THE PROBLEM OF RACE IN THE MESOLITHIC OF EUROPE[1]

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The problem of the origins and racial affinities of the mesolithic peoples of Europe has received attention from a good many writers in the past. Much of the material on this subject is conflicting and the arguments are scattered throughout a large number of sources. It may at least be suspected that some of the arguments have been influenced by the geographical locations and cultural associations in which the human remains have been found. The notion of race itself has undergone some revision in the period during which these remains have been accumulated (Vallois, 1953). Ideas on the usefulness of small or poorly preserved skeletal samples for racial identification have become somewhat more rigorous during this time. Perhaps it would be worthwhile, then, to examine some of the statements on race in the Mesolithic against the background of the bones of contention—the skeletal remains—themselves.

Factors of importance to studies of prehistoric race, such as the degree of isolation or of contact with other peoples, must be viewed in the perspective of the cultural situation pertaining in the particular case or cases, and this in turn is influenced as regards such factors by the environmental conditions of the time. Accordingly, I have thought it useful to include as a preliminary a brief review of the major environmental and cultural developments of the European Mesolithic.

NATURAL AND CULTURAL ENVIRONMENT[2]

Natural Environment. The boundary between the Upper Palaeolithic and Mesolithic in Europe is by common agreement drawn to coincide with the transition from the Late Glacial to the Post Glacial (Recent) period. Inasmuch as neither the environmental conditions nor the cultural traditions show a sharp break from one period to the next, this line must be drawn arbitrarily in both cases. The indications of the final shift from terminal Pleistocene environmental conditions are not equally marked, or equally studied, in all parts of Europe. Differences in latitude, elevation and distance from large bodies of water make it appear very probable that the causes of this final shift were effective in some regions somewhat earlier than in others.

The transition is most clearly marked in northern Europe. Here the Late Glacial period is taken to end with the recession of the glacial sheet from the Fenno-Scandian moraines. With this event the opening stage of the Post Glacial, the Pre-Boreal climatic phase, is ushered in. Temperature changes leading up to the retreat of the ice sheet from the Fenno-Scandian moraines had brought about a series of oscillations in the climatic conditions of final Pleistocene times. Three major oscillations have been inferred from paleobotanical evidence. The first of these, the Early or Lower Dryas Period, was marked by arctic conditions and tundra growth in northern

Europe. This was followed by a period of climatic amelioration, the Allerød Period, during which birch, willow and pine invaded the northern regions. The final Late Glacial period, the Upper or Younger Dryas Period, marked a temporary return to arctic tundra conditions. Faunal remains associated with these Late Glacial climatic oscillations indicate that tundra and steppe forms predominated: reindeer, horse, lemming, etc. The sequence of contemporaneous oscillations in southern and eastern Europe has not been worked out in anything approaching the detail known for northern Europe; what evidence there is from southern Europe suggests a greater regional climatic variation with somewhat milder conditions overall.

With the opening of the Post Glacial period came the onset of climatic changes which, with only minor regressions, have led to the conditions of the present. As with the Late Glacial period, the climatic phases of the Post Glacial are best read in northern Europe where varve analysis, paleobotany and paleontology have given a relatively precise chronology of the temperature and precipitation cycles and the accompanying floral and faunal changes.

The Post Glacial of northern Europe is divided into five climatic phases (Plate 7), one of which is further divided into two sub-phases.

Pre-Boreal (ca. 8000 to ca. 6800 B. C.). This period opened with the beginning of the recession of the glacial sheet from the Fenno-Scandian moraines. Cold temperatures prevailed at the start, becoming slightly warmer as the period progressed. Precipitation was low throughout. Tundra vegetation gave way to forest types with birch reaching its maximum growth in this period and pine gradually increasing. Hazel and aspen appeared in the latter part of the period.

Boreal (ca. 6800 to ca. 5000 B. C.). Cold, dry continental climate continued during the Early Boreal sub-phase, but during the latter, Late Boreal, sub-phase temperatures took a marked upswing until at the end of the period summer temperatures were very nearly like the present. Forest vegetation continued to increase. Pine dominated during the early half, but with the increased temperatures of the Late Boreal, hazel reached a maximum and new deciduous trees, oak, elm and lime, from the south appeared.

Atlantic (ca. 5000 to ca. 2500 B. C.). In the early half of this period optimum temperature conditions prevailed, with summer temperatures slightly higher than those of today. Precipitation took a sharp increase at the opening of the period until it reached an annual average comparable in northern Europe to present conditions. Such warm, moist conditions encouraged the growth of warmth-loving trees. Maple and ash appeared and oak, elm and lime became the dominant forms. The conifers and birch retreated to the alpine and northernmost regions.

Sub-Boreal (ca. 2500 to ca. 500 B. C.). Colder continental conditions returned with this period and rainfall dropped to about half its present level. With this deterioration in climate, pine returned and reached a

second maximum growth level. The warmth-loving forest types dropped off sharply. Decreased precipitation led to a general lowering of lake levels and the drying up of many surface peat bogs.

Sub-Atlantic (ca. 500 B.C. to present). With the Sub-Atlantic period we are in the present climatic era of increased temperatures and abundant precipitation.

The Post Glacial period may be briefly summarized as a phase of transition (Pre-Boreal) from the arctic Late Glacial conditions followed by two onsets of cold continental conditions (Boreal and Sub-Boreal) alternating with two onsets of warm maritime (Atlantic and Sub-Atlantic) conditions. Nothing more than an approximate correlation with this picture has yet been established for the central and southern regions of Europe. There is some evidence (Zeuner, 1952:105) that the sequence of climatic changes in central Europe was somewhat in advance of that of the more northerly regions. Southern Europe, because of the proximity of both elevated regions and large bodies of water, appears to have experienced considerable regional climatic variation.

The changes in climate and vegetation gradually brought about a shift in faunal types during the Post Glacial. Land mammals adapted to the tundra and steppe environment of the Late Glacial, including the reindeer, wild horse, cave bear, elk, arctic fox and lemming, slowly gave way to such forest species as the red and roe deer, wild pig, brown bear, beaver and marten. Marine mammals, molluscs and fishes exhibit a similar change in species and increase in numbers, and the same is true of wildfowl and other bird forms. Certain of the land mammals of the Late Glacial, such as the reindeer, elk and wild horse, persisted in the northern regions well into the Post Glacial and some of their numbers apparently held out in isolated pockets until early in the present era.

The release of waters from the receding ice sheets and mountain glaciers resulted in a gradual but pronounced rise in sea level during the Post Glacial. By late Boreal times this sea level change had isolated England from continental Europe by a narrow strait which has continued to widen through wave action and tidal scour up to the present day. At the beginning of the Post Glacial the Baltic was a huge lake cut off from the North Sea by ice dams. The melting of the ice early in the Pre-Boreal allowed the sea to invade the Baltic basin, forming what is known as the Yoldia Sea. At about the middle of the Pre-Boreal period an uplift of the land again dammed the connection with the sea and the Ancylus Lake was formed. This lake persisted until the beginning of the Atlantic period when the rising sea level again breached the connection with the North Sea and again flooded the Baltic basin. The resulting Litorina Sea was much greater in extent than the Baltic of today.

Simultaneous with the rise in sea level occurred a gradual rise in land elevations in the glaciated regions due to the removal of the enormous masses of ice. This isostatic re-elevation of the land was naturally most pronounced in the regions around which the ice sheets centered, but its effects appear to have extended far south of the farthest glacial advance. The

PLATE VII

Some Mesolithic Cultures of Europe

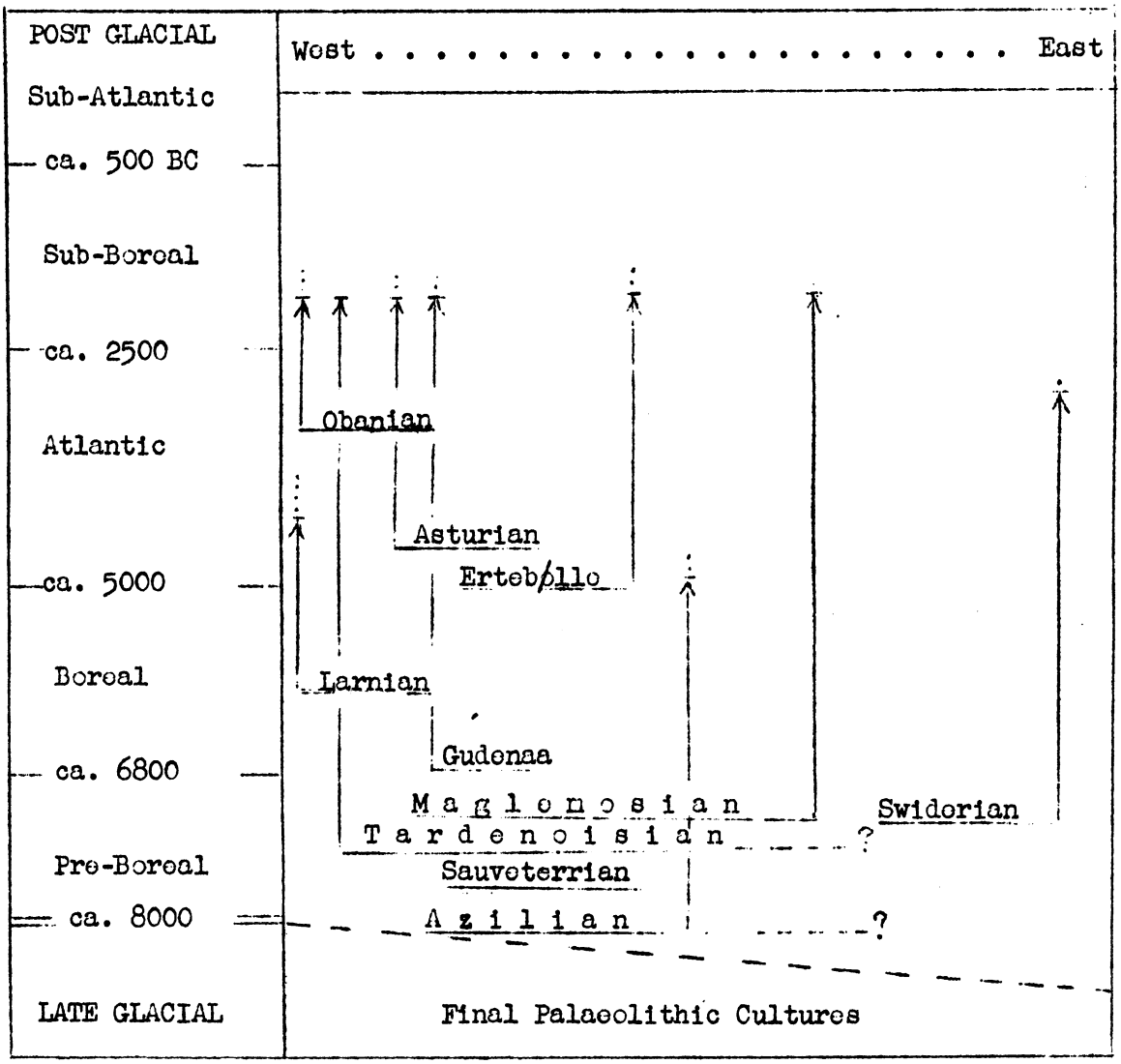

Plate I

eustatic rise of sea level and the isostatic emergence of the land combined to produce an extremely complicated series of topographical changes throughout the whole of the European Mesolithic. These changes added to the climatic and biotic changes mentioned above produced a physical environment on the whole different from that of the late Pleistocene.

Mesolithic Cultures. During the Mesolithic, Europe was occupied by a large number of cultures which show great regional and chronological variation. These cultures may be clustered on the basis of shared traits into a series of cultural phases or facies, and these in turn may be divided into several rather loosely defined major cultural traditions. We shall be concerned here in the main with only the roughest outline of these great traditions (Plate 7).

The term Mesolithic as it is widely used in Europe has come to refer to the group of cultures following the Palaeolithic which depended for their subsistence upon hunting, fishing and gathering, and which lacked the means of food production through domestication of animals or food plants. The upper limit of this period may thus be defined with the introduction of food production, a criterion which is comparatively easy to determine archaeologically. The lower boundary, however, as was mentioned above, is arbitrarily drawn to coincide with the beginning of the Post Glacial period. This has resulted in several cultures being designated as late Palaeolithic which bear close resemblances to some of the early mesolithic cultures. The so-called "tanged point cultures" of northern Europe are a case in point. These cultures, whose roots go back to the Magdalenian and Gravettian, were by Upper Dryas times distributed over northern Europe from northern Holland to Poland. Their principal subsistence activity was the hunting of reindeer with the bow and arrow as their chief weapon. All of these cultures shared the use of crudely chipped, stemmed arrowpoints, giving rise to the descriptive term "tanged point cultures." A strong microlithic element is clearly marked in some of these cultures. Numerous traits of the early mesolithic cultures of northern Europe appear to derive ultimately from these reindeer hunting cultures.

