes of the Abbevillian and the early Acheulian, or embodies an independent culture, is not clear at the present moment. In the last years, few researchers have, in my opinion rightly, pronounced it as an independent culture. Geologically, the Lower Palaeolithic should cover the period between the Holstein Interglacial (perhaps also the last phase of Mindel) and the early to middle phase of Riss.

¹⁾ Translated from German by Mrs. J. Jones-Göbel and checked by S. K. Arora.

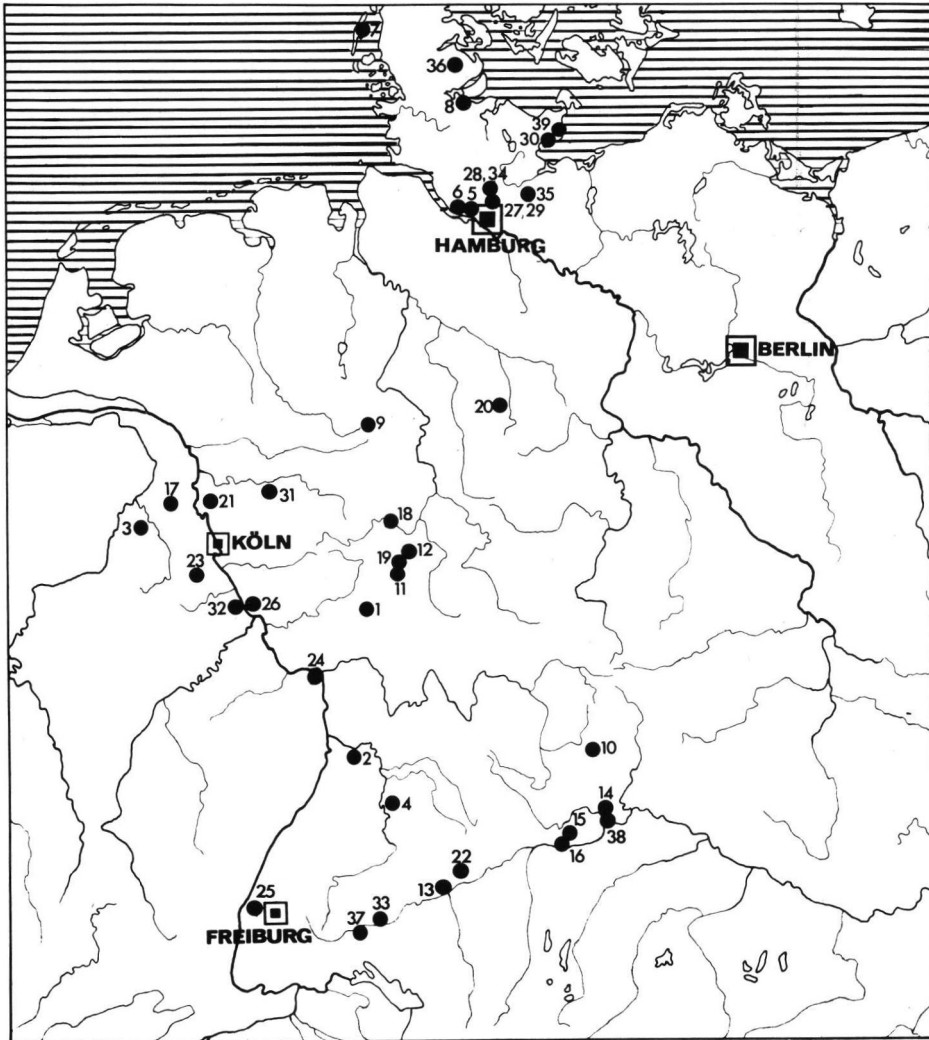


Fig. 1. The most important excavated sites, referred in the text.

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| 1) Münzenberg near Butzbach | 21) Hochdahl, district Düsseldorf-Mettmann |
| 2) Mauer/Heidelberg | 22) Vogelherd/Lonetal |
| 3) Palenberg near Geilenkirchen | 23) Lommersum, district Euskirchen |
| 4) Steinheim on the Murr | 24) Linsenberg/Mainz |
| 5) Hamburg-Eidelstedt | 25) Munzingen |
| 6) Wittenbergen near Hamburg | 26) Gönnersdorf, district Neuwied |
| 7) Nösse (Sylt), Morsumcliff | 27) Meiendorf, district Stormarn |
| 8) Eckernförde, Schleswig-Holstein | 28) Stellmoor, district Stormarn |
| 9) Stukenbrock near Sennestadt | 29) Poggenwisch, district Stormarn |
| 10) Hunas, district Hersbruck | 30) Grömitz, district Ostholstein |
| 11) Reutersruh, district Schwalmstadt | 31) Martinhöhle near Letmathe |
| 12) Lenderscheid, district Schwalmstadt | 32) Martinsberg near Andernach |
| 13) Große Grotte near Blaubeuren | 33) Zigeunerfels near Sigmaringen |
| 14) Sesselfelsgrötte at Neu-Essing | 34) Pinnberg near Ahrensburg |
| 15) Speckberg near Meilenhofen | 35) Duvensee near Mölln, Schleswig-Holstein |
| 16) Weinberghöhlen near Mauern | 36) Satrup, district Schleswig |
| 17) Rheindahlen near Mönchengladbach | 37) Jägerhausgrötte near Beuron |
| 18) Buhlen, district Waldeck | 38) Altessing, district Kehlheim |
| 19) Rörshain near Ziegenhain | 39) Rosenhof near Grube, Ostholstein |
| 20) Lebenstedt-Salzgitter, Niedersachsen | |

The Middle Palaeolithic is the period from the appearance of the Levallois technique to the disappearance of the Mousterian groups. The Levalloisian does not appear to represent an independent culture, but merely a technique. Geologically, the Middle Palaeolithic roughly covers the period from middle Riss to early or middle Würm, extending almost to the so-called "Würm I/II Interstadial". Besides the Levallois technique displayed by certain groups, increasing differentiation is characteristic of the Middle Palaeolithic. It is expressed in the appearance of numerous tool-groups including: Late Acheulian, Upper Acheulian, Micoquian with several sub-groups (Inventory Types), Tayacian, Weimarian, Mousterian of Acheulian Tradition, Charentian, Jabrudian, Micro-Mousterian etc. and the various groups of leaf points (Blattspitzen).

The Upper Palaeolithic, in which *Homo sapiens* in the narrower sense emerges, is distinguished archaeologically by the appearance of slender blade cultures, bone and antler tools, the appearance of art as well as clearly recognizable religious representations. In general an increasing differentiation in all spheres of life begins in the Upper Palaeolithic. This applies to tools and weapon techniques, the character of settlements as well as to man's intellectual manifestations. Geologically, the Upper Palaeolithic lies between the Würm I/II Interstadial and the Younger Dryas period. Its end terminates the Palaeolithic and coincides with the end of the Glacial Period.

