Chapter 5

The Earliest European Human Peopling After the Recent Discoveries: Early Neanderthals or Different Lineages?

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Abstract This report is a review of the European fossil record during the Pleistocene. We investigate the possibility of an anagenetic evolution of Neandertals starting from the most ancient hominins found at Ceprano, Gran Dolina, etc. It appears that the contribution of the Dmanisi population to later Europeans is very unlikely. We focus on the metric and morphological features of the oldest human fossil in Europe: the cranium from Ceprano. Among the characters observed in Ceprano, a few are also seen in more recent European *H. heidelbergensis* fossils (especially in Petralona) and many in African *H. heidelbergensis* fossils (especially in Bodo and Kabwe). We then consider the hypothesis that Ceprano could be ancestral to African *H. heidelbergensis* but not to European members of this taxon. A cladistic analysis seems to confirm this view. Lastly, in European *H. heidelbergensis*, we observe a continuity in characters that become more numerous approaching the beginning of the Late Pleistocene. These characters are typical of *Homo neanderthalensis* following the "Accretion-Model" hypothesis.

Keywords Ceprano • Dmanisi • Pleistocene • Phylogenetic analysis • Cladistic analysis

Extraordinary discoveries of remains belonging to hominids were made in the last decade of the twentieth century, as well as in the current century. These discoveries occurred in Italy at Ceprano (Ascenzi and Segre 1996, 2000; Clarke 2000; Gilbert et al. 2003; Mallegni et al. 2003), in Spain at Atapuerca (Arsuaga et al. 1993), and in southern Caucasus at Dmanisi (Gabunia and Vekua 1995a, b; Gabunia et al. 2000, 2002; de Lumley et al. 2006). The bones found at Dmanisi are considered the earliest representative remains of ancient humanity that reached the northern hemisphere of the Old World. After these discoveries, some paleoanthropologists developed new hypotheses about human evolution in these areas.

Humankind represented by the fossil record, which is more recent than the above-mentioned discoveries, is quite complex, as well as Humankind that preceded it in the African regions. Perhaps the skull found at Ceprano (Ascenzi and Segre 1996), in the middle of the Italian peninsula (Tyrrhenian area), and those discovered in La Gran Dolina at Atapuerca, in northern Spain (Arsuaga et al. 1993, 1997), could not be considered important enough to allow us to hypothesize a contribution to the later human lineages. In fact, at this moment, the skull of Ceprano is the only finding with a quite complex phenotype that seems to differentiate from that of other contemporaneous fossil records (for more details see Mallegni et al. 2003). The remains discovered in La Gran Dolina at Atapuerca are mostly represented by very fragmented bone remains, generally of young individuals(at least the bone fragments which allowed us to scientifically hypothesize their significance in the evolution of mankind).

We must proceed in order. We have already mentioned that in Southern Caucasus, and more precisely at Dmanisi, near Tiblisi in Georgia (Gabunia and Vekua 1995a, b; Gabunia et al. 2000, 2002), an exceptional series of remains belonging to hominids was exhumed from the deepest layers of the excavation site. At the beginning of the excavations, the site was believed to have contained only medieval remains. The most representative and prestigious of these bones are obviously skulls, but postcranial elements were found as well (de Lumley et al. 2006). All these remains belong to *Homo* and are datable between 1.8 and 1.75 Ka. This discovery represents, up until now, one of the indications of the earliest presence of hominids in the areas outside of Africa. It is slightly earlier than the discovery of the remains of Sangiran, in south-eastern Asia, which is about 1.6 Ka. To our knowledge, we can assume that these remains probably represent one of the most ancient migrations, perhaps the first, of hominids from the African cradle.

Since we must consider the evolution of human groups in the European territory, perhaps the remains of Dmanisi, which are so significant for the reasons mentioned above, are not so important in this ambit. In fact, up until now, we have not found bone remains of hominids in the European territory,

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nor any evidence of their culture, belonging to the chronologic period of at least 600 thousand years, which divides the remains of Dmanisi from the ones considered, for now, the most ancient in Europe. The Caucasian area, where Dmanisi is located, is separated from the Russian Sarmatian plain by a mountain range. These mountains may have represented an insurmountable barrier for these ancient groups, making it impossible to reach the Sarmatian plain, and the European territories. There were possible passages in the east and west of the mountain range due to the presence of small plains overlooking the Black Sea and the Caspian Sea, but they were probably unapproachable due to climatic factors (e.g., the intense cold). These groups probably were not adapted for living in these new and negative climatic factors. In particular, another insurmountable frontier was chiefly represented by the large Sarmatian rivers, the Don river, the Dnepr river, and the Volga river, which flow into the Azov Sea, the Black Sea, and the Caspian Sea.