The first culture to be definitely recognized as mesolithic was the Azilian. This culture, which is best known for its painted pebbles and flat, bilaterally barbed harpoons of stag antler, is an early mesolithic development that, like the Magdalenian from which it probably derives, employed caves and rockshelters as habitation sites. Azilian sites are found in northern Spain, southern and central France and in the upper Rhine drainage. Azilian-like materials have been reported from as far east as the Crimea. Lithic implements include crude retouched flake knives, small square and round scrapers, burins, and some geometric microliths. Bone awls were used, and perforated stag canines and sea shells were worn for ornamentation. A few bone points, possibly for the spear, have been found in Azilian sites.

The Tardenoisian tradition includes a large group of quite varied cultures, all of which are distinguished by the use of large numbers of microliths. Many of these are deliberately fashioned into geometric shapes in several traditional forms. Flake and core scrapers, burins and flake knives

are common in Tardenoisian sites, and implements of bone, antler and shell were used in numerous forms. Use of the bow and arrow is inferred from the finding of triangular microliths embedded in bone. Remains of the domestic dog have been recovered in Tardenoisian sites.

The Tardenoisian is found in the Iberian Peninsula and British Isles, and from western Europe to southern Russia, but it appears not to have penetrated into the fertile plains south and east of the Baltic. Sites are frequently in caves, but open sites on the fringes of the forests are common in the northern areas. In the coastal regions of France and Portugal, shell middens of this culture have been found. The Tardenoisian apparently spanned nearly the whole of the mesolithic period, being found in Pre-Boreal context in northwestern Europe and persisting until the Neolithic in both Spain and northern Europe. In southern France a variant of the Tardenoisian, derived probably from local late palaeolithic survivals, appears to underlie the full Tardenoisian. This culture, the Sauveterrian, differs from the Tardenoisian principally in its microlithic element.

The appearance of microliths in large numbers in the Tardenoisian gave rise to the formerly prevailing belief that this culture represented a migration from North Africa by way of the Straits of Gibraltar. This argument has lost some of its force with the recognition of a strong microlithic element in the Gravettian and somewhat less developed occurrence in several other upper palaeolithic cultures of Europe. The implications of this argument on mesolithic racial origins are obvious and will be discussed at greater length later in this paper.

In the coastal regions of northern Portugal and Spain and in southwestern France, an unusual late mesolithic culture is found. This is the Asturian, a culture which is found in caves and rockshelters and in coastal shell middens. This culture is characterized by its use of large, crudely flaked stone tools. Flake scrapers, core choppers and the distinctive Asturian "chopping tools" or pointed core picks are found in abundance. The core pick is made of an elongate pebble, generally of quartzite, flaked to a rough point at the used end and left unfinished at the other. Only slight use of bone or antler, and this in the form of large pieces showing wear at one end, is indicated. The Asturian has been found in a number of sites superimposed over Azilian deposits, and there is evidence that it persisted at least until contact with neolithic cultures.

The British Isles experienced a complicated series of cultural developments during the Mesolithic. It appears certain that some groups of the British upper palaeolithic tradition, the Creswellian, survived well into the early Mesolithic. In some sites evidences are found of influence on this culture by the Late Glacial "tanged point cultures" of western Europe. Early in the Mesolithic the Tardenoisian of western Europe invaded England and, somewhat later, the Maglemosian of northern Europe came into England and Scotland. Both of these cultures influenced the surviving Creswellian cultures.

With the final retreat of the ice sheet and the rapid spread of the

early Post Glacial forests, a new mesolithic culture developed in northeast Ireland. Termed the Larnian, this culture appears as a specialized outgrowth of the paleolithic Creswellian. The Larnian is known only from its lithic implements; only a few non-diagnostic bone implements have been found in sites of this culture. The early phase of the Larnian is distinguished by its steeply dressed blade tools, flake picks, perforators and a variety of scraper types. In the late Larnian points with base retouching, choppers made on flakes and cores, and well made flake axes and adzes appear. This culture appears to have been established by middle Boreal times and to have persisted into the early Neolithic. Evidence of its diffusion into southwest Scotland by the late Boreal has been found at several sites.

During the late Atlantic period, the Obanian culture developed in the coastal regions of Scotland and northern England. This culture shows a number of influences from the Larnian in its stone implements and stoneworking techniques. Other influences probably attributable to the Tardenoisian and Maglemosian cultures of northwestern Europe are seen both in the lithic assemblage and bone and antler implements. The stone tools include flake blades, picks, chisel-like tools, flake and core choppers and narrow pebbles with end wear, possibly used in the preparation of food. Bone points, awls and pins, and barbed fish spears and wedge-like tools of bone and antler are found in abundance. A distinctive Obanian implement is the polished bone splinter with heavily used end, possibly employed in the treatment of skins and perhaps also as flaking tools. The Obanian persisted in this northern region for some time after the arrival of neolithic peoples.

Beginning very early in the Mesolithic a remarkable group of cultures developed in northern Europe. These are grouped together under the term Maglemosian. Sites of this general culture have been found in England and Scotland, southern Scandinavia, northern Germany and in the eastern Baltic region. The Maglemosian is generally believed to stem directly from the late paleolithic peoples of this region, the "tanged point cultures." Subsistence was by hunting, fishing and collecting, with numerous local variations and adaptations. The bow and arrow was universal among these groups. Antler harpoons and bone fishhooks were used. Some groups employed woven fiber fishing nets. Microliths have been found in the western sites of the culture, derived perhaps from both the late palaeolithic groups and from contact with the Tardenoisian culture. Probably the most important development of the Maglemosian was that of a variety of woodworking tools, following the tradition begun by the cultures ancestral to them. Wedges, chisels, gouges and possibly adzes were made of bone and antler. But the most efficient woodworking invention was the adze of flint or fine-grained stones. These adzes are of the tranchet type, made by striking off a flake from one end of a prepared core by a blow at right angles to the long axis of the core. East of the Baltic pebbles of fine-grained stone were sharpened to an edge by grinding to produce the "ground stone axe," an implement long held to be diagnostic of the Neolithic. In the coastal regions of Denmark and southern Sweden the tendency appears to have been toward a more settled existence and increased dependence upon the sea for subsistence, leading to the development of a distinctive way of life characteristic of later mesolithic groups in this region. Elsewhere the Maglemosian persisted much as before, and some

Maglemosian groups apparently continued in their mesolithic patterns of existence for some time after the arrival of neolithic patterns in this region.

In the inland areas of Jutland, a culture very much like the Maglemosian, the Gudenaa culture, developed in early Boreal times. Certain of the stone and bone implements of this culture are suggestive of forms used by the later coastal cultures of this region, and it was at first supposed that the Gudenaa culture was an intermediate development from the Maglemosian to these later cultures. This idea has given way with the recognition that the Gudenaa culture itself persisted with only minor changes in its patterns until the end of the Mesolithic.

The late mesolithic coastal cultures of Denmark, northern Germany and southern Sweden are commonly grouped under the term Ertebølle, the name of one of the sites of this tradition. These are the so-called "kitchen midden" cultures, an appellation which is not truly descriptive of these cultures since not all groups lived on such middens and not all such middens were inhabited by the Ertebølle. These people lived in apparently permanent villages on or very near the coasts and derived much of their subsistence from the sea. Their dependence upon molluscan species for a large part of their supply resulted in the accumulation of large shell deposits in the village areas, but fish and sea mammals were also utilized and remains of land mammals in the middens indicate that these too were hunted. The principal hunting weapon was the bow and arrow, the arrows being tipped with microlithic transverse arrowpoints (the petit tranchet or "chisel-ended" point) or sometimes with triangular microliths. Axes of flint and fine-grained stones are much more common than adzes in Ertebølle sites. The fine-grained stone axes are ground and polished. Flake scrapers, knives, burins, bone and antler harpoons, wooden throwing sticks and bone points and awls are among the other items in the cultural inventory. The most distinctive innovation of this culture was the use on a fairly large scale of pottery, a development which appears to be entirely independent of the later neolithic introduction of pottery over the whole of Europe. This mesolithic pottery is a rough tempered, poorly fired black ware which is built up by the coiled technique. Large, pointed-base jars and oval "saucers" (possibly used as blubber lamps) are the most frequent forms.

The Ertebølle first appears in the archaeological record at the opening of the Atlantic climatic period. The rising air and sea temperatures and increased rainfall of this period, with the accompanying floral and faunal changes, made it possible for man to pursue a successful existence in the northern coastal regions, and it is generally held that the development of the Ertebølle was a response to the new opportunities. Certain of the industrial traits of this tradition appear to stem directly from the Maglemosian. But the Ertebølle is not merely a coastal version of the developed Maglemosian as was for a time held possible. It has been pointed out (Clark, 1951:95-97) that the blades and burins, certain of the arrowpoints, and the use of deeply incised geometric patterns in decorating bone and antler agree more closely with traits possessed by the Late Glacial peoples of this general region than with the early Maglemosian. The use of pottery also is an innovation of non-Maglemosian origin.

Numerous other northern cultures tending, like the Ertebølle, to the use of the stone axe, geometric microliths and in some cases, pottery, are known from the late Mesolithic. The mesolithic cultures of Finland are described in some detail elsewhere in this volume. The Finnmarkian culture of the extreme north of Norway and the adjacent parts of Russia is distinctive among mesolithic cultures for its use of refractory stone, leading to the production of rather crude appearing implements. Its gravers and adze blades are similar to Maglemosian pieces manufactured from flint, and some of its flake tools are reminiscent of Mousterian forms. This has led to the hypothesis that the Finnmarkian was one of a group of eastern hunting cultures which spread westward along the retreating glacial front. An alternative, and climatologically more likely, hypothesis is that this culture is simply another mesolithic culture, possibly of Maglemosian affinity, which moved northward from the Baltic region in late mesolithic times.

The Mesolithic of eastern Europe is as yet not worked out in detail comparable to what is known of this period in the rest of Europe. One serious problem has been the difficulty of dating the archaeological deposits due to the absence of clearly marked climatic phases such as are known for northern Europe. Tardenoisian-like and Azilian-like assemblages have been reported from this region, and several skeletal finds from deposits of this nature will be described later in this paper. The Swiderian culture appears to be a distinctively eastern European mesolithic culture. This culture contains elements strongly reminiscent of the local Gravettian of the Upper Palaeolithic. Its distinctive diminutive tanged points in particular are very similar to a Gravettian form, but greatly reduced in size.

This brief review of mesolithic environment and culture in Europe has some bearing on the discussions of mesolithic skeletal materials and race problems which follow. In the first place, we should note that the Mesolithic covered a span of over 6000 years, considerably more time than has elapsed since. Certainly by the end of this period the natural environment and biota were essentially as we have known them in historic times, allowing for the changes wrought by man. But during the period, the transition was made from the arctic and sub-arctic environments of the Late Glacial to those of the present era.

What effect these changing conditions had on the movements of populations surviving from Palaeolithic times we can only speculate upon. We might guess that the spread of forests and water bodies and the gradual extinction of the large herd mammals, together with the apparent increase in local plant foods, would have tended to bring about the isolation of human groups from one another for long periods. The effect of this on human physical characters, if it actually occurred, would be to allow local differentiation and specialization in particular physical traits, on the principle of genetic drift. But we lack real evidence that human populations in the Mesolithic were on the whole more isolated than during the Palaeolithic. On the contrary, a review of the archaeological record shows that, despite the regional specializations which developed in culture, there

must have been considerable contact between human groups. This is so marked in fact that we are able to relate groups in fairly large regions on the basis of numerous shared traits.

The general picture for any given time in the Mesolithic is that of a number of "tribes," each consisting of a number of localized bands or "tribelets" which were more or less in contact with one another and which perhaps shared a common language. The "tribes" are in turn united by shared traits into the great cultural traditions covering large geographical areas, much as in aboriginal America. The interchange of genes under these circumstances must have been of a fairly high order and we might expect to find a considerable degree of variation in the physical characters of the small unit populations. This does not deny that some populations might have experienced relative isolation of some duration during their history. It might make us demand, however, a fairly large population sample before we accept claims as to the racial affinities of this or that group or the foreign origin of this or that physical trait.