To the Early Upper Palaeolithic belong primarily the Aurignacian and the Perigordian, and, to the Middle Upper Palaeolithic in particular the Gravettian and, in western Europe, the Solutrean. The Magdalenian belongs to the Late Upper Palaeolithic. To the Final Upper Palaeolithic (also called Endpalaeolithic) belong the different penknife (Federmesser)-groups such as Romanellian, Azilian, Tjonger group, Rissen group, Wehlen group etc. and furthermore, the tanged-point (Stielspitzen) cultures such as the Bromme/Lyngby group, the Ahrensburg group and the Swiderian, to name a few.

The Mesolithic begins with the Post-Glacial. It is especially characterized by geometric microliths and, in the north and northwest of Europe, also by flint axes. The appearance of bone and antler axes of various forms is remarkable as is also the appearance of canoes. The Early Mesolithic, broadly speaking, comprises the Pre-Boreal, the Middle Mesolithic, the Boreal, and the Late Mesolithic, the first half of the Atlantic.

In the second half of the Atlantic, the Ertebølle-Ellerbek culture of the north emerges. It includes certain Neolithic culture elements and may be interpreted as partly Proto-Neolithic.

The Archaeolithic

Conditions in Central Europe are less favourable for the discovery of tools from man's earliest history than in East Africa and the Jordan Valley, areas of volcanic activity and its corresponding sedimentation during the early Pleistocene. The cultural remains from man's early history are revealed through volcanic activity and a stratigraphic classification of the finds is possible. Whilst European finds from this period exist; in the south of France, for example, from the Vallonet cave, which can be placed (DE LUMLEY 1963) geologically in the Villafranca; in Romania some pebble tools are known (Informations P. SAMSON) from the basin deposits of the later Villafranca at Oltetz; in Hungary the site of Verteszollos, lying in fresh-water limestone and systematically excavated by L. VERTES (1965) can be dated to Mindel; and in Bohemia (ŽEBERA 1964/65) a pebble tool series also from the Mindel period has been recovered. In all, few corresponding finds from western Central Europe are present. However, these finds discovered in the post-war years are of considerable significance for the prehistory of Europe.

In Hessen, H. KRÜGER together with O. BOMMERSHEIM have found several sites with pebble tools in the area of Gießen, of which the most important is Eiloh near Münzenberg. The excavation of H. KRÜGER (1959) at Eiloh has unearthed a continuous pavement-like horizon of pebbles and pebble tools of various types, which he interprets as a living floor. Unfortunately, the geological date is not certain. E. SCHÖNHALS (personal communication) considers the possibility of a Mindel Terrace remains at Eiloh. In this case, the pebble tools could be Mindel or later. This question can perhaps be clarified by a coherent geological mapping of the area, which is presently being carried out.

In Rheinland-Pfalz, in the area of Nahe (KRÜGER 1968), H. BELL has assembled a series of pebble tools.

At the well-known find spot of *Homo heidelbergensis* in Mauer, A. RUST has been endeavouring since the 1950's to recover artefacts from the deposit containing the human mandible. He has devoted a monograph to these finds and has assigned them to a "Heidelberg stage". Though nearly half a dozen pebble tools are included, the majority of the artefacts from the deposit are made from slab-like stone material. It is but natural as in the sand and in the bone-bearing Homo deposit, mostly irregularly shaped stones and slab-like quartzite occurs and seldom pebbles. RUST's assessment of the Heidelberg finds has been criticized diversely, therefore various remarks upon this important problem are necessary here.

The artefacts of quartzite-sandstone are naturally not as easy to analyse as those of flint; the necessary criteria of human workmanship are more difficult to recognize. But along the former course of the Neckar near Mauer, people were living and working during this period, as is demonstrated by the find of the mandible. The result of their handiwork, namely the tools, ought to be found in the bone-bearing deposit from which the mandible of *Homo heidelbergensis* originates. This was also the starting-point of RUST's reflections. And when no flint was available, raw materials found in the locality were used. This is applicable especially to all periods of man's early history, a realization which should have by now become familiar. Practical experiments have shown that the quartzite-sandstone from Mauer is in fact quite serviceable for tool-making and in some cases also highly suitable. Essentially the problem lies in the poor typification of early tools and in the recognition of human workmanship, especially in tools made from coarse stone material and also which were rolled and weathered. There are fewer problems in dealing with classic pebble tools. The problems are much greater and partly insolvable with tools made of other raw materials.

As to the typification, finds allocated by RUST to his "Heidelberg stage" are by no means missing. Apart from simple scrapers, some having a bulb and a bulb negative, RUST especially differentiates between the "Nasenschaber" and the "Querhobel".

From the "Nasenschaber" has arisen the question of whether such forms could be chipped solely by natural forces, namely by pressure on one face (REGENHARDT 1970). It is quite conceivable that these or similar forms exist as a result of pressure from natural forces in one direction, within moraines or gravels. On the other hand, there are corresponding artefacts in the form of "Zinken" or "Grobzinken", made from blades, flakes or natural nodules in the Upper Palaeolithic and the Neolithic. Unquestionably, "Nasenschaber" also exist in old and reliable assemblages (ZIEGERT 1969). The "Querhobel" at Mauer appear again and again, always in the same form — an alternately carved-out cutting edge placed approximately transverse to the surface. The question is whether it can be accidental that certain forms are repeatedly produced by natural agencies; on the one hand, by pressure on one face — as the "Nasenschaber", and on the other hand, at the very same site, by alternate pressure on opposing faces — as the "Querhobel".

A further observation of significance in examining the finds from Mauer. A. RUST and the author were able to excavate a closed-complex of flakes and other artefacts from a limited area in the bone-bearing deposit. This assemblage will be published shortly by RUST.

With regard to RUST's conception of his "Heidelberg stage", one recalls what A. C. BLANC, the discussion-chairman at the International Congress on Prehistory in Hamburg, 1958, emphasized: "Throughout his research in Jabrud and the discovery of Upper Palaeolithic sites in the Hamburg region, Alfred RUST has demonstrated so much intuition that, through his rich experience, he is probably in advance of us in his handling of human artefacts."

RUST's suggestions in this sphere should be taken up, thoroughly and seriously examined, and followed up by modern research methods. Here a comparative-statistical analysis of the forms in a numerically large collection of material from artefact-bearing and artefact-absent sites, considered geologically similar, could possibly bring some progress. It is natural that the criteria of human workmanship cannot be based upon the numerous traits of the tools of later periods. The determination of artefacts and non-artefacts is also impossible with the aid of only one attribute. Adequate attribute-combinations must be worked out for the archaeological Palaeolithic which, indeed, must be claimed for a single artefact. Meaningful use should be made of modern statistical methods.

Indeed it must be noted with astonishment that almost no younger colleague is inclined to devote himself to this difficult yet urgent research problem. One exception appears to be in the work of W. D. LANGBEIN, who, at the instigation of G. RIEK, has prepared a (not yet published) dissertation on the very old finds from Schnaitheim (Württemberg). Apart from A. RUST research into the Archaeolithic has otherwise remained in the hands of amateur archaeologists such as J. ITERMANN (inf.) and A. FORSTMAYER (1973). But, precisely the development of new methods of evaluation leading to comprehension of the tools — the remains from the earliest periods of human history — in so far as they are open to possible examination, is not only interesting, but of the utmost significance in the achievement of decisive progress in this sphere (cf. also FEUSTEL 1970).

