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VARIABILITY AND GEOGRAPHY

Contribution to our knowledge of European and North African Middle Pleistocene Hominids

Palaeoanthropology has been very successful in the recent decades in discovering a large number of finds, often striking the scientific world. At the same time it has been marked with certain incorrect views:

1. It has been influenced by the first finds of the *Homo erectus* from Java and China, which have become "types" in our minds. It seems that most scholars expected that the new finds of *Homo erectus* in Europe and also elsewhere will roughly correspond to the above-mentioned Asian "type".

2. The incorrect views regarding the physical development as a gradual and steady morphological change of the whole complex of anatomic characters led to the expectation of similar evolutionary changes in the same chronological horizons also elsewhere.

3. The influence of the environment (climate, nutrition and the degree of isolation of the fossil populations) were accepted on the one hand, on the other however, they were in most cases not applied, due to the fact that their impact on the human development has not been theoretically fully explained.

In this situation important new finds of Middle-Pleistocene hominids have been realized in Europe, the most important of them being the finds of *H. de Lumley* in the Arago Cave, the find of a skull in the Petralona cave in Greece, the discovery of a fragment of an occipital bone in the village of Vértesszölös in Hungary, and fragments of an occipital and frontal bones from Bilzingsleben in the German Democratic Republic.

The finds from Bilzingsleben and from Vértesszölös and the mandibles II and XIII from Arago

have considerably changed our hitherto fragmentary ideas concerning the respective parts of the skull of the European Middle Pleistocene hominids. The facial skeleton from Arago and the skull from Petralona are unique new finds of entire complexes of cranial morphological characters, so far not known from such an early period of the European prehistory.

Since palaeoanthropological finds illustrate the evolutionary process, which similarly as each historic process can be measured through the rate of changes per time units, the correct dating of these finds is a precondition for the interpretation of their development. The dating of the finds in Bilzingsleben and in Vértesszölös was relatively simple thanks to the rich accompanying palaeontological finds and also thanks to the clear stratigraphic situation.

The dating of the skull from Petralona, due to the obscure circumstances of its discovery, was a complicated matter. The latest studies have shown its connection with Middle Pleistocene sediments and fauna (Kretzoi 1977, Kurtén, Poulianos 1977, Sickenberg 1971, Ikeya 1977), putting its minimum dating at about 300,000 years B.P. (Stringer, Howell, Melentis 1979).

The braincase of the skull strikes us with its volume (with its minimum volume of 1,200, according to Stringer et al. 1979). The postorbital narrowing of the skull is not so strong as in the Asian finds, *Homo erectus erectus* and *Homo erectus pekinensis*, and the low, broad and oblique front is not separated from the supraorbital region with a well visible transversal sulcus, as is the case with most typical *Homo erectus* finds. The supraorbital

morphology in frontal view shows two arches separated at the centre by a depression in the place of their maximal thickness. They resemble the situation in the Arago and Steinheim skulls. The find from Arago is of special importance for comparison with the Petralona skull, due both to the good state of preservation of the facial skeleton, and also thanks to its dating. In lateral view we can see that the supraorbital depression (sulcus) of the frontal bone in the Arago XXI skull is deeper than that of the Petralona find. The facial skeleton is set under the front similarly as in the Petralona skull, but it is somewhat more prognathic. In frontal view the Petralona find has higher maxilla, whose overall shape differs from the Arago XXI skull. On studying the dental arc and upper palate, however, Murill (1974) found certain similarities with the Broken Hill skull. The third molar is visibly smaller than the second one, but this character is even more clear in Arago XXI. The angle of the skull base too, shows a similar angulation in the Petralona skull as in the Broken Hill find. The occipital bone is angulated in the same way as in the Broken Hill skull, but its muscle relief and the torus occipitalis are not so strong. Compared with the occipital bone from Vértesszölös we can see that the Petralona find is more robust. The Vértesszölös specimen has in general larger and wider occipital angle, pointing to a larger braincase capacity. The morphology of the temporal region of the Petralona skull is also closer to the Broken Hill find. Striking is the very rich pneumatization of the supraorbital region, and also of the other parts of the facial skeleton. In this respect the Petralona find lacks any analogy among the fossil finds.

If we regard low braincase capacity, the bones thickness (the occipital and parietal bones of the Petralona find), the shape of the torus occipitalis and the angulation of the occipital bone as decisive characters for *Homo erectus*, the Petralona find can be really attached to this species, however, a number of other characters point to a trend towards the later European *Homo sapiens* and it differs, namely from the Asian finds of *Homo erectus*.