Another area of study bearing on the problem of race in the Mesolithic should at least be mentioned. This has to do with the effects wrought more or less directly on mankind by the change from Late Glacial to Recent environmental conditions. What factors of selectivity were involved, for instance, in changes in disease types and frequencies as a result of climatic and dietary changes? Another question concerns the effects on human genetics and plasticity of dietary changes themselves. In a number of the descriptions of the mesolithic skeletal materials reviewed on the following pages the authors comment on the increased frequency of dental caries in the Mesolithic, usually attributing this to the difference in dietary habits. What were the other, less easily detected, effects of the supposed shift from a predominantly meat diet to one high in plant or sea foods? Differences in soil chemistry due to increased precipitation and the resultant effects on nutrition, viewed both regionally and in general, raise other problems. These are only some of the questions that can be raised, but not answered, in this area of inquiry. A start has been made (cf. Coon, Garn and Birdsell, 1950) toward their consideration in race problems, but it is only a start. They should at least be borne in mind, however, as of possible significance in the picture we are about to review.

MESOLITHIC SKELETAL MATERIALS

We shall be concerned here with a brief description of the majority (3) of the European human remains which are generally accepted as of mesolithic age. Many remains of doubtful mesolithic provenience have been described. It has been necessary to rely on recent opinion for the selection of those to be considered here. The descriptions below are arranged by modern nations in Europe, beginning in the south and working north and then to the east. The general location of each of the sites discussed is shown on the map, Plate 8. Stature and the principal cranial measurements and indices of the more complete of the skeletal finds are given in Table 1.

Muge. Beginning shortly after the middle of the last century, a series of skeletal finds were made in the shell middens in the Tage (Tagus) River valley near the village of Muge, District of Santarém, in southern Portugal. Some 200 burials have been removed from these mounds to date, many of which have been scattered and lost. Most of the finds are from two mounds locally termed Cabeço da Arruda and Moita do Sebastião. These sites are dated from their cultural materials as Tardenoisian, although not necessarily contemporaneous. The first description of any of the remains was that of Paula e Oliveira (1886) who published a brief description of five crania. Two other short papers, by Pereira da Costa (1907) and Mendes Corrêa (1923) followed, describing respectively one and three other crania not described by Paula e Oliveira.

In 1930 Vallois made an attempt to locate and measure all of the skeletal materials known to be from the Muge sites (Vallois, 1930). During this survey Vallois discarded several of the crania described by the previous writers because of their unreliability due to post-mortem deformation. He added a number of previously undescribed crania and gave the first description of many of the post-cranial materials. Only nine crania were found sufficiently complete and undeformed for detailed measurement and observation, and stature could be calculated from the long bones of only 22 individuals (Table 1).

The skulls are ovoid in form with some vault flattening. The occipital region is rounded and not protruding. Cephalic indices average 71.8 for the males, 72.5 for the females. The frontal bones are straight among the females, inclined among the males. Browridges are rugged in the median region, but not on the sides, among the males and only slightly developed among the females. Faces are mesoprosopic (mesene), mesorrhine and mesognathous. Some variation exists in these indices as will be noted in Table 1. The orbits are low. Mandibles are medium in size with pronounced chins. Teeth are large for the size of the skulls. The sex identification given by Vallois has been employed in the above cranial summary. It is interesting to note, however, that the metrical values given (see Table 1) are nearly identical for the male and female groups. Sex differentiation was performed on the basis of the general ruggedness of the skulls, especially with regard to eyebrow ridges. No very great reliance, therefore, should be placed on the sex data.

The post-cranial skeletons, which in most instances could not be related to the skulls, were in general light with only a few individuals showing strong musculature. The femoral pilaster was strongly developed on about half of the individuals, weak or absent on the rest. Platymeria was marked in the majority of cases, and about half of the individuals showed platycnemic development of the tibia. Stature was short to medium (males 160.7 cm., females 152.7 cm.).

In the course of his examination of the Muge material, Vallois attempted to locate for measurement two crania which Paula e Oliveira had previously

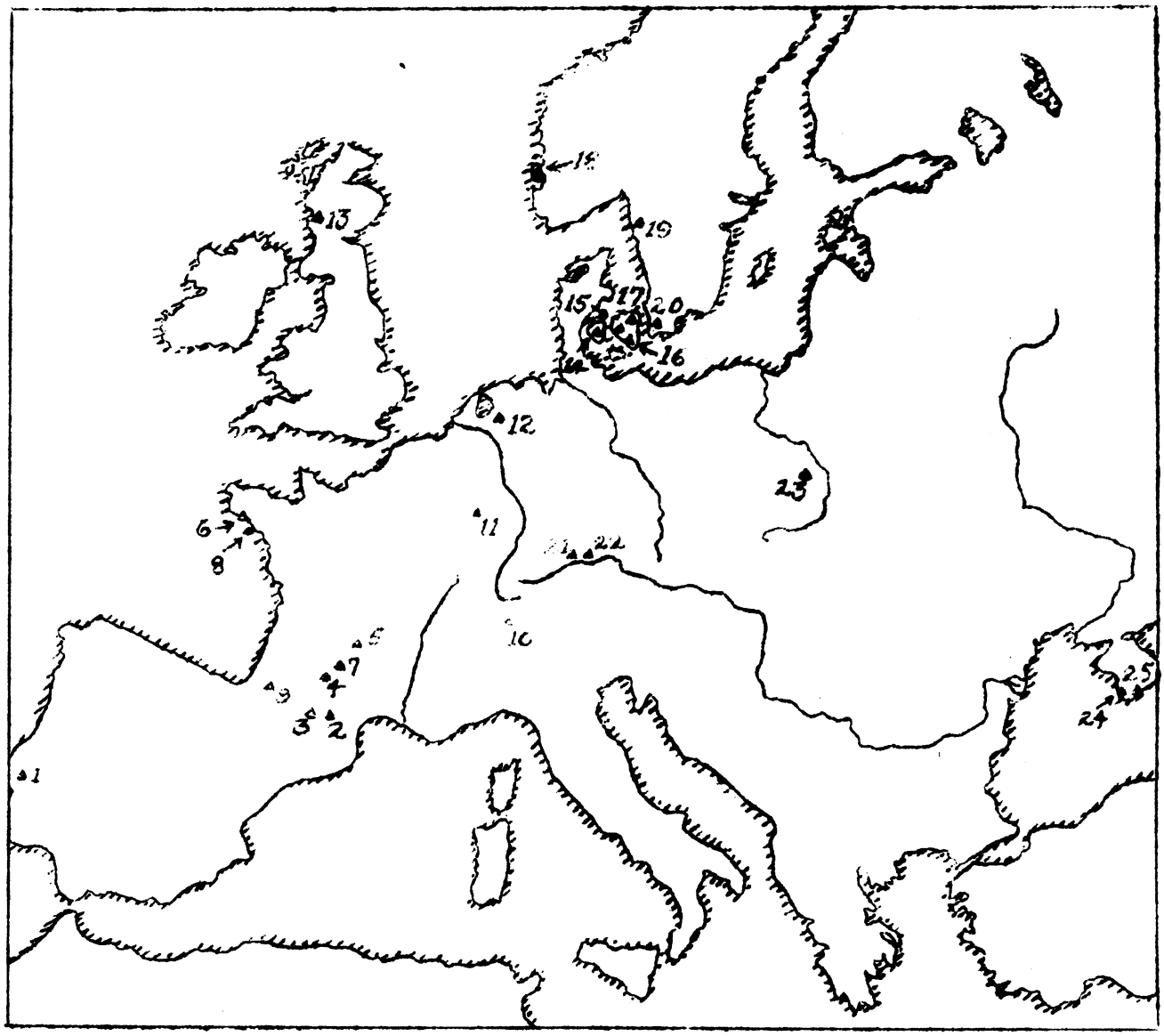

Plate 8

described as brachycephalic. These skulls unfortunately had disappeared and were represented only by casts, from which nothing truly accurate in the way of measurement could be obtained. Seven other skulls which appeared to be brachycephalic were so badly deformed that they could not be used. Vallois concluded (1930:379) that it was very likely that the bracycephalic "type" described by Paula e Oliveira was in reality mesocephalic and that no true brachycephalic had been recovered from the Muge mounds.

In a later communication Mendes-Corrêa (1933) replied in part to Vallois' treatment of the Muge materials. Noting that Vallois had classed the upper facial length-breadth relationship as mesoprosopic (mesene), Mendes-Corrêa (1933:370) states that it would be more accurate to indicate that this relationship is more leptoprosopic (leptene) than chamaeprosopic (euryene), inasmuch as the mean upper facial index is 53.6 for the specimens described by Vallois. He objects also to Vallois' characterization of the Muge populations as averaging mesognathous, remarking that true orthognathism is the exception. The general picture would be better expressed, he feels, by describing the Muge finds as of a "tendency" toward prognathism, or as "mesoprognathous."

From a restudy of the materials stored with the Service Géologique at Lisbon, Mendes-Corrêa takes exception with Vallois' treatment of the question of brachycephaly in the Muge populations. Despite the clear indications of post-mortem breakage and deformation, which caused Vallois to eliminate some specimens in his study, Mendes-Corrêa feels (1933:371-372) that enough can be determined to indicate that a small minority are brachycephalic or at least exhibit a clearly marked brachycephalic "tendency." Thus Moulage No. 170 is brachycephalic despite its deformation. Cranium No. 24 from Moita do Sebastião—not mentioned by Vallois—is brachycephalic despite the lack of several cranial fragments and perhaps a slight deformation. No. 1 from the same site, which Paula e Oliveira called sub-brachycephalic, is not unusable as claimed by Vallois but can give braincase measurements with only slight error. Cranium No. 15 from Cabeço da Arruda, which was not located by Vallois, is, despite its considerable deformation, clearly brachycephalic, so regular even as to warrant the term "sub-spherical." Other crania in the Service Géologique are mesocephalic or of a "brachycephalic tendency." Vallois' severity toward the brachycephales of Muge is not justified, Mendes-Corrêa feels, since there is no real reason why brachycephaly should not exist in the mesolithic populations of Muge. The predominant type, however, is clearly dolichocephalic, he states, as both he and Vallois have maintained.

In this same paper (1933) Mendes-Corrêa mentions the discovery in 1930-1931 of several fragmentary skeletons in Cabeço da Amoreira, another of the Muge shellmounds. These will be mentioned below as described by Ataíde. The extreme rarity of trapezes in Cabeço da Amoreira as compared with Cabeço da Arruda leads Mendes-Corrêa to infer a greater age for the former, justifying the term "capsio-tardenoisienne" (in line with his belief in the North African origin of the Tardenoisian) or "tardenoisien très ancien" for the culture (1933:367-368). This early Tardenoisian of

Cabeço da Amoreira has in addition certain resemblances to the Sauveterrian, the author states. Later works by other writers apparently have not credited this suggestion of an affinity with the Sauveterrian.

Mendes-Corrêa's remarks in this paper, we may note, appear to be directed more to Vallois' caution than to his actual use of certain of the Muge materials. The differences between the two writers in the interpretation of these materials will be brought out later in this paper. In the absence of dependable metrical data to support Mendes-Corrêa's contention of brachycephaly in the crania which Vallois regarded as unreliable for measurement, we are left with nothing more concrete on this question than the knowledge that the two authors are in disagreement. Vallois still maintained, as late as 1940 (p. 614), that the claims for a brachycephalic element in the Muge populations rest on badly deformed crania.

In 1940 Ataíde published a description of the skeletal remains found in the Muge sites by Mendes-Corrêa and others between 1930 and 1937. From Cabeço da Amoreira came a number of fragmentary individuals, of which two were suitable for some measurements. No. 1, a male adult, is of relatively robust appearance. The skull is ovoid in norma verticalis, tending toward ellipsoid, with a protruding glabella. The frontal is slightly receding, and a small occipital torus is present. Maximum skull length is 186 mm., but only an approximate breadth could be obtained (136 mm. (?)), giving a questionable cephalic index of 73.1. No. 3 from Cabeço da Amoreira is a male with ovoid skull form, slightly protruding glabella and slightly inclined frontal. Stature was calculated by the Pearson formula, from a reconstructed humerus, as 155.6 cm.

Ataíde gives some data on three new finds in Cabeço da Arruda. No. 1 in this new series is an adult female consisting of a badly deformed skull and several long bones. Stature as calculated from one tibia is 144.8 cm. No. 2 of this series is an adult female with a small ovoid skull. The zygomatic arches are small. The parietal eminences are well marked, and glabella and occiput are slightly projecting. Maximum length of the skull was measured as 172 mm. and maximum breadth as 143 mm. These measurements yield a cephalic index of 83.1. This one skull, Ataíde states (1940:646), confirms the occurrence of brachycephaly in the Muge sites. The post-cranial skeleton is small and without marked musculature. Stature, obtained by the Pearson formula, is 143.1 cm. No. 3 from Cabeço da Arruda is in the best state of preservation of all the recent Muge finds. The skeleton is that of a male of robust build. The skull is ovoid in form with vertical frontal, projecting glabella and strong brow ridges. The occiput is rounded, with no projecting torus; the mastoid processes are large. The facial profile is apparently orthognathous, but some post-mortem facial distortion has occurred. Some distortion of the mandible is apparent, but it is clearly robust, with pronounced chin. The cephalic index is 71.9. Cranial capacity using the Lee-Pearson formula is calculated at 1349.9 cc. Stature by the Pearson formula is 160.2 cm., just under the mean obtained by Vallois for the Muge males.