The geological classification of the Mauer finds appears to be clear. The bone-bearing deposit with the mandible should, on the evidence of fauna, be placed in the Günz-Mindel-Interglacial.

Another site of the Archaeolithic period is "Palenberg", north of Aachen, investigated by J. Itermann (ITERMANN 1970). If the tool character of the classic "Nasenschaber" and of several other tools from the same deposit could be effectively corroborated by further finds, it would be the oldest European Palaeolithic site, namely from the Upper Pliocene. Before a comprehensive evaluation of the site is made, it should first be further investigated. Unfortunately, the discoverer of the site, J. ITERMANN, has recently died.

The Lower Palaeolithic

Until recently there was no certain evidence for the Lower Palaeolithic within the Federal Republic of Germany. A single handaxe has long been in existence from Steinheim on the River Murr (Württemberg), the site of *Homo steinheimensis* (ITERMANN 1962, SCHWABEDISSEN 1970).

The handaxe was discovered by J. ITERMANN and, according to its stratigraphical position, it is the only older handaxe in Central Europe. GUENTHER (1970) dated it within the Mindel-Riss Interglacial, namely, in Holstein. Even if the Stein-

heim human skull also belongs to the same interglacial, there need be no direct temporal connection between the two. Beyond this, one or another of the numerous handaxes from Hessen may correspond typologically with those of the Abbevillian, but without an attendant-stratigraphy, precise dating is not yet possible.

Most remarkable is the increasing number of Clactonian sites in northwest Central Europe, especially in the Federal Republic. In the 1920's, O. K. PIELENZ had already discovered 2 assemblages in Hamburg-Eidelstedt: at "Jungbrunnen" and at "Großen Behnkamp", during exposure work. G. SCHWANTES regarded these as Levallousian and called them "Eidelstedt stage" (SCHWANTES 1934). O. K. PIELENZ allotted these finds to the Clactonian (PIELENZ 1961).

Geologically, the former site is dated before or early in the Saale Glaciation, and the artefact from "Großen Behnkamp" should originate from an involuted weathering horizon of Saale Glaciation. According to the material still available (part of it was lost during the war), and from the drawings of the finds, Clactonian is indisputably represented.

After the Second World War, A. RUST published the comprehensive material from Wittenbergen which lies on the steep bank of the Elbe, north of Hamburg (RUST 1962). The finds in question are from the collection of G. STEFFENS. Amongst these is to be found a complex, undoubtedly belonging to the Clactonian. Furthermore, material preserved in four other collections confirms the Clactonian character of the site. All the finds will be presented in a publication prepared by the author.

Geologically, the artefacts lie in the lower part of a till which is covered by peat of the Eem period (cf. GRUBE in RUST 1962). According to the statements of several collectors, part of the finds could certainly have been recovered from the section of the till. The tools by no means originated only from the foot of the steep bank. These belong to the period before the last phase of Riss-(Saale)Glaciation. They can, however, be reworked and belong to the Holstein Interglacial.

A further Clactonian assemblage comes from Nösse on the island Sylt. The site is not far from the Morsum Cliffs and lies under a thin capping bed of silt. The age of the silt is not certain but may possibly be determined by pollen analysis. The finds lie in a gravel horizon under the silt. These artefacts will also be presented in the above-mentioned publication.

PIELENZ (1970) and others (BAUDET 1970) have placed the numerous finds collected on the Baltic coast in the Clactonian, which indicates the presence of a Clactonian habitus. The dating of these finds is still problematic because they have not yet been recovered from a geologically datable deposit. Whilst part of the flint artefacts from the Ertebölle period and the Neolithic of the north also show very archaic features (SCHWABEDISSEN 1968), the classification of these finds must be regarded as uncertain. This need not mean that no old finds or possible Clactonian can be found on the Baltic coast. A site now being investigated by us, at Eckernförde Bay, may clarify matters. At the base of a 12 m. thick section lie stratified clays, which, according to R. SCHÜTRUMPF, belong to the pre-Eem Interglacial. Artefacts recovered thus far have supposedly been buried under these interglacial clays. The investigations, carried out in association with R. SCHÜTRUMPF and various geologists, has not yet been concluded.

At this point, another site should be mentioned, which was discovered by W. ADRIAN (1969) on the southern slope of the Teutoburg Forest near Stukenbrock, not far from Bielefeld. Besides the pebble tool like implements, the finds also include artefacts of Clactonian similarity. The geological dating of the finds, which lie both on and in the Riss sands, has not yet been determined.

In conclusion, it can be affirmed on the grounds of new research that the Clactonian was not confined only to northern France and England, but was also distributed in the northwest continental area. When one includes several central German sites such as Walendorf and Wangen (TOEPFER 1968) it extended into the middle of Central Europe.

The only comprehensive excavation of a Lower Palaeolithic site in West Germany is that of Hunas near Hersbruck in Franconia (HELLER 1966), where a cave choked with rubble was exposed by quarrying operations. In an investigation carried out by Fl. HELLER in association with W. SESSLER, a stratigraphy was uncovered containing rich palaeontological material and also artefacts. Among the latter no handaxes are to be found. Tools with a flake character predominate. The exact archaeological assignment of this stone industry is yet to be settled. The palaeontological remains in conjunction with the stratigraphy indicate that the site belongs primarily to the Riss Glaciation.

The Middle Palaeolithic

Since the 1960's, the opening up of the Middle Palaeolithic has become the central point of Palaeolithic research in the Federal Republic of Germany. In 1960 G. BOSINSKI completed a monograph on the Middle Palaeolithic in western Central Europe. This publication, which appeared several years ago (BOSINSKI 1967), presented the then-known material, and an archaeological as well as a chronological classification were attempted. The working out of groups and inventory should especially be mentioned. Besides this, the Micoquian was shown for the first time to be separate and predominately handaxe culture with various sub-groups. The distribution centered mainly in the highlands of Central and Southern Europe. G. BOSINSKI's monograph represents an important basis for research into the Middle Palaeolithic

The above-mentioned monograph is supplemented by a study by H. SCHWABEDISSEN on the distribution of the handaxes in Central Europe (SCHWABEDISSEN 1970). Thereby it becomes evident that, in contrast to the earlier opinion of ANDREE (1939), western Central Europe belongs to the distribution area of the handaxe culture, at least in its later phases. Furthermore, it now appears that an area formerly held to be without finds, such as Hessen, today represents a central distribution area of handaxes, thanks to the efforts of A. LUTTROPP. Of the thousand or so handaxe finds in Central Europe, half belong to Hessen. This is mainly because A. LUTTROPP has drawn attention to quartzite as a raw material. The distribution of quartzite handaxes extends into the Rhineland and the Palatinate.