The finds in the Arago Cave included individual teeth, fragments of parietal bones, a patella, phalanges and part of the pelvis, in 1969 mandible Arago II, in 1970 other jaw Arago XIII and in 1971 a facial skeleton together with frontal bone (Arago XXI). The smaller mandible Arago II belonged according to its discoverers Henri and M. A. de Lumley to a female. Half of the other mandible marked as Arago XIII is much bigger and robust, belonging without doubt to a male. These two finds coming from the same layer show that there was strong sexual dimorphism (compare with the difference between the mandibles from Ternifine in Algeria). Their absolute dimensions are large (namely the width of the jaw). Although both jaws from Arago can be classed with the same group as the Mauer and Montmaurin jaws, their absolute dimensions, especially those of Arago XIII, exceed even the dimensions of the Mauer jaw. The same holds also for the dimensions of the teeth — the teeth in the

female jaw Arago II are of average size, but those in the male jaw Arago XIII are much bigger than the teeth in the Mauer jaw. We can see clear sexual dimorphism also when comparing the individual finds of isolated teeth. Their morphology and the pattern of grooves on the occlusal surface is not too primitive. The third molar is somewhat smaller than the second one. The dental arch is rounded at the front. In this respect it differs from the dental arch of the maxilla from Petralona. In the male mandible Arago XIII the symphysis inclined, without any indication of the chin, similarly as in the Mauer and Montmaurin jaws. In the female mandible Arago II we can see a slight indication of the chin connected with the existence of mandibular depression. In the Arago XIII mandible we have been surprised by the strong alveolar plane and low-lying mental foramen. The branch of the mandible in Arago II is perpendicular, while in Arago XIII it is slightly oblique, similarly as in the Mountmaurin mandible.

In the facial skeleton Arago XXI the attached frontal bone is not so flat as in most Asian finds of *Homo erectus*. The new find of *Homo erectus* VIII from Java, however, indicates that here too, we must count with variable situation. Arago XXI has relatively strong postorbital constriction and due to this fact it has relatively narrow front. Nevertheless, the constriction is not so strong as in the Asian finds of *Homo erectus*.

In contrast to the Petralona find in Arago XXI the sinus frontalis is simple and very small. The facial skeleton lacks the fossa canina that can be found in the Steinheim find, as well as in *Sinanthropus* from the East-Asia. The orbits are rectangular, completely different from the typical orbits of the classical Neanderthal man.

From the hitherto finds we can conclude that the specimens from Arago clearly differ from the *Homo erectus pekinensis*, and to a great extent also from *Homo erectus mauretanicus*. They are closest — as far as the hitherto finds permit us to make any comparison to the earliest European finds, namely to the finds from Mauer, Montmaurin and Petralona.

A fragment of a frontal bone and two mutually fitting fragments of an occipital bone, a small fragment of parietal bone and a molar were found during the discovery of a prehistoric settlement from the Holstein Interglacial in the travertine hill at Bilzingsleben (GDR). On the fragment of the frontal bone we can see the robust central part of the supraorbital relief resembling the finds from Petralona and Broken Hill in the degree of its development. Morphologically it is clear that the supraorbital torus was one continual form without any glabellar depression or division. In this feature is Bilzingsleben nearest to some later classical Neanderthal finds e.g. La Ferrassie skull. The interesting thing is that the frontal bone is not very thick. In the occipital bone, whose occipital plane is wide and low, we can see a characteristic angulation and flat nuchal plane. Vlček (1973, Vlček, Mania 1977) writes that the angulation of the occipital bone is larger than in the Vértesszölös find. Be-

cause, there is not great difference in the occipital angle it seems that this impression has arisen perhaps due to the difference in the absolute size of the occipital bones of both finds. Anyhow the announcement of a new sub-species of *Homo erectus* (Vlček 1973) requires the differentiation of this find from the hitherto subspecies of *Homo erectus* especially from the *Homo erectus heidelbergensis*.

The incomplete occipital bone found (with the four deciduous teeth) on the travertine locality near Vértesszölös north-west of Budapest, strikes us with its large dimensions and small angulation. This enabled Thoma (1966, 1969) to calculate its capacity at over 1,400 cc, which is quite beyond the capacity of *Homo erectus*. Tobias after reconstructing the missing opisthion made new calculations and arrived at a minimum capacity of 1,350 cc. Across the bone there is a strong, not divided torus occipitalis. The bone in the upper part is considerably strong in the lower part its strength varies and at places it is slight. The upper part of the bone is high and vaulted i.e. considerably differing from other finds of *Homo erectus*.