In Table 1, cranial measurements and indices from the reports of Val-

lois (1930) and Ataíde (1940) on their respective skeletal series are listed in separate columns.

The new materials described by Ataíde fall easily into the range of characteristics described by Vallois, with the exception of the brachycephalic female. It is unfortunate that here at Muge, where a good skeletal sample might have been secured, we are left with only a comparatively small and in many cases poorly preserved collection of remains. We can hardly regard the few remains summarized above as truly representative of the Muge sites.

Franco

Mas d'Azil. The type site of the Azilian, a cave site in the Department of Ariège, south France, was excavated in 1887-88 and 1895 by Piette and briefly described, but without a systematic description of the skeletal remains found there. These remains consist of several fragmentary bones, representing a mandible, a tibia, two femora, two humeri, a fibula fragment and fragments of the right ulna. The post-cranial bones were located some years later by Sawtell and briefly described (Sawtell, 1931:244). The bones, which were covered with red ochre, were described by Sawtell as those of an adult female as determined by the slight development of the femoral pilaster and the general lack of robusticity in other characters. Stature, calculated by the tibia only, was 145 cm. The femora showed a slight eurymeric development and the tibia was moderately platycnemic. The condition of the remains precluded further measurements or observations. The remains from Mas d'Azil tell us virtually nothing as to the physical nature of the inhabitants.

Montardit. The rockshelter site of Montardit is located 18 kilometers west of Mas d'Azil in the Department of Ariège. The site was excavated by I. and P. Vaillant-Couturier and Ruth Sawtell in 1924, and its skeletal materials were described by Sawtell in 1931. An Azilian level lying above a Magdalenian level was found at this site, the two levels being separated by a sterile layer. Two extended burials surrounded with rocks were found in the Azilian level. The first of these, termed Montardit I by Sawtell, was of an elderly male. The skull was in fragmentary condition, lacking parts of both temporals, and portions of the right parietal and frontal. The skull base and most facial bones were missing. A complete femur, tibia and humerus were recovered from this burial. The rest of the post-cranial bones were fragmentary. Eyebrow ridges are rugged. The frontal is moderately sloped. The mastoids are large and rugged. The menton and gonial angles are strongly marked. The occipital region is rounded with only slight protuberance. The skull is ovoid in form. Long bones are sturdy and show heavy musculature. Stature as calculated by the Pearson formula was 159.8 cm., by the Manouvrier formula 160.2 cm. The cephalic index is 75.8, barely into the mesocephalic range.

Montardit II, the second burial, was in a very poor state, with only fragments of the parietals, occipital and right frontal remaining of the skull. No long bones were present, and only fragments of several other

post-cranial bones were found. Sawtell judged the specimen to be a male by its greater skull thickness (than Montardit I)and prominent occipital torus. Age was estimated as young adult on the basis of suture closure. Only two measurements were attempted: maximum width of skull, 136 mm., and glabella to lambda, 119 mm. The comparable measurements on Montardit I are 136.5 and 116 mm. The fragmentary state of both specimens from this site necessitated extensive reconstruction, especially in the case of Montardit II. Probably none of the measurements, except for the stature of Montardit I, can be regarded as dependable. We can derive little from those remains beyond the fact that both specimens show rugged skeletal features and that one was of medium stature.

Sauveterre-la-Lémance. This site, the type site of the Sauveterrian, is located in the Department of Lot et Garonne, southwestern France. The site was excavated by L. Coulonges in 1938. Beneath a hearth of Sauveterrian provenience was found a damaged human braincase with part of the facial bones from the right side. The cranial remains were first called to attention by Vaufrey (1938) in a brief note in which a number of observations made by Vallois, after a preliminary reconstruction, are quoted. Vallois notes that the remains are those of an aged individual. Features by which sex might be determined are of an uncertain nature. The skull is ovoid in form, mesocephalic and of medium vault height. The face is moderately long and clearly orthognathous, with slightly projecting malars. Nasal form is leptorrhine and the orbits are of medium height. Vallois remarks that the Sauveterre skull is remarkably similar in a number of features to the Granat male, to be discussed below, its most notable difference being in its greater relative breadth. These few observations may well give us as clear a picture as may be obtained from the damaged Sauveterre specimen.

Roc du Barbeau. The skeletal remains from this site have not been described. The site is a rockshelter in the eastern Dordogne which was excavated in 1934 by Vidal and Roye, and briefly reported upon in 1935 by Vidal and Peyrony. One skeleton in very fragmentary condition was recovered from a level claimed to be of Sauveterrian origin. It is doubtful if the damaged state of these remains will warrant anything more than general observations of the physical characteristics.

Téviec. The excavations on the small isle of Téviec on the Breton coast have contributed the largest dependable series of skeletal materials known for the entire Mesolithic of Europe. This site, excavated by the Péquarts from 1926 to 1928 and described by themselves, Boule and Vallois in 1937, is a small shellmound representing a local development of the Tardenoisian. Ten rock-lined tombs containing 23 individuals were excavated. Of this number, seven are adult males, seven adult females and one an adolescent female of 14 to 16 years. The remains were in a generally excellent state of preservation, attributable, according to the authors, to the neutralizing effect of the shell content of the site on the soil acids.

The 14 adult and one adolescent specimens are excellently described

by Boule and Vallois. The seven males range in age from approximately 20 to 47 years of age. The seven adult females range from 20 to 35 years. The skulls are thick boned and rather massive in structure. Cranial form is predominantly dolichocephalic among the males (range 71.6 to 76.8; mean 74.3) and dolichocephalic to mesocephalic among the females (range 70.3 to 79.4; mean 75.1). The faces tend to be low and relatively broad. The orbits are low. Nasal indices for both males and females average in the mesorrhine range. Sub-nasal profiles are orthognathous to mesognathous, but one female showed a pronounced prognathism (index 106.6). The frontal region is straight among the females, sloped among the males. Eyebrow and glabella ridges are large for all but one of the males and for several of the females. The nasion depression is deep, the zygomatic arches small. Mandibles are robust with pronounced chin and broad ascending rami. The post-cranial skeletons of these people are not especially robust. Stature is short to medium, averaging 159 cm. for the males and 151 cm. for the females. The distal extremities are relatively long. The femoral pilaster is only slightly developed. Platymeria is marked, and the tibia is platycnemic. The Téviec series, despite its marked variation in certain features, exhibits on the whole a fair degree of uniformity.

Cuzoul de Gramat. The rockshelter site of Gramat, located some 25 kilometers northeast of Sauveterre-la-Lémance, was excavated by Lacam and Niederlender and its skeletal finds were described by Vallois (Lacam, Niederlender and Vallois, 1944). The site contained five cultural levels: beginning at the bottom, one Sauveterrian level, three Tardenoisian levels and a neolithic level. The various levels were differentiated by soil changes as well as by cultural materials.

In the lower level of the Tardenoisian proper were found one complete male skeleton and fragments of three or four others. The fragmentary pieces are too small to warrant full description, but Vallois does note one feature of interest concerning them. This is the fact that they show evidence of cutting and burning, which Vallois believes indicates cannibalism and considers as a survival from the Upper Palaeolithic (Lacam, Niederlender and Vallois, 1944:52-53).

The male skeleton was dorsally extended with the arms alongside the body. The skull is complete except for a piece of the right parietal and temporal bones. Post-cranially, only the sternum, left radius and left fibula were missing. The head form is dolichocephalic; some difficulty was experienced in measuring head breadth due to the right temporal bone breakage, but Vallois feels that the index could not have been greater than 73.2 and more likely was the 71.2 obtained from his reconstruction. The glabella and eyebrow ridges are extremely strong. The frontal bone is elevated and relatively large, with only slight inclination. The face is orthognathous, leptoprosopic and leptorrhine with low orbits. The temporal crests are rugged, the malars protruding. The mandible is heavy, with strong chin eminence and broad rami. The post-cranial members are rugged; the femora are massive and without platymeria. Stature was calculated at 164 cm.

The Granat find, despite its apparently numerous "primitive" characters, is within or just barely outside of the range of variation for the Téviec males and well within the range of modern European populations.

Hoédic. Hoédic is a small island approximately 30 kilometers south of the isle of Téviec on the Breton coast. The site is a shellmound strikingly similar to the Téviec site and yielding cultural materials of the same local facies of the Tardenoisian (Péquart, 1934). Nine rock-outlined graves were excavated. From these were recovered the remains of 13 individuals, eight of which were in a fairly good state of preservation. The full description of these remains will add one of the better series to the mesolithic skeletal inventory.

Pocymaü. This site is a cave in the Department of Basses Pyrénées, southern France. Exploratory excavations by Laplace-Jauretche in 1951 revealed a late mesolithic industry associated with the remains of Recent fauna. A single adolescent human skeleton was recovered from a bed of Helix shell of this "late mesolithic" provenience. The remains consist of a badly fragmented cranium and a number of damaged post-cranial bones. The youthfulness and fragmentary condition of this skeleton render it of very limited usefulness for metrical studies.

Switzerland

Laufon. In 1945, a rockshelter near the town of Laufon in the valley of the Birse was excavated by Lüdin. The site contained several Tardenoisian levels and, beneath these, a level sealed by an undisturbed stalactite deposit in which were found a number of flint implements. These consisted in the main of simple blades and a type of point with edge retouching on one face only. The level was assigned to the early Mesolithic on the basis of this assemblage, with the likelihood that it is of Sauveterrian affinity. From this level was recovered the skeleton of a mature male. The remains consist of a cranium in a fairly good state of preservation and a number of post-cranial bones, most of them broken or incomplete.

A short description of the site and human remains was published by Bay and Lüdin in 1951. The skull is dolichocephalic, with an index of 71.5. The face is short with a broad bizygomatic breadth, giving a hypereuryprosopic index (72 to 75). Nasal form is mesorrhine, and the orbits are low. The mandible is small with chin not especially prominent. The facial profile is mesognathous. Stature was calculated at 155 to 160 cm.

Luxemburg

Loschbour. The rockshelter site of Loschbour is located near the village of Reuland, approximately 20 kilometers northeast of the city of Luxemburg. Two cultural levels were found in the site, a pottery-bearing level probably of neolithic origin and below this a sandy clay level containing antler, bone and flint implements. This lower level was pronounced mesolithic of unspecified affinity by Oswald Menghin, who visited the site during the excavation in 1935 (Heuertz, 1950:439). A nearly complete adult male skeleton was found in the lower level, lying in a flexed position.

The Loschbour materials are in a relatively well preserved state. Some cranial deformation had occurred after burial and a few of the facial bones were broken during recovery with loss of a few fragments. Several of the long bones were broken but were restorable. Restoration of the skull was done by Clavelin of the Muséum d'Histoire Naturelle in Paris. The materials are described by Heuertz (1950).

Head form is long and relatively very narrow, giving a hyperdolichocephalic (65.0) index. The frontal is high and moderately inclined, and the vault is of medium height. The face is leptoprosopic total facially and mesene upper facially with a very straight profile (total profile angle 95°). Damage to the nasal region prevented precise measurement, but Heuertz states that the nasal form probably is in the platyrrhine range. Brow ridges are heavy. The orbits are low, but the facial breakage prevented the accurate restoration of this region. The malars and mandible are moderately strong and a pronounced chin is present. Cranial capacity using the Manouvrier method is 1584. The post-cranial members are large with medium musculature. An average of 160.2 was obtained for the stature using the Pearson, Manouvrier and Rollet formulae.

Holland

Deventer. This site, located south of the town of Deventer in eastern-central Holland, was discovered during excavation for sand and gravels in 1936. Four gravel strata were found, separated by layers of sand. The bottom stratum contained a cold fauna and is attributed to the late Pleistocene. The sands above this yielded Recent fauna and several antler artifacts of a type which could be either Maglemosian or Tardenoisian. Above the gravel stratum which sealed off this supposed early mesolithic level were a sand level containing neolithic materials and another with later materials. The cultural materials are believed to have accumulated during successive occupations of the site which were terminated by flooding of the nearby stream (Vallois, 1943:3-4).