One of Luttrupp's assemblages, that of Reutersruh, has been published in a monograph by BOSINSKI and LUTTROPP (1971). Further finds from Hessen, especially that of Lenderscheid, still await publication. In North Germany the number of sites of handaxes has also greatly increased.

Besides the comprehensive publications, a whole series of excavations belong to the Middle Palaeolithic.

In 1960, G. RIEK began excavations in the "Großen Grotte" near Blaubeuren. The investigations, which were continued until 1964, provided the following stratigraphy (WAGNER 1972):

At the bottom, Acheulian with Levallois technique

A layer with few artefacts of Micoque character

Mousterian of La Quina type

Mousterian of another type, mostly with leaf points (Blattspitzen)

This last layer II is the richest in finds.

While the geological classification of the basal layer should be confirmed as Riss-Würm Interglacial, that of the subsequent layers remains unclear. They should belong to an early period of Würm. The layer with abundant leaf points (Blattspitzen) belongs to the period after the cold maximum in Würm I, forming the transition to the Würm I/II Interstadial, which is in accordance with the appearance of early leaf points (Blattspitzen). The layers predominated by leaf points between the Mousterian and the Würm I/II Interstadial are the most interesting.

In 1964 L. F. ZOTZ began an excavation at the "Sesselfelsgrotte" near the Altmühltal in Neu-Essing (ZOTZ 1970). Since 1967 it has been directed by G. FREUND and investigations are still being carried out (FREUND 1968—70). The numerous archaeological levels descend from the Mesolithic through an Epipalaeolithic and a late Upper Palaeolithic to a richly provided Middle Palaeolithic. In the lower levels, interesting Microlithic tools appear (FREUND 1968), and artefacts of Levallois technique excluding handaxes. As to the character of the lower artefact levels, nothing final can be stated until work on the remaining levels is completed. A similar situation exists with regard to the geological classification of the levels. The Sesselfelsgrotte already appears to be a significant site of the sub-division of the Palaeolithic. Especially the Middle Palaeolithic levels with Micoquian connections containing bifacial artefacts and Microlithic tools promise to widen our knowledge of the period and its sub-divisions.

To this can be added the research project undertaken by H. MÜLLER-BECK, whose purpose is the correlation of the stratigraphy of "Speckberg" (near Meilenhofen) and that of the "Weinberghöhle" near Mauer (MÜLLER-BECK 1973).

Both sites lie on the southern slopes of the Franconian Alps facing the Danube in the area of Neuburg a. d. Donau and are only 10 km apart. Speckberg is an open air site and the Weinberghöhlen are cave settlements. The project was founded to correlate the stratigraphies in order to obtain a complete relative cultural sequence for the area and perhaps also for a larger region. There are several difficulties, such as the absence of a continuous stratigraphy at Speckberg. The settlement levels are scattered over the plateau of the north depression (Nordmulde) and on the slope of Speckberg. MÜLLER-BECK writes:

"At Speckberg it is a question of condensed horizons which allow no fine archaeological interpretation." To begin with, the different levels at Speckberg, i.e. the settlement sites, must be placed in relation to one another and then the whole Speckberg stratigraphy must be connected to that of the Weinberg caves. MÜLLER-BECK (1973) has undertaken the attempted correlation but is himself aware of its hypothetical nature, particularly as "... the preservation of the faunal remains at Speckberg is very bad."

No particular opinion can be expressed about this interesting project before the analysis has been completed. Incidentally, one may recall the difficulties encountered in the correlation of the phases of Hengelo and Dehnekamp in Holland with that of the south of Germany and cave sedimentation layers, because of the varying nature of the regions.

In the Rhineland, the loess site of "Rheindahlen" near Mönchengladbach has become well-known, thanks to the recovering of finds during the Second World War by E. KAHRs. In 1949 K. J. NARR carried out and published the results of a short excavation (NARR 1951). In 1964 the Institut für Ur- und Frühgeschichte of the University of Cologne (Köln) undertook an excavation there under the direction of G. BOSINSKI. This is still in progress. The importance of Rheindahlen lies in the superimposition of several cultural layers in the loess. At the base is found a recently recognized and still poorly documented cultural layer containing artefacts of Levallois type. (BOSINSKI & BRUNNACKER 1973). The third find-layer from the base produced few artefacts which cannot be assigned to any

of the existing inventory types. The depression 3,70 x 2,90 m, interpreted by G. BOSINSKI as a dwelling pit, should be noted. The fourth layer from the base and the uppermost of all was in a redeposited area. According to BOSINSKI, its artefacts are typologically similar to those of the inventory type "Balve IV".

The geological interpretation of the section and the geo-chronological classification of the find-layers provide several difficulties, as "Rheindahlen" lies in an area of Atlantic climate. According to the present analysis of the profile by K. BRUNNACKER (BOSINSKI & BRUNNACKER 1973), the lower layer of Levallois character was accorded to the beginning of the Riss Glaciation and the layer above, with "Rheindahlen-type" artefacts, placed in the middle of Riss. The third layer should belong to the end of the Riss-Würm Interglacial. This geological classification is not completely in accord with the classification of the accompanying artefacts. Perhaps the recently begun excavations at Rheindahlen can contribute to a further elucidation of the geological position of the different cultural levels.

At "Rörshain", a site near Ziegenhain (Hessen), discovered by A. Luttrupp, excavations were undertaken in 1965 and more recently in 1972 for the Institut für Ur- und Frühgeschichte, Cologne, by G. BOSINSKI (LUTTROPP & BOSINSKI 1967). At the base of a layer 1—1,3 m thick, composed of a mixture of loess-loam and sand, and covered by a continuous band of clay, was found a rich layer of finds containing Middle Palaeolithic artefacts. It is probably the richest site in Central Europe; one square metre of the cultural layer yielded nearly 1000 artefacts.

Among the finds, two assemblages can be differentiated; one with handaxes belonging to the Acheulian and a second which includes handaxes and Micoquian "Faustkeilblätter", as well as leaf points (Blattspitzen).

The significance of "Rörshain" lies in the opportunity given to G. BOSINSKI to put forward the inventory type "Rörshain", which should lie between the Micoquian and the Altmühl groups of leaf point (Blattspitzen) cultures (BOSINSKI 1973). This also casts some light on the evolution of the leaf point cultures. Exact geological dating is unfortunately impossible and is hardly to be expected from the new excavations.

On the outskirts of the village "Buhlen", near the Eder Barrage, a site was discovered on a stepped ridge of Permian Dolomite, projecting into the valley, with Middle Palaeolithic stratified cultural layers. At the foot of the ridge lies a site of similar age which is interspersed with fluvial sediments. At the site, discovered by the geologist J. KULICK, the excavations were directed by G. BOSINSKI in 1966/67 and 1969 for the Institut für Ur- und Frühgeschichte.