These circumstances, and namely the high brain capacity led Thoma (1966, 1969) to call the find *Homo erectus seu sapiens*.

The find of human remains from the Arago cave were first classed with the Riss (320,000 years B.P.) and only the recent studies and dating are classing them with the earliest finds of the *Homo erectus* in Europe in Mindel 450,000 years (de Lumley 1979). This circumstance shows that although the finds of both the Arago II and XIII mandibles and of the facial skeleton XXI have been correctly described, the absence of the complex of archaic characters as known from the *Homo erectus erectus* and *Homo erectus pekinensis*, and on the contrary, the presence of some progressive characters typical of the later *Homo sapiens*, was not sufficient enough to suppose Mindelian dating of the find. Similarly, the find of the skull from Petralona was first considered to have belonged to the *Homo sapiens neanderthalensis*. Only the stratigraphic and palaeontological studies and the attempts to acquire absolute dating revealed the probability of its Mindel age. Nobody counted with such early appearance of progressive characters in the *Homo erectus*. Not only the Mindelian finds shocked the scholars with their combination of the archaic and progressive characters. Similarly some of the younger finds, e.g. the finds from Steinheim and Swanscombe did not match the traditional image of the *Homo erectus* or of the early *Homo sapiens* and they prompted new attempts of phylogenetic interpretation of the origin of the *Homo sapiens* as a special evolutionary branch different not only from the other finds from other continents, but also from the rest of the European finds. The study of the earliest European finds shows that all of them have characters typical of the early finds of *Homo sapiens*, but the degree, intensity and number of these characters varies in the individual finds. The appearance of progressive sapient characters is their typical feature. Whether these characters appear in such an early period only

in Europe, or whether there were similar trends also in other geographical regions will be revealed by further scientific studies and discoveries.

The disproportions in the occurrence of these characters correspond to the idea of mosaic model of development, when the genetic dispositions are winning through in various degree and in various context, due to the influence of various factors (environment, nutrition, climate, functional adaptability, etc.). With the low density of settlement and with the relative high degree of isolation of the individual population groups the final high variability is the result of the originally similar developmental trend. The study of the skull from Petralona made Stringer, Howell and Melentis to form a theory of three evolutionary stages, illustrating the transition from *Homo erectus* to *Homo sapiens*. Within the framework of these three stages the authors try to divide the finds into morphological subgroups. They underline that these groupings do not express any relationship. So what does the suggested grouping of Pleistocene hominid finds into three groups serve for, what is in the background of this classification attempt? It serves obviously for morphological classification according to the chronologically proceeding changes of morphological characters towards *Homo sapiens*. It follows that the changes are chronologically not contemporary which means that the changes we found in certain population (or better to say in certain finds only) can be found in other finds of the same period in different composition and in different degree. We can see a roughly identical evolutionary trend, that can be best followed over large geographical regions. If we want to compare the finds from such large regions we have at our disposal unfortunately only Europe, north Africa, east and south Africa, east and south-east Asia. North Africa is geographically nearest to Europe, in fact, if we have on mind the finds of fossil man concentrated near the north-African coast, forming part of the Circum-mediterranean region, this region has many common features with south Europe. There are similar climate and similar geomorphological character with frequent karst formations, and naturally with similar flora and fauna. Let me mention here the palaeoanthropological situation of this region. The well-known finds are from Ternifine in Algeria, Salé, Rabat, Sidi Abderrahman, Thomas Quarries and Temara in Morocco.

In Ternifine in a sand pit excavations three mandible and parietal bone were gradually discovered. The parietal bone with its flatness resembles the respective bones of *Homo erectus erectus* and *Homo erectus pekinensis*. It seems also that the maximum width of the skull at its base was on the temporal bones. The overall size of the parietal bone indicates that the skull was big and its braincase capacity was larger than it was usual with the *Homo erectus*. In this respect, and also with the limited thickness of the bone the find is closer to *Homo sapiens*. The majority of other characters link it with Asian *Homo erectus*. The three mandibles are robust and large. A point of interest for our study

is their outstanding morphological variability. Naturally, it would not be correct to consider these three mandible as remnants of individuals belonging to the same population. Nevertheless, they belong to the same, comparatively small span of time and they come from the same locality. It can be assumed that the owners of these mandibles were evolutionary, culturally and populationally quite close to each other. It means that their morphological variability can be interpreted first of all as intersexual dimorphism and individual variability inside the same evolutionary type and within the same locality.