Skeletal materials occurred in each of the artifact-bearing levels. These are described by Vallois. In undoubted association with the mesolithic level, in Vallois' opinion (1943:3-5), were a calvarium in fairly good shape, a complete braincase, a frontal fragment of another individual, a mandible of an infant of 4 to 5 years and two badly eroded tibiae. Another cranial fragment, an occipital bone, was found in doubtful association with the mesolithic level and will be ignored here.

The calvarium, C_1, is complete except for damage to the nasal bones and right facial region. Sex features are of a mixed nature, but Vallois feels that the overall size and large brow ridges indicate a male. Age by suture closure is 40 to 50 years. The skull is ovoid in form with a very regular outline, mesocephalic with moderate parietal eminences and a protruding occipital bun. The vault is low. The frontal is straight with marked bosses and fairly heavy glabella and brow ridges. The nasion depression is deep. The skull and face are disharmonic, the upper facial

dex being euryene. Zygomatic arches are feeble. Some prognathism is present in the sub-nasal region but the total facial profile is moderately orthognathous. Nose form is platyrrhine although questionable because of the facial damage, and the orbits are low. Cranial capacity is calculated as 1625 cc.

The complete braincase, C_2, was without deformation but was considerably corroded, perhaps by strong soil acids. Weak development of the muscle attachments led Vallois to assign the specimen as female, and of not less than 50 years of age as indicated by suture closure. The skull form is ovoid, mesocephalic in the length-breadth relationship. Vault height was relatively slightly greater than for the calvarium C_1; the frontal was more vertical and the occiput less protrusive. Brow ridges are very weakly developed. Cranial capacity was measured as 1417 cc.

The fragment of the frontal bone, C_3, has attached to it a small piece of the left parietal. This enabled Vallois to estimate age of the specimen from the suture closure: approximately 30 to 40 years. The presence of heavy brow ridges indicates that the individual was a male, Vallois states. The nasion depression is strongly marked. The specimen is generally larger than the equivalent part of the calvarium C_1.

Both of the tibiae from the mesolithic level are considerably eroded by soil action. One is a right tibia of an adult, showing moderate robusticity and a slight platycnemic development. By comparison with a complete tibia which is nearly identical in its comparable measurements, Vallois derives a stature of approximately 166 cm. for the Deventer individual. The other tibia from the Deventer level is a badly worn right tibia from a person of less than 16 years of age.

United Kingdom

At the present time, no human remains of certain mesolithic provenience in anything approaching a fair state of preservation are known from the United Kingdom. A number of finds in fair condition are of possible mesolithic origin but the doubts concerning them rule them out of a study of this kind (cf. Martin, 1935; Vallois and Movius, 1953:200-212).

The only materials which are of undoubted mesolithic origin are those from the caves at Oban, Argyllshire, on the western seaboard of Scotland. Here, from 1869 to 1895, a series of excavations were carried out which produced much material of a culture which later came to be termed after the place of its discovery, the Obanian. A number of finds of skeletal materials, most of them in a sadly damaged state, were also made in these caves. The remains were described by Turner in 1895.

Mackay Cave. Two skeletons, an adult male and a child of approximately 8 years, were recovered in this cave in 1869. During their transit by ship to Glasgow they were badly damaged by water exposure when the vessel sank. They were recovered but in a non-restorable state. Turner's observations on this material are therefore understandably limited. The

male adult skull had prominent supraorbital ridges and occipital torus and a heavy mandible. The femora showed platymeria, and the tibiae were platycnemic. Stature by the Manouvrier formula was 165.4 cm.

Distillery Cave. Numerous fragmentary remains were found in this cave in 1890. Fragments of eight mandibles, four probably of adults, and numerous skull and post-cranial fragments were recovered. No restoration was possible with these remains.

MacArthur Cave. From the midden layers of this cave were recovered, in 1895, a number of fragments of post-cranial bones, including only two of long bones.

Denmark

A number of sites bearing skeletal remains of Maglemosian and Ertebølle age have been excavated in Denmark. The remains from several of these sites will not be included here because of the youthfulness or extremely fragmented nature of the specimens recovered (4).

Koelbjerg Bog. A single human skeleton was found in 1941 by workmen digging peat in Koelbjerg Bog, Odense canton. No cultural materials or faunal remains were associated with the specimen. The level in which the remains were found was dated by pollen analysis as slightly later than the middle of the Boreal period. The skeleton is thus only inferentially of Maglemosian cultural affinity.

The remains were in generally excellent shape except for slight damage to the base of the skull. They were not in anatomical relationship but were somewhat scattered, the left femur being found some 10 meters from the skull. Inasmuch as no other individuals appear to be represented in this find, all of the remains are taken to be from one skeleton. The description of these materials was published by Bröste and Fischer-Möller in 1943.

The skeleton is that of a female of 25 to 30 years. The skull is ovoid in outline without heavy musculature. The frontal is moderately high and slightly inclined with medium brow ridges and slight glabella development. A marked nasion depression is present. Skull form is dolichocephalic. The mandible is broad and heavy. The total facial index is euryprosopic, upper facially mesene. Facial prognathism is well marked. The nasal form is leptorrhine and the orbits are low and rectangular. Cranial capacity was calculated as 1430 cc. The skeleton is quite gracile post-cranially, with marked platymeria and platycnemia. Stature using the Manouvrier formula was 157.8 cm.

Korsør Nor. The remains from this site consist of a single well preserved skeleton of a mature male. The skeleton was resting on and was covered with slabs of bark of trees. The find was made by a workman in 1943 on a narrow inlet on the southwest coast of Sjaelland. One artifact, a pointed flint flake, accompanied the burial and no other cultural mater-

ials were nearby. The grave was covered by marine sediments but above these were deposits datable by pollen analysis as late Atlantic in age. Thus we know only that the grave is earlier than this. Norling-Christonsen and Brösto, who described the site and its skeletal remains (1945), are of the opinion that the flint flake found with the burial and other flint artifacts from the near vicinity are of Ertebølle manufacture.

Age of the specimen was estimated as 40 to 60 years from suture closure. The skull is ovoid and dolichocephalic with well developed temporal crests but only slight development of the occipital torus. The frontal is medium in height and moderately sloping. Brow ridges are heavy in the medial region but only medium in size laterally. The face is characterized by large malars, medium facial height, low and rectangular orbits and leptorrhine nose form. Cranial capacity is 1640 cc. The stature is given as approximately 166 cm.

Ravnstrup Bog and Vedbaek. Data on the skeletal remains from these two sites were not available to me at the time this paper was prepared. The Ravnstrup find consists of a portion of a braincase while the Vedbaek material is the nearly complete skeleton of an adult male. The few measurements listed in Table 1 on these remains are taken from Hjortsjö (1945:228).

Norway

Bleivik. In 1952 workmen turned up a fragmentary human skeleton in a field at Bleivik, near the town of Haugesund on the west coast of Norway. The skeleton was lying in marine sediments datable by pollen analysis to the first part of the Atlantic period. No cultural materials were found. The description of the materials was given by Torgersen and Getz in 1954.

The find consists of a calvarium and parts of the facial skeleton, the shaft and distal end of the left humerus, the shafts of both femora, and several rib and vertebrae fragments. The cranial sex characteristics indicate the specimen to be male, of an age estimated at approximately 60 years. The skull is in the lower mesocephalic range. Musculature is well marked, especially in the heavy occipital. The frontal is sloping and has marked development of the glabella and brow ridges. The nasion depression is well marked. The face is relatively high and narrow. The nasal form is mesorrhine and the orbits are deep.

The femoral shafts are strongly built with pronounced muscularity and prominent pilasters. Both femora are hyperplatymeric. By measurement of femora comparable in features present in the Bleivik specimens, stature is estimated as not greater than 160 cm. The fragmentary condition of the Bleivik materials, especially the facial and post-cranial bones, seriously limits their use for detailed description and comparison with other specimens.

Sweden

Stångenäs. This site is a Maglemosian shell midden on the southwestern coast of Sweden. In 1842 the remains of one individual, consisting of a braincase in fragments, a femur, tibia and several foot bones, were found here. These materials were reconstructed and described by Frédéric

(1908). The defective braincase gave a cranial index of 71.9 and had rugged eyebrow ridges medially and laterally. The leg bones were heavy with marked femoral pilaster. Stature was calculated at 181 cm. Subsequent to Frédéric's work on these materials the post-cranial bones were lost, but not before another estimate was made of the stature (Hjortsjö, 1945:227). This also gave a tall stature, 180 cm.

Hylliekroken. The Hylliekroken remains, a single skeleton, were found in 1943 by workmen in sands near the coast of southern Sweden. In these sands near the skeleton were flint implements of Ertebølle type. A description of the skeleton was published in 1945 by Hjortsjö.

The cranium had suffered considerable post-mortem damage. The facial bones, most of the mandible, and large parts of the lower frontal and lower temporal bones were missing. The right side and lower region of the occipital were also badly damaged. The reconstruction was made by Hjortsjö, who attempted the reconstruction of the lower frontal region so as not to give too great emphasis to cranial length. The large size of the skull and ruggedness of the occipital led the author to believe that the remains were those of a male; age was estimated by suture closure as approximately 50 years.

The skull is ovoid and dolichocephalic, of medium vault height. Small frontal bosses are present and the temporal crests are well developed. Several small fragments of the mandible were present, which in the author's opinion indicate that the mandible was of robust structure. Fragments of nearly all the long bones were found, but only the left humerus could be reconstructed so as to obtain stature. Using the Manouvrier formula, stature was calculated as approximately 162 cm. The post-cranial materials indicate that the individual was of a robust build.

Germany

Ofnet and Kaufertsberg. In the autumn of 1908 the excavations of R. R. Schmidt in the cave of Ofnet, in west-central Bavaria, were rewarded by the finding of two nests of skulls, 27 in one group and six in the other. The cave contained a series of superimposed cultural levels, beginning with the Aurignacian, then Solutrean, Magdalenian, a generalized mesolithic level, neolithic, bronze and recent (Breuil, 1909:206-210). The mesolithic level, which was only five centimeters in depth, was distinguished from the Magdalenian level by virtue of its faunal remains and, less specifically, by its cultural materials.

Numerous non-diagnostic microliths and perforated stag canines were found in this level, but only one artifact, a triangular microlith, which would serve to distinguish the level from the Magdalenian was recovered. On the basis of the total faunal and cultural finds the level was termed "azilio-tardenoisienne" by Breuil (1909:210). The crania were in two pits extending from the mesolithic level into the Magdalenian level but not into the Solutrean. The soil surrounding the skulls in both pits was heavily

stained with red ochre. With the skulls were numerous perforated stag canines and shells so placed as to suggest original arrangement as necklaces and in one case as an ornamented headdress. The perforated shells were mostly of the land snail, but one Mediterranean species, Columbella rustica, was identified among the others. A number of microliths of indeterminate shape were found in the soil around the skulls.

The Ofnet skulls have been rather uncritically accepted as of mesolithic age on the basis of the evidence given above, and in most cases they have been assigned to the Azilian. Clark (1939:218), however, points out that there is no particular reason, aside from Breuil's original statement that the site stratigraphically resembled that of Mas d'Azil, to specify this period in preference to the Tardenoisian; the skulls might equally well be Azilian or Tardenoisian. The possibility exists, too, that they are not mesolithic at all, but may belong to a terminal phase of the Magdalenian. No remains of animals associated only with the late Pleistocene were found in the mesolithic level, but, on the other hand, the species found in this level are known to have existed in the late Pleistocene as well as in the early Mesolithic.

Certainly the cultural materials are not distinctive of the Mesolithic alone; all of them could be either late Palaeolithic or Mesolithic. The use of red ochre with burials, too, could equally well be of either period. Skull burial, the so-called "cult of the skulls," is well known for the Magdalenian and Solutrean, and also for the Neolithic. Thus, this trait at Ofnet need not be taken as indicative of the Mesolithic. We shall include the Ofnet skulls here, then, with the above reservations as to their cultural provenience.

In 1913 F. Birkner excavated in a cave near Kaufertsberg, only a short distance from the Ofnet cave, a single male skull. The circumstances here were exactly the same as at Ofnet: a skull buried in a pit in a generalized mesolithic context. No mortuary offerings accompanied this find, however.

The first description of the Ofnet skulls was given by A. Schliz who presented data on 21 of the total of 33. Fourteen of the number described were adults, which Schliz (1912:241-251) divided into types according to head form. In 1923 a second and much more complete description of the Ofnet materials was published by W. Scheidt, and the Kaufertsberg find was included. This author eliminated certain of the skulls considered by Schliz and kept for discussion of racial origins four male and six female skulls, plus the Kaufertsberg find. The materials eliminated by Scheidt were so treated because of their incomplete state or improper reconstruction. The 11 skulls described by Scheidt were divided into three basic groups consisting of three brachycephalic specimens, two dolichocephalic and six mesocephalic. It is pertinent to add here that in 1931 the Ofnet and Kaufertsberg materials were examined by Vallois who noted that the reconstruction of a number of the specimens was very approximate because of their fragmentary condition (Péquart, Boule and Vallois, 1937:173). Pending further work on these remains, however we shall depend on the data given by Scheidt.