An inventory was ascertained from the lowest cultural layer including a handaxe and Levallois flakes. A more exact archaeological classification of this layer is not yet possible. The same holds true for the next younger layer, containing large Levallois points and Levallois cores. The layer above this is very rich in material, containing Micoquian finds. These are similar to the "Klausennische" inventory type, but exhibit peculiarities, especially the so-called "Pradnic knife". The best comparable forms are to be found in the Polish caves near Cracow.

The topmost layer once again exhibits the considerable use of the Levallois technique and also yields numerous scraper types. In general, the inventory is of the type "Balve IV".

The significance of the site, for which a thorough preliminary report is available (BOSINSKI et al. 1973), lies in the evidence of a Micoquian facies with "Pradnic knives", formerly unknown in Germany. In a future excavation it would be important to elucidate the lowest cultural horizon. The geological-palaeontological analysis is not yet complete.

The presence of a band of volcanic tuff is significant, as is that of a rich rodent fauna in almost all layers.

After the war, A. TODE was able to excavate the important Middle Paleolithic site of "Lebenstedt-Salzgitter" on the North German Plain (TODE et al. 1953). Unfortunately, the monograph has not yet been published. The site lies on the slope of a river valley and was discovered by dredging. The find-layer is 4—6 m below the surface. The deposition of the finds below the water-level, partly in gyttja, has preserved the organic material excellently.

The fauna is well-represented; plant remains are also preserved and further pollen analysis was possible. Among the bone tools, a winged arrowhead and several dagger-like weapons, 60—70 cm long, made from mammoth ribs, are notable. As to human remains, it was possible to recover part of a skull.

The flint artefacts include handaxes of an evolved type, leaf points (Blattspitzen) and scrapers of various kinds, as well as artefacts of Levallois technique. Although the industry-assemblage shows individual traits, there is nothing to indicate that this assemblage is not homogeneous (cf. KLEINSCHMIDT, in TODE 1953). From the finds of Lebenstedt G. BOSINSKI has established a "Lebenstadt-group" representing his younger Acheulian.

In the dating of the "Lebenstedt-Salzgitter" site, geologists, palaeontologists, and pollen analysts are of the same opinion: a period of early Würm, perhaps an interstadial, is to be considered. This could be confirmed by several ¹⁴C-dates c. 50,000 BP. These results obtained from gyttja and wood possibly point to the Brörup-Interstadial. Further details can be expected in the monograph.

If the finds from "Lebenstedt-Salzgitter" really represent a younger Acheulian phase, and of this there can be no doubt at Lebenstedt, then this phase should in general terms be dated early Würm. But the many previously obtained dates would tend to contradict this. The well-known Acheulian or Acheulian-like sites such as those at "Herne" or "Ternsche" (ANDREE 1939) and in the Leine area near Hannover (JACOB-FRIESEN 1949) have hitherto been placed within the Riss (Saale) Glaciation. Indeed, dating seems to be uncertain and requires checking. The whole of Central Europe is lacking in excavated Acheulian sites with reliable dates. River gravel does not provide the best basis. From the archaeological point of view, it seems questionable whether all the sites with evolved Acheulian types in Central Europe really belong to one group and one period including Lebenstedt. It appears that Lebenstedt represents a young group, precisely the younger Acheulian of the early Würm period, which is preceded by an earlier phase of late Acheulian.

In order to test this hypothesis, a section was recently cut through the loess at "Hochdahl" (Neanderthal), location of the well-known handaxes, but the geological interpretation is not yet completed (SCHWABEDISSEN 1970).

When we survey the research into the Middle Palaeolithic in the Federal Republic of Germany since the war, we see that a large amount of activity has taken place in the form of comprehensive studies and excavations, which, when all the excavation results are published, may signify notable progress. A substantial contribution has undoubtedly been the work of G. BOSINSKI.

The Upper Paleolithic

While investigation through excavation lies in the forefront of palaeolithic research into Middle Palaeolithic, the same does not apply to the Upper Palaeolithic. Evidence

for the *Aurignacian* comes from many caves, especially in Southern Germany. Only one really excellent cave site is to be found in the Federal Republic, namely, Vogelherd in Lonetal (RIEK 1934). Indeed, this site with its animal sculptures hold an outstanding international reputation. At this point, a new sculpture from Lonetal, namely a human figure, is worthy of mention. It was discovered among the excavation finds from "Hohlenstein-Stadel" near Ulm and was put together by J. HAHN. It is 28,1 cm high. This largest known Aurignacian sculpture shows a completely individual style. The best illustration of it is found in HAHN 1970. Among the Aurignacian loess sites in Central Europe, only that of Breitenbach near Zeitz (German Democratic Republic) deserves mention. Recently J. HAHN found an Aurignacian site in loess at Lommersum in the Rhineland, which is important because of its westerly location and also because of its bone preservations. These are rare in central and western Europe (HAHN 1973). Its assignment in Aurignacian is assured by the flint technology and a ^{14}C -date of $33\,420 \pm 500$ (GrN = 6191). Certainly, the quantity of tools is still small; however, the excavation is not yet completed. A western Central European counterpart to Krems and Willendorf would undoubtedly be desirable.

We are further indebted to J. HAHN for a comprehensive study, "The Aurignacian in Central and Eastern Europe", a dissertation at the University of Cologne (Köln). In this dissertation, HAHN has re-catalogued and presented nearly the whole find material of Central and Eastern Europe. The comparison with the French material is important and is known by the author from his studies with F. BORDES. HAHN's work will provide an important basis for further research into the Aurignacian in general. Publication of the monograph is in preparation; a summary is being printed (HAHN 1973).

The extent to which classic *Perigordian* is present in Central Europe remains an open question. Until now only layer 4 of the "Ilsenhöhle" near Ranis in Thuringia is available for discussion (ANDREE 1939, fig. 214). No new material has been added to this sphere.

The situation of the *Gravettian* is similar. Its presence in Central Europe is beyond doubt, as demonstrated by the loess site of "Linsenberg" within the present city-limits of Mainz. HAHN (1971) has recently published the finds. It remains to be considered whether the finds from "Mauern", which BOHMERS (1951) refer to as *Lower Magdalenian*, represent a *Gravettian*. Furthermore there are a number of cave strata and single loess sites which may be considered *Gravettian*. In particular, several as yet unpublished loess sites could provide the inception for a more intensive investigation of the *Gravettian*. Such an undertaking would be important in clarifying the connections with the West *Gravettian* or with the East *Gravettian*. The presence of a few "gravettes" (*Gravette Points*) is not sufficient ground for seeing *Pavlovian*, as in the finds from Speckberg (MÜLLER-BECK 1973). Apart from that, until now, neither a *Pavlovian*, nor an East *Gravettian*, nor a West *Gravettian* have been clearly distinguished.

Whereas the *Solutrean* in France and Spain represents a special facies and is absent from Central Europe, the *Magdalenian* is represented in Central Europe. However, Central Europe seems to have played no essential role in the earlier development of this facies.