Chronologically the finds from Ternifine are the oldest among the north-African finds, and compared with the European finds they fit between the Vértesszölös and Mauer.

In Casablanca two mandibles were found in two quarries Schneider Quarry and Thomas Quarry I. Arambourg, Biberson (1956) attached the find Thomas Quarry to the find from Ternifine (*Atlantropus mauretanicus*). Both finds have characters connecting them with the mandibles from Ternifine (outstanding robusticity, the third molar is smaller than the second one, the shape and slope of the front side of the symphysis, strong planum alveolare, cingulum, macrodont teeth, etc.). The archaeological finds (Middle Acheulian) and their stratigraphic position enable their classing with the upper part of the Middle Pleistocene (corresponding to the beginning of the European Riss Glacial) (F. Sausse 1976).

The Rabat find consists of a mandible, parts of a maxilla and fragments of a braincase. A number of scholars have found in this find characters of *Homo erectus* (Arambourg 1963), others believe to have discovered links with *Homo sapiens neanderthalensis* (Vallois 1945). Mostly it is dated into the Middle Pleistocene (Howell). The mandible is robust, the internal edge of the symphysis resembles the Ternifine II and III mandibles and the mandible from Mauer. Very interesting is the shape of the planum alveolare. The musculus digastricus was attached to the ventral side of the mandible, showing the beginning of the chin formation. The occipital part of the preserved remains of the skull is vaulted, without any muscle relief. The impression of arteria meningica media on the endocranial side of the parietal bone has a number of archaic characters. The upper jaw too combines a number of archaic characters (prognathism and the lower part of the face is high) with progressive characters (e.g. the shape of the dental arch).

Generally we can say about the Rabat find that it shows a number of primitive (prevailing) and progressive (less outstanding) morphological characters. We can regard it as a late and well-developed type of the north-African Ternifine type.

The Salé skull chronologically fits with the other Moroccan finds, however, chronologically it is analogous also with the European Riss (Moroccan Tensiftian). Its brain capacity is below 1,000 cc (930 to 960 cc) and this fact together with the maximum width of the brain case situated low at the base of the skull and with strong platycranium shows

that the skull belongs to the local archaic type (*Homo erectus*). This classing is supported also by the existence of a strong supraorbital torus, and by the postorbital constriction connected with it. In the central sagittal line of the braincase there is a rooflike ridge. These archaic characters are combined with a number of progressive characters, such as the rounding of the occiput, big mastoid processes and parietal bosses on the parietal bones. Similarly as in the above-mentioned finds of this period, there is a group of characters, most of them archaic, resembling the north-African Ternifine type alongside with some progressive characters documenting the tendencies of evolution towards *Homo sapiens*. Jaeger (1974), consider this important find a specimen of developed *Homo erectus*. Younger than the above finds is the find of a mandible and teeth from the maxilla from Témara, chronologically belonging into pre-soltanian i.e. to the period corresponding to the European Riss. The accompanying archaeological finds belong to the Upper Acheulian. The archaic morphological characters prevail, especially conspicuous is the robusticity of the mandible — it is even slightly more robust than the Rabat mandible. The inclination of the symphysis is less oblique than in the Rabat mandible and on its front side we can see a slight indication of the chin. The teeth are without cingulum. The internal side of the symphysis is flat, it is almost without relief — these are certainly archaic features. Similarly as in modern man the third molar is smaller than the second one (in the Rabat mandible it was vice-versa).

With its morphology in general and with its dimensions the find is the late find of north-African Ternifine type (Sausse P. 1976) with a number of progressive characters.