Sex differentiation of the specimens was naturally made on the basis of the visible evidence: size and thickness of bones, browridge, mastoid, occipital and mandible development, frontal inclination and so on. A considerable overlap in these features exists between the groups selected by Scheidt as males and females, adding to the uncertainty which is naturally attendant upon sex differentiation without evidence from the postcranial skeleton. However, Scheidt appears to be quite certain of his selection in each case and we must accept his diagnosis.

In general, the skulls designated as male are larger in absolute measurement than the female. Head form among the four Ofnet males ranges from very dolichocephalic to barely brachycephalic (70.24 to 80.77) and the Kaufertsberg male is mesocephalic. The six females range from dolichocephalic to moderately high brachycephalic (73.9 to 86.7). Browridges are strongly developed on three of the Ofnet males and the Kaufertsberg male; the females range in browridge development from moderately rugged to slight. The occipital torus is most rugged among the Ofnet males, the females and Kaufertsberg skull showing a rounder occipital region. Ofnet faces are euryprosopic and orthognathous, where such measurements could be taken. The Kaufertsberg face is mesene upper facially and the total facial index is leptoprosopic; no facial or alveolar prognathism is present. The two Ofnet males for which the nasal index could be determined were leptorrhine; five Ofnet females range from leptorrhine to platyrrhine, and the Kaufertsberg index is platyrrhine. The orbital index is a high microsene for one Ofnet male, and high mesosene for another. The females and Kaufertsberg male are microsene. One male and one female Ofnet cranium had extremely heavy mandibular development, with flaring gonial angles. The rest varied from small to medium heavy mandibles.

It is apparent that the Ofnet and Kaufertsberg remains show a considerable variation in cranial features. This variation remains to a great extent when the skulls are arranged in morphological groups with head form as the principal criterion, as was done by Scheidt. Sex differentiation is overlooked in such grouping, and the intragroup variation suggests that the remains could be ordered following other criteria with perhaps just as much meaning. It appears to the present writer that these materials are best considered as a group without particular concern for morphological types. The fragmentary nature and uncertain reconstruction of the majority of the skulls renders them unsatisfactory for reliable description in any case.

Poland

Janislawice. In 1936, a group of farmers digging gravel in a field near the village of Janislawice, central Poland, encountered a human burial. The burial was in a pit intruded into sandy soils and filled with soil of a different color. With the burial were a number of microliths, including several geometric points, two bone points, a wedge-shaped antler implement, several perforated stag incisors, and some fragments of mammal bone and shell. The cultural materials were assigned to the early Tardenoisian on typological grounds by Chmielewska (1954). She points out, however, that a number

of similarities exist in the lithic implements to materials from Danish Maglemosian sites of the early Boreal period.

The burial was excellently preserved but badly broken and scattered by the farmers who discovered it. Remaining for study are the entire rear portion of the braincase, including the complete occiput and several adjacent fragments of the temporals and parietals, the lower extremities, part of the pelvis and parts of the upper long bones. The individual was a male, of an estimated age of 30 years. The long bones are moderately heavy and show a fair degree of musculature. Stature was calculated as 158.1 cm.

Steslicka-Mydlarska, who described the skeletal materials, attempted a reconstruction of the skull, including the frontal and facial region, based upon a series of modern Lapp skulls which closely match the Janislawice skull in the rear braincase measurements (1954:66). By this somewhat unusual method the author derives the information that the Janislawice specimen is brachycephalic, tapeinocranic, euryprosopic, and has a platyrrhine nasal index and low orbits.

U. S. S. R.

Fatma-Koba. This site is a cave near the southern tip of the Crimea. In 1927 a complete but badly shattered human skeleton was found in a level containing Recent fauna and cultural materials stated by the discoverer, Bontch-Osmolovskii, to be of Tardenoisian affinity. The human remains are described by Debetz (1936), who made the reconstruction.

The skeleton is that of an adult male. The skull is ovoid to pentagonal in outline, and dolichocephalic. The specimen shows a moderately heavy sagittal crest, but the occipital is rounded and non-protrusive. Skull thickness is medium to light; the mastoid processes are large. The frontal is marked by protruding bosses and strong lateral brow ridges, but only weak medial ridges and glabella. The face is euryene upper facially, mesognathous, and has a low platyrrhine nasal index and very low orbits. Cranial capacity by the Manouvrier method is 1720 cc., by the Pearson method 1498 cc. The skeleton is robust post-cranially. Stature is medium: 168.2 cm. using the Manouvrier formula, 168.9 cm. by the Pearson formula.

Murzak-Koba. The cave site of Murzak-Koba is located in the southern Crimea, a few kilometers distant from Fatma-Koba. Two skeletons were found in this site in 1936, lying side by side, dorsally extended. The bones were somewhat deteriorated but in anatomical position. The level in which the remains occurred contained a Recent fauna and implements of late Tardenoisian type. Description of the skeletal materials is by Zirov (1940).

No. I is a female of 20 to 25 years. The skull is mesocephalic with a cranial capacity of 1534 cc. as measured by the Pearson method. Face form is euryene upper facially. The orbits are low. Some facial prognathism is present. Stature is 163.2 cm. by the Manouvrier formula, 160.1 cm. by the Pearson formula.

No. II is a male of 40 to 50 years. The skull of this specimen is dolichocephalic and has very heavy eyebrow ridges. The nasion depression is deep. Upper face form is low mesene. The orbits are low and very wide, giving an extremely low index (58.0, averaging the indices). Cranial capacity is the same as for the female, 1534 cc. by the Pearson method. Stature was calculated as tall, 182.4 cm. by the Manouvrier formula and 177.4 by the Pearson formula. The tibiae are described as Cro-Magnon in type, sharp and compressed laterally. The post-cranial features indicate a generally robust individual.

THE PROBLEM OF RACE

In the above review, human remains representing not less than 120 individuals from 27 sites have received at least some mention. Post-mortem deterioration or immature development cause the elimination of many of these for comparative purposes. Lack of descriptive data on others further narrows the picture. In Table 1 are tabulated a series of commonly used comparative data on the best preserved of the materials described above for which information is available. This table summarizes data on a total of 68 individuals from 18 sites, but of this number only 49 are represented by more than three or four entries; and several of these by only a slightly greater number than this. Thirty-five of this reduced total of 49 were recovered from three sites. Thus it appears that we are not in a very good position to discuss mesolithic populations. The series of usable remains is, in fact, not much larger than the minimum sample which it would be advisable to have from a single site for an analysis concerning the racial affinities of the population.

Numerous assertions have been made as to the racial types of the finds from a number of the sites reviewed above. The following discussion will be limited for the most part to the ideas on racial types advanced by those who actually described the skeletal remains, since it is from these sources that most of the ideas on mesolithic races have sprung.

Ruth Sawtell (1931:238) prefaces her racial discussion of the Montardit materials with a note which might well serve as a keynote to this whole discussion:

> There can be little scientific satisfaction in drawing conclusions as to race type from a solitary specimen, nor can the fairly amusing game of minute comparisons with isolated individuals from other epochs lead to brilliant discoveries. But until some ninety-nine additional men who inhabited the Pyrenees during the Azilian culture period are unearthed, we simply put on record the unreliable first, and wait hopefully for more.

Having thus qualified her conclusions before offering them, Sawtell goes on to compare the Montardit skeletons with three specimens from Cro-Magnon, two from Solutré, the Chancelade find, and the Muge and Ofnet-Kaufertsberg series. The greatest metrical similarities were found with

the Kaufertsberg skull and one of the mesocephalic skulls from Ofnet, and somewhat less with one of the Muge skulls. The Ofnet and Muge skulls were described as females. From this comparison Sawtell concluded (1931:250) that the racial affinities of the Montardit population were not with the groups of the Upper Palaeolithic but with the Azilio-Tardenoisian types of France, Portugal and Bavaria.

Keith (1931:405) reached a somewhat different conclusion on the Montardit material:

> In its dimensions, in its shape and in the characters of its face and jaws this Azilian skull bears so close a resemblance to the smaller Magdalenian skulls found in the southwestern departments of France that I think we must assign all to the same race. The Azilians in Southern France may well have been the direct descendants of the indigenous Magdalenian population.

In the description of the Montardit materials above it was noted that none of the facial bones were present in the case of Montardit II and that most of these were lacking from Montardit I. It was also pointed out that no great credence could be given to measurements derived from the skulls of the Montardit specimens because of the approximate nature of the reconstructions. Thus neither the qualified conclusion of Sawtell nor the positive one of Keith need be taken very seriously.

The Muge remains have been the subject of several claims as to racial types represented. These have stemmed from the conclusions reached by those who originally described the skeletal materials. Paula e Oliveira, who was the first to study these remains, suggested (1886:310-320) that the dolichocephalic skulls might have descended from the Cro-Magnon "race." The two crania which he measured as brachycephalic he regarded as exhibiting mongoloid influences. Both of these ideas were in keeping with ideas current at that time—the long-headed Cro-Magnon "race" and the round-headed Mongoloids—and neither of them were based upon anything more than the most cursory comparison, with head form as the primary factor.

Mendes-Corrêa, after an examination of the Muge remains, noted that negroid characteristics are common to all of the dolichocephalic skulls. These he termed (1923:570-573) a special group, Homo afer taganus. This group, he declared, belonged to a family of primitive equatorial races, the so-called "bloc equatorial," which was characterized by microsome orbits, prognathism, meso-platyrrhine nasal form, and especially by extreme dolichocephalic head form. This family had already given birth to some European races in the proto-Ethiopian type of Combe-Capelle and the two negroids of Grimaldi, Mendes-Corrêa declared. The Muge race was thus related but not identical to these.

Vallois, in his study of the Muge remains, disavowed the notion of an African origin and suggested that the Muge population was descended from local upper palaeolithic peoples (Vallois, 1930:386). He maintained in this study that all of the upper palaeolithic skeletal finds, Grimaldi and Chancelade excepted, belonged to one race which he termed the Cro-Magnon race.

The "Old Man" of Cro-Magnon he believed to be an extreme type of this race, not to be taken as the type specimen. This provoked a reply from Mendes-Corrêa, who rejected the idea of a single upper palaeolithic race, Grimaldi and Chancelade again excepted, and reaffirmed the existence of Homo taganus, and the origin of this type from a "bloc equatorial" form such as Combe-Capelle (Mendes-Corrêa, 1933:368-369).

It should be noted that at about this time Morant published the results of his statistical comparison of the upper palaeolithic skulls with those of modern populations in which he showed (1930:135) that, despite the variability existing in the upper palaeolithic materials, the population of 17th Century Londoners was rather more variable. If there were races in existence during the Upper Palaeolithic, Morant declared "....it is clear that they must have been more homogeneous than any modern types which can be distinguished."

In a later paper, Vallois returned to the negroid affinities claimed by Mendes-Corrêa for the Muge skeletons. Here Vallois notes (Péquart, Boule and Vallois, 1937:167) that only one hyperdolichocephalic skull occurred in the Muge remains that he was able to measure. Of four skulls on which the gnathic index could be determined, Vallois found only one to show sub-nasal prognathism; two other skulls which could not be measured for this character appeared from observation alone to be slightly prognathous. Nor are the facial or nasal indices of the Muge series especially indicative of negroid ancestry, he declared. The nearest similarities appear to be with the Téviec group and the dolichocephalic specimens from Ofnet, in his opinion; but even here there are considerable differences.

Coon (1939:64) concluded that the Muge remains are most similar to the late Natufian population of Palestine. This conclusion is given without a specific metrical comparison between the two groups. He goes on to state that the Muge and Natufian remains represent a northward movement from a Mediterranean racial homeland somewhere in southwestern Asia, northeastern Africa, or both. Vallois, while admitting the general similarity of the two groups, points out (Péquart, Boule and Vallois, 1937:188-189) that there are at the same time differences, of the same order as those between the Muge, Téviec and Ofnet groups. Furthermore, the defective state of the skeletal materials in both groups prevents any very specific comparisons. Thus he feels that it is premature to speak of racial affinities.