There are almost no sites in the Federal Republic which may be placed in the old phase, namely in early or middle *Magdalenian*. Undoubtedly, archaic features are to be seen at two or three sites (cf. SCHWABEDISSEN 1954, fig. 101 a), but a definite classification is not possible. The same is true of the site of "Munzingen" at Kaiserstuhl, which is covered by 4 m loess (PADTBERG 1925). Recent geological investigations by GUENTHER (1968) have shown that the over-lying loess deposit is secondary. The archaeological in-

ventory indicates neither an early nor a middle Magdalenian. This is also the case with the lower Magdalenian from Mauern (BOHMERS 1951). In general, the majority of Magdalenian sites in Central Europe belong to the late Magdalenian. This is true of the numerous sites within the Federal Republic as well as of those in Thuringia, especially the Kniegrotte, Ölknitz and Saaleck (ANDREE 1939), and the cave site of Pekarna in Moravian Karst area. Formerly Petersfels near Engen in Hegau (PETERS 1930) was the richest and most important site in West Germany. However, since the beginning of the investigations at Gönnersdorf in 1968 by G. BOSINSKI, and which are still continuing, this site must be regarded as the most important of the late Magdalenian in Central Europe.

The site of "Gönnersdorf" lies on the edge of the Neuwied basin, barely 20 km north-west of the city of Koblenz. It is an open air site covered by a thin layer of loess above which lies pumice deposit. The pumice deposit, which is 1—1,5 m thick, originates from an eruption of the Laacher See Volcano. It belongs to the Alleröd period and provides a "terminus ante quem". The archaeological finds lie in the 20—30 cm thick primary and partially loamed loess. Above the loess there is a thin humus layer which led to partial loaming of loess. The humus layer may have been formed in the early to middle Alleröd or in the preceding oscillation. While certain indications of a Bölling date for the cultural layer are present, a reliable date can only be expected from ¹⁴C dating. It is geologically noteworthy that during the settlement period and shortly afterwards loess still drifted over the site — a much discussed question (cf. NARR 1953). The bone remains are important for palaeontology. The fact that the mammoth still lived in the Rhineland at this time deserves to be mentioned.

Of the archaeological finds and structures, the following should be mentioned:

- 1) groundplans of dwellings, 2,5—5 m in diameter, and two of 6 and 10 m diameter
- 2) flint tools, among them, backed blades though without end retouch, and no penknives (Federmesser)
- 3) bone points of various types, fragment of a harpoon and of a 'bâton de commandement' and bone needles
- 4) ornaments: perforated teeth and perforated snails (some from the Mediterranean area), beads of fossilized wood, including a necklace of more than 30 wooden beads, and the incisors of red deer, etc.
- 5) about 200 perforated discs, some with engravings
- 6) art:
 - a) 15 stylized female figurines out of antler, ivory, bone, or slate
 - b) engravings on slate plaquets with drawings of female forms, animals (mammoth, wild horse, rhinoceros, wolf, lion, auroch, bison, deer, fish, and birds) and of non-figurative designs (circles, cross, bundles of lines)

Geologically, the significance of "Gönnersdorf" lies in the relatively exact dating to the period before middle Alleröd and in the youngest phase of loess formation. Palaeontologically its importance lies in securing the accompanying fauna, and archaeologically, in the evidence for dwellings, in the acquisition of a closed tool-inventory of the Late Magdalenian and in the numerous examples of art (figurines and engravings) which, in part, add to the faunal range.

The engravings connect our area with Western Europe. Gönnersdorf gives an indication that crucial finds from the Magdalenian need not only be expected from caves but also from open air sites. The open air site of Gönnersdorf contributes essentially to the characterizing of the Late Magdalenian in Central Europe.

Geographically, Late Magdalenian is widely distributed throughout Central Europe, as shown by maps (cf. SCHWABEDISSEN 1954, fig. 101 b, principally cave sites). Whether

the impression that the Magdalenian infiltrated Central Europe from the west during its later phase is correct, must be elucidated by further research.

During the Oldest Dryas period a culture appeared on the northwest European plain diverging from the Magdalenian, namely the Hamburgian. Its morphology and distribution have been worked out in the works of SCHWANTES (1934), RUST (1937, 1943), and SCHWABEDISSEN (1938). In this respect, the excavations conducted by A. RUST during the 1930's in the Hamburg area at "Meiendorf" and "Stellmoor" were decisive. In these excavations, the Late Palaeolithic was unearthed, using modern scientific archaeological methods and thereby heralding a new epoch. RUST resumed his excavations in the post-war years and considerably augmented our knowledge of the Hamburgian culture through his investigations of the sites at Borneck, Poggenwisch, and Hasewisch (RUST 1958).

At all three sites, it was possible to demonstrate for the first time the presence of Late Palaeolithic dwellings in the shape of round tent ground plans c. 5—6 m in diameter. These discoveries gave impact to the identification of Palaeolithic dwelling ground plans in Central and West Germany as well as in France.

Another important result is the evidence for a younger phase of the Hamburgian culture. With the aid of pollen analysis, carried out by R. SCHÜTRUMPF, the site of Poggenwisch could be dated to the Oldest Dryas immediately before the Bölling Oscillation. According to pollen analysis, Meiendorf and Stellmoor belong to the full Oldest Dryas (cf. SCHÜTRUMPF, in RUST 1958). Finds of the later Hamburgian culture of the Poggenwisch type were secured by BRÜCKNER (1970, p. 365 f, fig. 114) from the steep bank on the Baltic coast near Grömitz. These were covered by till. Geologically, this means that before Bölling, or, what is more probable, in the ensuing Older Dryas (absolute date 10,000 B.C.), the glaciers must have advanced once again into the Bay of Lübeck, so that the site was covered on their retreat by till up to 4 metres thick.

Furthermore, the conjecture that the Hamburgian culture could be subdivided into phases, which had been based on typological comparisons, was confirmed by the excavations at Poggenwisch (SCHWABEDISSEN 1938 and 1949).

The chronological relationship of the Hamburgian culture to the Magdalenian has to be further clarified. If the late Magdalenian at Gönnersdorf is not datable before the Bölling Oscillation, then Hamburgian is clearly older. This has been assumed by RUST (1937) and SCHWABEDISSEN (1938). It might, in fact, be contemporary with the Middle Magdalenian.

As to the distribution of the Hamburgian, the area mapped by SCHWABEDISSEN (1944, Plate 125) has since been enlarged, especially by new sites in Holland (BOHMERS 1970, p. 13, fig. 9) and those in Lower Saxony (NOWOTHNIG 1963). It extends from the southern part of Jütland to the Midhighlands and in the west, as far as the lower course of the Rhine. The work of A. RUST in the Ahrensburg-Meiendorf Tunnel valley area has recently been resumed by G. TROMNAU. The results of his excavations of different settlement sites lying on mineral soils of the Tunnel valley are in the process of being printed.

With the Alleröd Oscillation, which seems to signify a remarkable period at the end of the Ice Age, a number of archaeological industry assemblages emerge in the north-western part of the European continent and beyond. These are the Penknife (Federmesser) and the Tanged Point (Stielspitzen) cultures, each having several sub-groups.