Although this paper deals mainly with finds usually regarded as *Homo erectus*, I would like to add some comments also concerning younger finds, namely those complementing our ideas on the course of the evolutionary process of the hominids. From north Africa we know several such finds. Let me mention Djebel Irhoud, Tangier and Haua Fteah. Djebel Irhoud is a locality south-west of Sidi Abderrahman in Morocco that yielded a skull (1961) and fragments of an other skull (1963). On describing the first skull C ab o t B r i g g s (1968) pointed out the differences between the Djebel Irhoud and between the European Neanderthal man. Namely Djebel Irhoud I has high vaulted frontal bone, with relatively small supraorbital arches. The occiput of the skull (the occipital bone is wide) has quite sapient character in its sagittal curve. The relatively short face below the supraorbital arches has in general modern shape, but on the upper jaw with big teeth there is no fossa canina. The mixture of archaic and progressive characters has resulted in contradictory assessments of this important find. Gieseler (1974) ranks it with the west European classical Neanderthal man, but Howells (1973) and Piveteau (1967) class it with *Homo sapiens* — without connecting it with *Homo sapiens neanderthalensis*. Although other two north-African

finds — Tangier and Haua Fleah in Libya with two fragments of mandibles, are too fragmentary, it is very interesting that many scholars in their recent studies regard these finds as a product of local, i.e. north-African development, leading to the past as far as to the finds from Ternifine (Jaeger 1973, Saban 1972, 1975, Howell 1957). C. B. Stringer (1979) in his study of the fossil skull (*Homo sapiens sapiens*) from Singa, Sudan (Upper Pleistocene) unearthed in 1924, classes this with the Djebel Irhoud find (... "the Djebel Irhoud I specimen is closest in overall Penrose [1954] distance, size and shape to the Singa fossil").

Compared with the European Middle Pleistocene finds we arrive to the conclusion that in north-Africa there was a similar evolutionary trend leading to *Homo sapiens sapiens*, through somewhat different combination of the morphological changes.

In order to be able to understand the causes of the various combinations of morphological changes we must obtain more profound knowledge on the influence of the environment, functional anatomy and about the degree of changes in the evolution in certain geographical areas. For such a study we shall need new and more numerous material. If our assumptions concerning uneven development in large geographical regions according to the so-called mosaic-pattern are correct, then they should hold for all periods of human evolution, not only for the Middle Pleistocene. We must follow various degrees of isolation (depending on the number and density of hominid groups, on the geographical conditions and way of life). We must study the different standard of cultural development, the migration of populations or of their parts.

The west-European population of the classical Neanderthal people, or perhaps the role attached to them in the process of hominid evolution retarded the correct interpretation of evolutionary changes. Only the better knowledge and understanding the situations outside west-Europe will make us to understand finally that the west Europe is not a typical, but a rather atypical territory as regards human evolution. The existence of the last Neanderthal people and of the first *Homo sapiens* at the same period can be best explained through the uneven, mosaic-patterned evolution within the framework of a certain geographical region. The territories of the Near East, central and east Europe are other geographical regions which help us through profound anthropological study and comparison of types and number of evolutionary changes to understand the process of evolution in its entire scope. The attempts to define and assess the various transition phases can be successful if the individual stages can be evaluated through objective methods. Several such attempts appeared in the recent anthropological literature (Bilborough 1978, Stringer et al. 1979).

The purpose of this study not containing any metric data is to draw attention to the need of the assessment of the quality and quantity of evolutionary changes in connection with the geographic

regions in which the development of the respective population took place, and which influenced this development to a considerable degree. The example of European and north-African Middle Pleistocene hominids show that they have arrived to similar results (*Homo sapiens sapiens*) from relatively different Middle Pleistocene populations. In Europe it is important that already the Middle Pleistocene finds have a considerable number of characters pointing towards the later *Homo sapiens*. So far none of the European finds demonstrates a complete set of characters as known from the Middle Pleistocene specimen from south-east and east Asia. It is necessary to study more profoundly the process of evolutionary changes in one chronospecies within the given geographical region. The hitherto study of European Middle Pleistocene finds, the new dating of the Arago finds complement these studies and the first publication of metric and morphological data about the Petralona skull do not support the earlier evaluation of the European Middle Pleistocene hominids as *Homo erectus*. The morphological analysis of these finds indicates, instead, that the evolution proceeded in different ways within the same species. Stringer et al. (1979) included into their stages of *Homo sapiens* the finds from Petralona, Vértesszölös, Mauer and Bilzingsleben as stage No. 1, Steinheim, Swanscombe, Montmaurin and Arago as stage 1 or 2.

I hold that the north-African specimens represent the local evolution leading to *Homo sapiens sapiens*. We can say already on the basis of our present knowledge that it is not correct to call the north-African Middle Pleistocene finds *Homo erectus mauritanicus*.

I am sure that further finds and their detailed study will cast more light on the origin of *Homo sapiens* not only in Europe and Africa but also in other regions of the world.

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