Both Mendes-Corrêa and Vallois, we should note, are convinced that the Tardenoisian invaded Europe during the Mesolithic out of North Africa. This belief, which has been shared by many others, is founded on the fact that microliths were first noticed in large numbers in Tardenoisian assemblages. It was perhaps natural then to look to the post-Aterian cultures of North Africa for the origin of the Tardenoisian. With the increase in knowledge of the prehistory of Europe, however, has come the realization that microliths were already present in the Gravettian and Magdalenian and in the Late Glacial cultures of northern Europe. Hence the arguments for an immigration from North Africa have lost some of their strength (Childe,

1954:32-33; Clark, 1951:93). This does not, of course, rule out the possibility that some movement of peoples between the two continents might have occurred. Smith (1953:118-119) has shown that we cannot yet entirely disregard such a possibility. We can, however, rule out the necessity of an immigration to explain the presence of microliths in the Tardenoisian, even for those who refused to credit the possibility of independent invention.

The main difference between Mendes-Corrêa and Vallois in this matter, it appears, is that the former is willing to use the notion of an immigration from Africa to strengthen his case for an African affinity of the Muge population, whereas Vallois insists on a likely African ancestral group before he will commit himself as to the affiliations in that direction with the Muge materials (Vallois, 1940:625-626).

The Ofnet and Kaufertsberg remains have excited their share of speculations as to racial affinities. Schliz, who published the first detailed description of the Ofnet finds, divided them (Schliz, 1912:241-251) into three basic morphological groups. The two extreme groups, the brachycephalic and dolichocephalic specimens, were declared to represent pure races which had descended from the Palaeolithic. The intermediate group of mesocephalic specimens were a mixture of the extreme forms. Subdivisions of each group were made on the basis of cranial indices and facial features. The brachycephalic "pure" race was a hypothetical race which the author believed to have existed in the Palaeolithic and which persisted in the Mesolithic and Neolithic. The comparison of the dolichocephalic skulls was principally with the skulls from the caves of Engis and Brünn. These comparisons were made using single examples to represent each "pure" race from Ofnet and single examples of the palaeolithic skulls.

The later study of Scheidt on the Ofnet and Kaufertsberg materials is very similar in its conclusions as to race. Scheidt reconstructed and remeasured the Ofnet skulls and in so doing eliminated some of those used by Schliz in his classification. But his final results (Scheidt, 1923:78-86) are about the same. His brachycephalic pure race is founded upon a hypothetical palaeolithic group which persisted through the Mesolithic and resulted in the neolithic type of Grenelle (which site has since been shown to be of uncertain age). This pure race was represented at Ofnet by three skulls, two female and one male. The dolichocephalic race was based on a comparison with the Brünn, Engis and Hussowitz materials, and three skulls from Cro-Magnon. One male and one female represented this type at Ofnet. A third group of mesocephalic remains was held to be the result of mixture of the first two groups, with some predominance of the mesocephalic type characters. This group consisted of four Ofnet females. Another mesocephalic type, consisting of the Kaufertsberg male and one Ofnet male, was believed by Scheidt also to be a mixed type resulting from the two pure types but with influences from yet another brachycephalic element which the author attributed to the remains from the cave of Furfooz, Belgium (which Scheidt believed to be Palaeolithic but is now in the uncertain category).

Numerous other claims as to the racial background of the Ofnet and Kaufertsberg materials, such as the Lapponoid and negroid types claimed by Ulbrich-Kudelska (cited in Vallois, 1937:171-173) and the Pygmoid type proposed by Stolyhwo (1928:75-76), have been made but we shall not consider them

here. They are all based upon comparisons of single skulls from Ofnet and Kaufertsberg with other single specimens, or with the generalized specifications of some larger group such as those cited immediately above.

Boule and Vallois have made a somewhat broader approach to the problem of mesolithic physical types. These authors, after making detailed comparisons between the Granat and Téviec remains and those from Mas d'Azil, Montardit, Muge, Ofnet, Kaufertsberg, Stångenäs and a number of Upper Paleolithic finds, set up four European mesolithic morphological types. These are defined as follows (6).

The brachycephalic type of Ofnet consists of the three clearly brachycephalic skulls from that site. They are defined secondarily by their low cranial vault, eury- or mesoprosopic face, lack of prognathism, meso- to platyrrhine nose, low orbits and moderately large interorbital diameter.

The dolicho-mesocephalic type of Téviec comprises all of the remains from this site, the Kaufertsberg skull, three mesocephalic skulls from Ofnet, the Montardit skeletons and perhaps the Mas d'Azil remains (on cultural grounds). Secondary characters of the type include a high cranial vault, broad facial index, mesognathism, mesorrhine nasal index, low orbits, narrow interorbital diameter, short stature, high radius-humerus index and strong platymeria and platycnemia. It is obvious that the authors had to exercise their imaginations to include the Ofnet, Kaufertsberg and Montardit materials under some of these secondary criteria.

The dolichocephalic type of Ofnet includes the two dolichocephalic finds at Ofnet and, very approximately, the Stångenäs material. This type shows great length of skull absolutely and relatively, moderately high vault, strong occipital development, euryprosopic face, mesorrhine nose and low orbits. The large skull dimensions suggest to the authors that this type is of relatively tall stature.

The dolichocephalic type of Muge consists of the majority (number unspecified) of the finds from the Muge sites. This type is high vaulted and cranial dimensions in general are smaller than those of the preceding types. The face is more narrow, meso- or leptoprosopic. Other features include a mesorrhine nasal index, orbits often mesosome, large interorbital diameter, mesognathous facial profile and moderate development of platymeria and platycnemia. Stature is comparable to the Téviec group, but the skeleton is more gracile.

The Granat skeleton is compared to each of the four mesolithic types given above and found not to correspond exactly to any of them. Its greatest similarities appear to be with the Muge or Téviec morphological types, but it differs specifically from each: by its greater stature, absolute size of skull, and orthognathism, from the Muge type, and by its greater stature, more robust cranial features, leptoprosopism and orthognathism, from the Téviec type. Vallois decides, therefore, that the Granat find is intermediate between these two types. He is reluctant to establish a new type on the strength of only one example and prefers instead to regard the Granat find as an actual mixture of the Téviec and Muge types (Lacam, Niederlender

and Vallois, 1944:89-90). He takes the intermediate character of the Granat find as evidence of the broad diffusion of the Téviec and Muge types during the Mesolithic. Granat, he speculates, may be one of the first evidences of this diffusion. The Granat skeleton, we should note, is not "intermediate" between the Téviec and Muge series in a number of important characteristics, as a glance at Table 1 will show.

In their comparison of European mesolithic skeletons with those from the Upper Palaeolithic of Europe and Algeria, the Natufians of Palestine, and with the generalized characters of living pygmies and negroids, Boule and Vallois found no evidence of positive genetic relationship. They prefer to set the mesolithic Natufians apart as a separate morphological group, similar but not identical to any of their European types. The question of affinity with negroid or pygmy types is quickly disposed of. The only upper palaeolithic find which they consider as close, perhaps significantly so, to any of the mesolithic types is that of Chancelade. The resemblances of this find to their Téviec morphological type appear to the authors as of possible racial significance. But they are restrained in this comparison and state that more finds of the Chancelade "race" must be made before anything definite can be said.

Boule and Vallois specifically disavow the notion of race in the formulation of their morphological types. These types, they claim, are established on phenotypic characters which may not be the most significant ones for racial determinations. They point out that considerable variation in physical type existed in the Upper Palaeolithic and in the Neolithic. By their division of the mesolithic materials into morphological types they are demonstrating that such variability existed also in the Mesolithic (Péquart, Boule and Vallois, 1937:189). We have seen, however, that in practice the four mesolithic morphological types are not regarded simply as descriptive categories to highlight physical variability. Thus one of the four, the Téviec dolicho-mesocephalic type, is seen as the possible descendant of an upper palaeolithic Chancelade "race." And Vallois has treated the Granat find as an intermediate form resulting from the mixture of two of the morphological types. However they may be defined by Boule and Vallois, their "types" are treated as genetically differentiated groups, as races.

In his report on the Deventer remains Vallois (1943b:21) compares these remains with the morphological types defined by Boule and himself. He finds that the Deventer materials are most similar to the "type dolichocéphale d'Ofnet." The facial and vault forms are the same and both show well developed occipital tori, but the two Ofnet skulls are longer and more narrow than the Deventer specimens. The Ofnet cranial-facial disharmony is more marked, the frontals are narrower and more receding, and the muscle relief is more rugged. The Ofnet crania, Vallois remarks, show a generally more brutalized aspect than do the Deventer remains. He feels that the most important difference between the two lies in the greater skull breadth of the Deventer finds but notes that this may be only a secondary matter. Perhaps the Deventer population had evolved toward a brachycephalic cranial form; or perhaps a mixture with the "type brachycéphale d'Ofnet" is indicated in the Holland remains. The important thing, Vallois feels, is that here we have

proof of a relation between the fossils of Holland, and one of the already known forms of the Mesolithic of Bavaria!

Vallois goes on to compare the Deventer materials with a series of upper palaeolithic specimens and with the modern population of Holland. He finds a definite affinity with the Cro-Magnon population of western Europe, sufficient to infer a genetic connection between the Deventer and Cro-Magnon peoples (1943b:23). The greater cranial breadth of the Holland forms may indicate a shift toward brachycephaly in this population, or may be the result of mixture with a broad-headed race. Vallois concludes that the mesolithic finds represent an intermediate form between the Cro-Magnon and modern Holland populations. Differing from the Cro-Magnon group principally in their greater cranial dimensions, the mesolithic peoples have become modified in modern Holland by an elongation and narrowing of the face.

Several of the other writers on the mesolithic skeletal finds are more restrained in their comparative treatments than some of those reviewed above. Heuertz (1950:441) states simply that the Loschbour skeleton bears a close resemblance to the dolichocephalic type of Cro-Magnon. Brösto and Fischer-Möller (1943) find that the Koelbjerg remains do not differ essentially from many of the neolithic remains of Denmark, despite the presence of several "Cro-Magnon" features, such as short facial length, low orbits, dolichocephaly and moderate cranial vaulting. Norling-Christensen and Brösto (1945: 16-17) conclude that the Korsør-Nor, Vedbaek, Koelbjerg and Ravnstrup finds all belong to an "early Nordic" group which differs in no respect from the greater part of the modern population of Denmark. The Bleivik remains are likewise described (Torgerson and Getz, 1954:33) as of a type common in modern Norway.

Hjortsjö compares the fragmentary Hylliekroken skeleton with an Upper Palaeolithic series and with the Danish finds. The Hylliekroken male is found to resemble the "Old Man" of Cro-Magnon much more than do the Danish skeletons (1945:227) but, on the other hand, Hylliekroken differs no more than do these others from the living Nordic dolichocephalic population. He concludes that the Hylliekroken find supports the idea that the original population of Scandinavia belonged to a racial type of short stature and dolichocephaly.

Zirov, in his paper on the Murzak-Koba remains (1940:183), notes that both the male and female from this site present characters which are found in the Cro-Magnon "race." This race, he claims, constitutes one of the principal stages of the evolution of upper palaeolithic man of Europe, North Africa and western Asia. His Cro-Magnon "race" thus appears to be somewhat less narrowly defined than is usual.

A somewhat unusual method of comparison was employed by Steslicka-Mydlarska (1954) in her study of the braincase fragment from Janislawice, Poland. Lacking a sufficient comparative sample from the Mesolithic for statistical reconstruction, she selected a series of 50 Lapp skulls bearing the strongest resemblance to the man of Janislawice. This series was minutely compared with the Janislawice skull fragment. The analysis indicated, as

might be expected, that "...the individual of Janislawice represents a morphological type that we find frequently among the contemporary Lapp population" (1954:66).

In this recital of statements on the racial affiliations of the mesolithic remains, no attempt has been made to analyze in detail any particular claim. The purpose has been simply to note some of the ideas advanced by those who have been intimately concerned with the actual specimens. From the descriptions of the materials from each site we can get an idea of the condition of the original specimens and hence of their reliability for comparative purposes. We have seen that many of them are not capable of yielding dependable measurements. The number of specimens of undoubted mesolithic context which have given large series of reliable measurements is indeed small. Some of the above statements on race are thus questionable on this ground alone.

The practice of dividing skeletal series into morphological types and relating similar types, while regarding intermediate forms as mixtures of already defined types, does not appear to be productive of much that is useful to the study of race. It does, to be sure, point up the variability that is present in the respective series. But this variability is already apparent in each series, and it need not be regarded as resulting from racial admixture in each case. Similarly, the comparison of single specimens with each other, or even with large series from the same or from different time periods, is not likely to tell us much about populations.

The diffusion of cultural traits on a fairly large scale throughout the regions of Europe is indicated by the archaeological record, just as it has been in other periods. We must assume, therefore, that some diffusion of genes occurred as well. We do not know what isolating effects nor what selective factors were involved in the changes in environmental and biotic phenomena during the shift from Late Glacial to Recent conditions. But, given the genetic heritage of the upper palaeolithic population, which by itself shows great variability in physical characters, it is not surprising to find a similar variability among mesolithic groups. Whether the differences between these groups are of the order of race or not is certainly not clear from the studies so far made, any more than is the case with upper palaeolithic populations.