Since 1938, H. SCHWABEDISSEN has published a series of articles introducing the finds of new sites in Northern Germany, the Netherlands, and Northern Belgium. They are

grouped together as the penknife (Federmesser) civilizations and are regarded as a type of the Final Magdalenian (SCHWABEDISSEN 1944 a, 1944, 1951). The whole material has also been published in a single monograph (1954).

Since then, the sites of "Martinshöhle" near Lethmathe (Westphalia), "Martinsberg" near Andernach on the Rhine, and "Probstfels" near Beuron (Baden-Württemberg) have confirmed the relationship with the Magdalenian. The connections with the Magdalenian have become evident firstly, through the excavation at Gönnersdorf, from which penknives (Federmesser) are absent, and which lies in loess, therefore must be dated as true Late Magdalenian, and secondly, from the newly submitted report by BOSINSKI and HAHN (1972) about the finds of Martinsberg, which includes penknives.

In the geographical distribution between Northern Belgium and Holstein various groups can be distinguished: the Tjonger group in Northern Belgium and the Netherlands, the Rissen group lying between Western Holland and the Hamburg area, and the Wehlen group in northeastern Lower Saxony and southeastern Holstein.

The chronological position of the Penknife (Federmesser) groups has also been established in the post-war period. The site of Rissen yielded two sections: Rissen 14, with an overlying bed of finds of the Younger Dryas Ahrensburgian culture, and Rissen-Bombenrichter, with an underlying bed of gyttja, dated by pollen analysis and ¹⁴C methods to the Alleröd (SCHWABEDISSEN and SCHÜTRUMPF). At Borneck near Ahrensburg, the Wehlener group could similarly be dated to the Alleröd period (RUST 1958: contribution by SCHÜTRUMPF, p. 11 ff.). Lastly, the site of Usselo near Enschede, Holland, belonging to the Tjonger group, also was dated in the Alleröd period (HEIJZELER 1947).

Concerning the history of settlement, the appearance of numerous sites during the Alleröd period is very interesting. The improved climate of the Alleröd, with the changes in flora and fauna, evidently made the North German and the Dutch Lowlands very attractive to man. This was not only the case for the Lowlands of northwestern Europe but also generally for the open air area and for the Highlands of western and central Europe. Since the establishment of penknife groups in northern Germany, corresponding groups have been identified in several regions of Poland, Czechoslovakia and Switzerland. The Azilian of France and the Romanellian of North Italy can also be included. These two groups can also be dated to the Alleröd.

While we know something of the dwelling-types of the Penknife civilizations — SCHWABEDISSEN has identified a hut depression at Rissen (1954, p. 37, fig. 21/22) and RUST likewise a hut foundation made of stones (1958, p. 46 ff., figs. 13, 14) — an excavation of a Penknife (Federmesser) site in the lowland area with bone and antler material and possible evidence of art is still lacking.

Concerning the stratigraphical relationship of the Penknife culture and the Late Magdalenian, W. TAUTE recently published an important cave section at "Zigeunerfels" near Sigmaringen, in which a Late Magdalenian was covered by several Penknife layers (TAUTE 1972, p. 29 ff., plus fig.).

Concerning the history of settlement, the opening up of the Penknife groups in the north and northwest of our continent and in vast regions of Europe is one of the most important results of prehistoric research in the last decades. It can clearly be seen how man took possession of the open air area shortly before the end of the Ice Age, i.e. in the Alleröd Oscillation.

During the Alleröd period, the so-called Bromme/Lyngby group is to be found in Jütland and on the Danish coast and is to be included in the Tanged Point cultures (Stielspitzen). There is also indication of interlocking with the Penknife civilizations in the

southern part of Jütland. Besides the large, tanged points of Bromme/Lyngby type, penknives and backed blades are found on many sites. This may indicate that these civilizations were contemporary. The dating of Bromme on Seeland to the Alleröd is certain. Furthermore, at the Pinnberg excavations near Ahrensburg, a Bromme/Lyngby complex could also be dated by pollen analysis to the Alleröd period (SCHÜTRUMPF, in RUST 1958).

The Younger Dryas, which brought a cold recession, is, strictly speaking, the period of the Tanged Point (Stielspitzen) groups in the North German, Dutch, and Polish Lowlands. The best-known is the Ahrensburg group which is distributed between the Netherlands and the region of Berlin (cf. TAUTE 1968, Map 107) and which was first revealed in the excavations of A. RUST (1943). Except for the above-mentioned investigation by G. TROMNAU at Ahrensburg — Meiendorf Tunnel Valley — no other significant excavations during the post-war years have been recorded. The complete material from northern Central Europe, supplemented by that from his own excavations, was presented and methodically dealt with in a comprehensive monograph by TAUTE (1968). His work lays the foundation of further research in this field. Whether or not one accepts all of TAUTE's sub-groups — for which the material is insufficient or incomplete — the merits of the monograph still stand.

The Mesolithic

Before we turn to the details of the Mesolithic, a few words on the dividing line between the Palaeolithic and the Mesolithic are relevant. In northern, central and other parts of Europe, the line is drawn after the Ahrensburg or its contemporary culture. Consequently, the division lies, in geological/geo-botanical/palaeontological terms, after the Younger Dryas and coincides with the conventionally accepted end of the Ice Age. In southwestern Europe, above all in France, there is a tendency to regard the cultures of the Alleröd, i.e. the Azilian, as already Epi-palaeolithic or early Mesolithic.

Naturally, the Alleröd does not signify a division between the Pleistocene and the Holocene in geological terms as in the following Younger Dryas period a marked cold recession ensued noticeable even in the central and southern French pollen profiles and also in the fauna. A general development began only after the Younger Dryas, which has led to present conditions.

The next point of interest to archaeology is that man's way of life and his culture were firmly embedded in and influenced by his environment. The cultural remains from the Alleröd and the Younger Dryas periods are also more closely connected to the Palaeolithic, while in the Pre-Boreal a development of tool techniques and a cultural history began leading to present conditions. An exhaustive and detailed discussion of the above question is found in two publications by SCHWABEDISSEN (1961/64 and 1971).

The excavations at Pinnberg in the Ahrensburg-Meiendorf area carried out by A. RUST in 1937/38 and published in a monograph (RUST 1958) lead us to the questions of transition from Palaeolithic to Mesolithic and the development of early Mesolithic cultures. At Pinnberg, the ground plans of huts and the evidence of the oldest core and flake axes are important.

Immediately after the war, H. SCHWABEDISSEN took over the excavations at the well-known moor site of "Duvensee" in southern Holstein — originally begun by G. SCHWANTES and K. GRIPP (SCHWABEDISSEN 1949). These investigations were continued by K. BOKELMANN in an excavation in 1966/67. He has since assembled and evaluated the results of his own and all previous excavations in this area in his dissertation (BOKELMANN 1969). Although a monograph has not yet been published, a summary has appeared (BOKELMANN 1972).

K. BOKELMANN was able to work out five different living areas, of which the most important (area 1) belongs to the beginning of the Boreal, according to pollen analysis by R. SCHÜTRUPF (in BOKELMANN 1969). The ^{14}C -dates lie c. 7000 B.C. One of the most important results of BOKELMANN's research is the archaeological and pollen analytical evidence for "floating islands" as they existed in the living area 1 with one hut built on a flooring of wooden logs and bank. Pieces of wood and flint artefacts on the former "floating islands" and below could be fitted together. R. SCHÜTRUPF (loc. cit.) was able to show by pollen analysis that the peat of the "island" and the underlying gyttja were of the same date. J. TROELS-SMITH was the first to produce evidence for "floating islands" and now this can be exactly demonstrated by archaeological methods.

Furthermore, BOKELMANN was able to confirm the independence of the Schleswig-Holstein area and those adjoining it in the south and east from the Maglemose group in the north. In accordance with the present state of research, it is no longer possible to term all Mesolithic sites with bone and antler implements as Maglemose irrespective of the flint inventory. Unfortunately, this still often happens. Moreover, BOKELMANN distinguished an older and a younger Duvensee group. The Duvensee living areas 1 and 2 belong to the older group.

The question attached to the Duvensee finds is whether a genetic relationship exists between them and those of the next phase of cultural development, the Oldesloe phase (in Jutland, the Gudena Culture). G. SCHWANTES placed the Oldesloe at the beginning of the Atlantic. Proof of this has long been wanting. Recently two Oldesloe sites were excavated in the peat-bogs of the Satrupholm Moor, district Schleswig. These were the sites of "Fasaneninsel" and "Rüde 2", with its wood and bone tools (SCHWABEDISSEN 1957/58). According to the pollen analysis, the latter actually belongs to the early Atlantic, roughly at the end of pollen zone VIII a, according to OVERBECK-SCHMITZ.

So, between the Duvensee phase and the dated Oldesloe sites, there is a considerable space of time. Moreover, the blade technique in Oldesloe is very fine and contrasts with the flint techniques in Duvensee. The Satrup sites evidently represent a later Oldesloe phase. BOKELMANN is certainly correct in assuming that there are several phases of development within the Oldesloe group. In the Duvensee, different phases of development must also be reckoned with during the Boreal; its earliest phase is not yet known. The question of a genetic relationship between Duvensee and Oldesloe must, for the present, remain open, since excavations of a later Duvensee and an earlier Oldesloe site are lacking.

In southern Germany, the excavation of various cave sites by W. TAUTE has provided important information about the development of the Mesolithic between the Alps and the River Main. One is the already-mentioned "Zigeunerfels" cave (TAUTE 1972) where an early Mesolithic lies above the various Penknife (Federmesser) layers. The second cave site of special importance is the "Jägerhaus Grotte" near Beuron. Here W. TAUTE uncovered a series of Mesolithic cultural layers with a closed stratigraphy (TAUTE 1967). Until then, a stratigraphic succession for the Central European Mesolithic was missing, making TAUTE's excavation results all the more important. Even though the cultural succession at "Jägerhaus Grotte" may contain certain local characteristics, the stratigraphy still provides an important base for further research into the Mesolithic in southern Germany.

It should be added that W. TAUTE has written his "Habilitation" on the Endpalaeolithic and Mesolithic in southern Germany. The first part of this is in print (TAUTE 1971). Furthermore, S. K. ARORA is working on the West German Mesolithic as a dissertation for the University of Cologne (Köln). This work is almost finished. Thus, investigations into the Mesolithic in western Central Europe have been completed.

The Proto-Neolithic

As with the above-discussed transition Palaeolithic/Mesolithic, the transition from Mesolithic to Neolithic is of special interest to prehistoric research. It means a change in living styles: from that of the hunter, fisher, collector nomadic life to that of the farmer, living in permanent village-like settlements. Interest in the evolution of the Neolithic is so widespread because an economic and cultural phase was begun which has practically continued up to the present time. The problem to be elucidated here is whether the Neolithic culture, first emerging in the Near East spread from there by folk movements or arrived in Europe by gradual cultural diffusion from the Mesolithic cultures, or whether both factors played a role in certain areas.

On several of his excavated sites in southern Germany (Jägerhaus, Falkensteinhöhle, Lauterneck), W. TAUTE found Neolithic elements in a Mesolithic milieu.

In another area, namely the north, Neolithic influences appear to be more tangible, e. g. in the so-called Ellerbek-Ertebölle culture of Schleswig-Holstein. The so-called "Kjökkenmöddinger" or kitchen middens of the Ertebölle culture in Denmark were and still are placed in the Mesolithic. In Schleswig-Holstein there are no kitchen middens but inland-settlements appear on rivers or lakes, and also on the Baltic coast. Although the kitchen middens in Denmark represent a special phenomenon, the groups in Schleswig-Holstein are chiefly referred to as Ellerbek-Ertebölle.

New light has been cast on this group by the excavations of H. SCHWABEDISSEN on the Satrupholm Moor between Schleswig and Flensburg (SCHWABEDISSEN 1957/58) and on the Baltic coast at Rosenhof in the Lübeck Bay (SCHWABEDISSEN & SCHÜTRUMPF 1972).

Domesticated animal appear in all Ellerbek settlements and, according to the investigations of G. Nobis, these are mainly cattle and pigs. Besides this, all pollen profiles from the Ellerbek period analysed by R. SCHÜTRUMPF produced clear examples of cereal pollen, admittedly only 1—1½%. In addition, ashwood spades and pottery are present. As regards the pottery, clear Neolithic elements are recognizable at Rosenhof. Besides this, several broken pieces of pick or adze-like (Schuhleistenkeil) stone tools are also present.

Everything points to the fact that c. 4000 B.C. and shortly thereafter, in a period in which full Neolithic cultures (late Bandkeramik, Stichbandkeramik, early Rössen) were widespread throughout Europe, more and more Neolithic elements penetrated the originally Mesolithic cultural milieu and altered it in the direction of the Neolithic, so that the Ellerbek group can no longer be referred to as Mesolithic but as Proto-Neolithic.

The excavation at Rosenhof has produced one further important result (SCHWABEDISSEN/SCHÜTRUMPF 1972). By means of several sections, it was shown that the Ellerbek site at Rosenhof had definitely lain on the shore of a former bay of the Baltic Sea — the Dahme Bay. The refuse from the settlement lies in unequivocal sea sediment, as shown by R. SCHÜTRUMPF (loc. cit.).

This Ellerbek shore lay c. 3,50 m below present sea level, thereby excluding subsidence of the settlement layer which lies on till. This means that the level of the Baltic Sea c. 4000—3600 B.C. was some 3,50 m lower than today. Dates obtained by ¹⁴C methods during c. 3000 and 2000 B.C. provide further reference points for the variation in sea levels, at least in the area of the Dahme Bay.

It appears that under favourable conditions it is possible to obtain dates for important geological questions such as sea-transgressions by archaeological methods.

In general, the necessity for more direct interdisciplinary participation of all the branches of quaternary research, including prehistoric archaeology, is becoming more apparent. This contribution is intended to further this end.

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