What is needed obviously is more and larger series of remains from sites of indisputable mesolithic context, as well as similar series from the Upper Palaeolithic. Until these are available, the problem of race in the Mesolithic must remain unsolved.

TABLE 1.	Max. Cranial length		Max. Cranial breadth	
	Range	Mean	Range	Mean
Muge:				
(Vallois, 1930)(5)	(3M) 173-185	179	(3M) 123-136	129
	(6F) 170.5-181	176	(6F) 125-133	128
(Ataíde, 1940)	(2M) 185-186	185.5	(2M) 133-(136)	134.5
	(1F)	172	(1F)	143
Montardit I (male)		180		136.5
Téviec	(7M) 180-191	--	(7M) 129-143	--
	(8F) 172.5-190.5	--	(8F) 133-142	--
Granat (male)		202		(144)
Laufon (male)		186		133
Loschbour (male)		200		130
Deventer C_1 (male)		193		151
C_2 (fem.)		176		137
Koelbjerg (female)		191		141
Kors/r Nor (male)		197		144
Ravnstrup		187		141
Vedbaek (male)		198		144
Bleivik (male)		184		139
Hylliekroken (male)		(202)		146
Stångenäs		196		(141)
Ofnet (5)	(4M) 182-205	190.5	(4M) 139-147	144
	(6F) 174-179	176.7	(6F) 133-150	140
Kaufertsberg (male)		182		141
Fatma-Koba (male)		189.5		138
Murzak-Koba I (fem.)		190		146
II (male)		198		140

TABLE 1. (cont.)	Basion-Bregma ht.		Gnathion-Nasion ht.	
	Range	Mean	Range	Mean
Muge:				
(Vallois, 1930)	(2M) 131-132	131.5	--	--
	(4F) 125-133	129	--	--
(Ataíde, 1940)	--	--	--	--
	--	--		
Montardit I (male)		--		--
Téviec	(6M) 128-150	--	(6M) 106-129	116.3
	(8F) 129-142	--	(7F) 99-113	107.8
Granat (male)		151		126
Laufon (male)		--		--
Loschbour (male)		138		120
Deventer C_1 (male)		135		--
C_2 (fem.)		127		--
Koelbjerg (female)		(138)		114
Korsϕr Nor (male)		143		--
Ravnstrup		156		--
Vedbaek (male)		--		--
Bleivik (male)		143		--
Hylliekroken (male)		143		--
Stångenäs		--		--
Ofnet	(2M) 136-137	--	(1M)	113
	(6F) 122-139	128	(1F)	99
Kaufertsberg (male)		139		115
Fatma-Koba (male)		150		--
Murzak-Koba I (fem.)		--		--
II (male)		--		--

TABLE 1. (cont.)	Max. Bizygomatic dia.		Prosthion-Nasion ht.	
	Range	Mean	Range	Mean
Muge:				
(Vallois, 1930)	(3M) 115-128	121	(3M) 63.5-68	65.5
	(5F) 113-122	118.6	(5F) 55-68.5	63.2
(Ataíde, 1940)	--	--	--	--
Montardit I (male)		--		--
Téviec	(7M) 123-150	139.2	(7M) 65-73	68.9
	(7F) 120-139	130.8	(7F) 61-68	64.4
Gramat (male)		(134)		74.5
Laufon (male)		--		--
Loschbour (male)		(130)		67
Deventer C_1 (male)		(136-140)		(68)
C_2 (fem.		--		--
Koelbjerg (female)		139		70
Korsør Nor (male)		150		77
Ravnstrup		--		--
Vedbaek (male)		--		--
Bleivik (male)		(134)		(70)
Hylliekroken (male)		--		--
Stångenäs		--		--
Ofnet	(2M) 140-144	--	(3M) 63-66	65
	(5F) 124-138	131.6	(6F) 58-68	61
Kaufertsberg (male)		125		64
Fatma-Koba (male)		137		66
Murzak-Koba I (fem.)		139		67
II (male)		147		76

TABLE 1. (cont.)	Cranial Capacity		Cephalic Index	
	Range	Mean	Range	Mean
Muge:				
(Vallois, 1930)	(2M) 1262-1456	1359	(3M) 69.1-73.4	71.8
	(4F) 1238-1449	1364	(6F) 70.7-73.6	72.55
(Ataíde, 1940)	(1M)	1349.9	(2M) 71.9-(73.1)	--
			(1F)	83.1
Montardit I (male)		1389		75.8
Téviec	(6M) 1339-1737	1561	(7M) 71.6-76.8	74.3
	(8F) 1444-1720	1548	(8F) 70.3-79.4	75.1
Gramat (male)		1861		71.2
Laufon (male)		1420		71.5
Loschbour (male)		1584		65.0
Deventer C_1 (male)		1625		78.2
C_2 (fem.)		1417		77.8
Koelbjerg (female)		1430		73.8
Kors/r Nor (male)		1640		73.1
Ravnstrup		--		75.4
Vedbaek (male)		--		72.7
Bleivik (male)		1450-1500		75.5
Hylliekroken (male)		(1550)		(72.3)
Stångenäs		--		(71.9)
Ofnet	(4M) 1380-1632	1491	(4M) 70.24-80.77	75.78
	(6F) 1039-1493	1277	(6F) 73.9-86.71	78.76
Kaufertsberg (male)		1422		77.47
Fatma-Koba (male)		(1498-1720)		72.8
Murzak-Koba I (fem.)		1534		76.8
II (male)		1534		70.7

TABLE 1. (cont.)	Total Facial Index		Upper Facial Index	
	Range	Mean	Range	Mean
Muge: (Vallois, 1930)	--	--	(3M) 52.5-57.3 (5F) 48.6-58	54.3 53.2
(Ataíde, 1940)	--	--		--
Montardit I (male)		--		--
Téviec	(6M) 76.6-91.4 (7F) 76.7-86.8	84.6 82.2	(7M) 43.3-53.6 (7F) 46.6-52	49.2 49.1
Granat (male)		(94)		55.5
Laufon (male)		(72-75)		--
Loschbour (male)		92.3		51.5
Deventer C_1 (male) C_2 (fem.)		-- --		(48.5-50) --
Koelbjerg (female)		82.0		50.4
Korsør Nor (male)		--		51.3
Ravnstrup		--		--
Vedbaek (male)		--		--
Bleivik (male)		--		--
Hylliekroken (male)		--		--
Stångenäs		--		--
Ofnet	(2M) 78.47-78.57 (1F)	-- 77.34	(2M) 45-45.82 (5F) 42.03-49.19	-- 45.47
Kaufertsberg (male)		92.0		51.2
Fatma-Koba (male)		--		48.2
Murzak-Koba I (fem.) II (male)		-- --		48.2 51.7

TABLE 1. (cont.)	Nasal Index		Orbital Index	
	Range	Mean	Range	Mean
Muge:				
(Vallois, 1930)	(3M) 50-52.6	50.9	(3M) 68.4-81.5	74.97
	(5F) 47.9-56.1	51.3	(6F) 69.7-84.7	79.2
(Ataíde, 1940)		--		--
Montardit I (male)		--		--
Téviec	(7M) 44.6-55.7	51.3	(6M) 68.2-77.7	71.9
	(7F) 47.3-55.8	50.3	(8F) 68.2-85.3	74.5
Granat (male)		47.2		71.1
Laufon (male)		--		--
Loschbour (male)		--		(79.5)
Deventer C_1 (male)		(54.3-56.5)		76.9
C_2 (fem.)		--		--
Koelbjerg (female)		40.0		76.2-78.0
Korsør Nor (male)		38.6		81.8
Ravnstrup		--		--
Vedbaek (male)		--		--
Bleivik (male)		48.0		89.7
Hylliekroken (male)		--		--
Stångenäs		--		--
				--
Ofnet	(2M) 41.18-47.17	--	(2M) 82.05-88.24	--
	(5F) 45.45-54.55	49.62	(6F) 67.5-74.36	70.72
Kaufertsberg (male)		54.17		70.73
Fatma-Koba (male)		52.2		66.7-68.3
Murzak-Koba I (fem.)		--		63
II (male)		--		57.4-58.7

TABLE 1. (cont.)	Gnathic Index		Total Facial Prognath.	
	Range	Mean	Range	Mean
Muge: (Vallois, 1930)	--	--	--	--
(Ataíde, 1940)	--	--	--	--
Montardit I (male)		--		--
Téviec	(6M) 93.1-101 (7F) 92.9-106.6	98.8 100.4	(6M) 83-90° (6F) 80-87°	85.8° 82.5°
Granat (male)		93.9		92°
Laufon (male)		--		82°
Loschbour (male)		--		95°
Deventer C_1 (male) C_2 (fem.)		 --		88° --
Koelbjerg (female)		--		--
Kors/r Nor (male)		--		--
Ravnstrup		--		--
Vedbaek (male)		--		--
Bleivik (male)		--		--
Hylliekroken (male)		--		--
Stångenäs		--		--
Ofnet	(2M) 85.4-95.5 (6F) 84.4-96.6	-- 90.8	(1M) (5F) 89-92°	83° 90.4°
Kaufertsberg (male)		92.1		84°
Fatma-Koba (male)		100		--
Murzak-Koba I (fem.) II (male)		-- --		79° 86°

TABLE 1. (cont.)	Stature	
	Range	Mean
Mugo:		
(Vallois, 1930)	(11M) 152.6-169.1	160.7
	(11F) 143.5-158	152.7
(Ataíde, 1940)	(2M) 155.6-160.2	--
	(2F) 143.1-144.8	--
Montardit I (male)		159.8
Téviec	(7M) 144-167	159
	(8F) 145-157	151
Granat (male)		164
Laufon (male)		155-160
Loschbour (male)		160.2
Deventer C_1 (male)		--
C_2 (fem.)		--
Koelbjerg (female)		157.8
Korsør Nor (male)		166
Ravnstrup		--
Vedbaek (male)		--
Bleivik (male)		(160)
Hylliekroken (male)		162
Stångenäs		180
Ofnet		--
		--
Kaufertsberg (male)		--
Fatma-Koba (male)		168.2-168.9
Murzak-Koba I (fem.)		160.1-163.2
II (male)		177.4-182.4

ENDNOTES

(1) This paper was originally prepared for a seminar in physical anthropology given by Dr. T. D. McCown, Department of Anthropology, University of California, Berkeley. To Dr. McCown I owe my thanks for his criticism and helpful suggestions in the original version of the paper. I am also indebted to Mr. Robert T. Anderson for help in the translation of the Scandinavian materials used.

(2) The brief summaries which follow are based principally upon the works of Breuil and Lantier, 1951; Childe, 1950, 1954; Clark, 1936, 1951, 1952; Lacaille, 1954; Movius, 1942; Smith, 1953; and Zeuner, 1952. These authors are in essential agreement on the general picture presented here. The use of references to particular studies will therefore be held to a minimum.

(3) Detailed descriptions of the remains from several mesolithic sites in Europe were not available to the writer at the time this paper was prepared. These sites are: Arene Candido, Italy ("Early Mesolithic"; 7 male, 2 female); Urtiaga, Spain (Azilian; male cranium); Rochereil, France (Azilian; male); Ravnstrup, Denmark (no artifacts; calva of female (?)); Vedbaek, Denmark (forerunner of Ertebølle culture; male); Bottendorf, Germany ("Mesolithic"; 1 fragmentary male adult, fragments of 3 child skeletons); Falkensteinhöhle, Germany (Azilian; fragmentary skeleton). The data given in Table 1 on the Ravnstrup and Vedbaek remains are taken from Hjortsjö, 1945:288.

(4) The sites excluded are: Dyrholmen (Ertebølle), Honsehals (Ertebølle), Maglemose Bog (Maglemosian) and Svaerdborg (Maglemosian). These materials are described by Nielsen, 1920-24, Arnborg, 1925, and Degerbøl, 1942. A number of the remains from some of these sites show evidences of cutting and breaking, strongly suggesting cannibalism. For data on several other sites of doubtful mesolithic age in this area, see Clark, 1936:133-136, and Coon, 1939:72-74.

(5) In tabulating the Mugo and Ofnet materials I have included some measurements which the authors of the descriptive reports placed in brackets to indicate them as uncertain values. Any error thus introduced in the mean values for the male and female series is therefore to be attributed to me.

(6) See Péquart, Boule and Vallois, 1937:186-189; Lacam, Niederlender and Vallois, 1944:85-89.

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