After the period of the remains of Dmanisi discovered in the Southern Caucasus, there were new arrivals of hominids from the southern areas of the northern hemisphere (without considering the Oriental Asian areas). These arrivals were separated by at least two other remarkable chronological hiatuses. The first hiatus (which lasted 900–800 thousand years) is represented by the discovery of the skull of Ceprano and by the remains of La Gran Dolina of Atapuerca. The second hiatus could be associated with the arrival in the Middle East (approximately about 250 thousand years ago) of the human form which evolved in *H. sapiens* (remains of Zuttiyeh?). Otherwise, the second hiatus could be associated with the arrival in the Middle East of *H. sapiens* (approximately 100 thousand years ago), and it could be represented by the remains of Skull and Qafzeh (McCown and Keith 1939), which were defined by Vandermeersch (1981) as proto-cromagnoid. Their possible descendants appeared in Europe after 60 thousand years. In fact, the site of Pestera cu Oase, in Romania, represents for now the first presence of *sapiens* in the European territory, as it dates back to 40 thousand years (Trinkaus et al. 2003a, 2003b).

We can hypothesize that the same climatic and/or biogeographical factors (which in all probability occurred cyclically) impeded free access to the north-western areas of these *sapiens* whose cognitive and cultural apparatus was without doubt more effective than that of the hominids represented by the remains of Dmanisi.

It is a common belief that the most ancient Pleistocene humans, represented in the northern hemisphere by Dmanisi, would have found their future toward the east, traveling in the direction of the parallels and not of the meridians. At least, other human populations (except for those that arrived in Dmanisi) probably behaved in this way. They abandoned the African cradle and appeared in the Far East (in China, Java, and in the Indian subcontinent) in a period between 1.8 and 1.6 million years ago. However, with the ever-increasing number of excavations currently being carried out, it becomes increasingly likely that we will find ancient evidence of the same period (or immediately later) also to the west of Caucasus, in the European territory. Due to the argument proposed for this Congress, we must begin our dissertation from the remains of Ceprano and of La Gran Dolina of Atapuerca.

The skull of Ceprano was discovered by chance during road construction. Biddittu (aggregated to the Human Paleontology Institute of Rome) (Ascenzi and Segre 1996) recognized some bone remains belonging to the neurocranium in the soil removed by the scraper. The Human Paleontology Institute of Rome promptly organized a team that collected the human bone remains. In this way, we were able to restore part of the neural cranium, which allowed us to obtain some metrical measurements and morphological features (Fig. 5.1).

Unfortunately, the greater part of the remains of the upper side of the face was lost, the only bone elements found are so fragmented that any reconstruction of this side of the skull was impossible. We could only replace the frontal processes of the zygomatic bones. The right part of the neural cranium is in very good condition. This allows us to have a complete vision of the skull, by using CT images. The left part of the skull is deformed *ab antiquo*, probably due to the pressure of the soil on this side of the remains. The analysis of the earth inside the skull caused us to assume that the cranium dates back to between 900 and 800 thousand years (Ascenzi et al. 1996).

We took some reliable measurements following the Martin and Saller methodology (1956–1959) and the Wood method (1991). We also tested the presence, and the absence, of nonmetric characters (about 30) that Wood (1991) believes to be characteristic of *Homo erectus*. This kind of examination was also performed on other bones representing extinct species (Mallegni et al. 2003), both preceding and succeeding the skull of Ceprano. Some of these remains are African, belonging to *H. habilis*, *ergaster*, *rhodesiensis* (or to African *heidelbergensis*), others are Asian (*P. erectus*, *H. erectus*), and some others belong to the European area (*H. heidelbergensis*, and the so-called ante and pre-Neanderthals). Unfortunately, it was not possible to include the remains of La Gran Dolina of Atapuerca, which are called *H. antecessor* on the basis of the features of a juvenile mandible, because they were not suitable for this kind of observation due to the fact that the most well-preserved fossil records, as we have mentioned above, were juvenile (Arsuaga et al. 1997).

The features of these specimens were utilized for a cladistic analysis, following the method that was originally formulated by W. Hennig in 1996. This methodology codifies the features to formulate some hypotheses on the phylogenetic relationships among *taxa*. The results of the cladistic analysis were eight equally parsimonious trees (Mallegni et al. 2003)

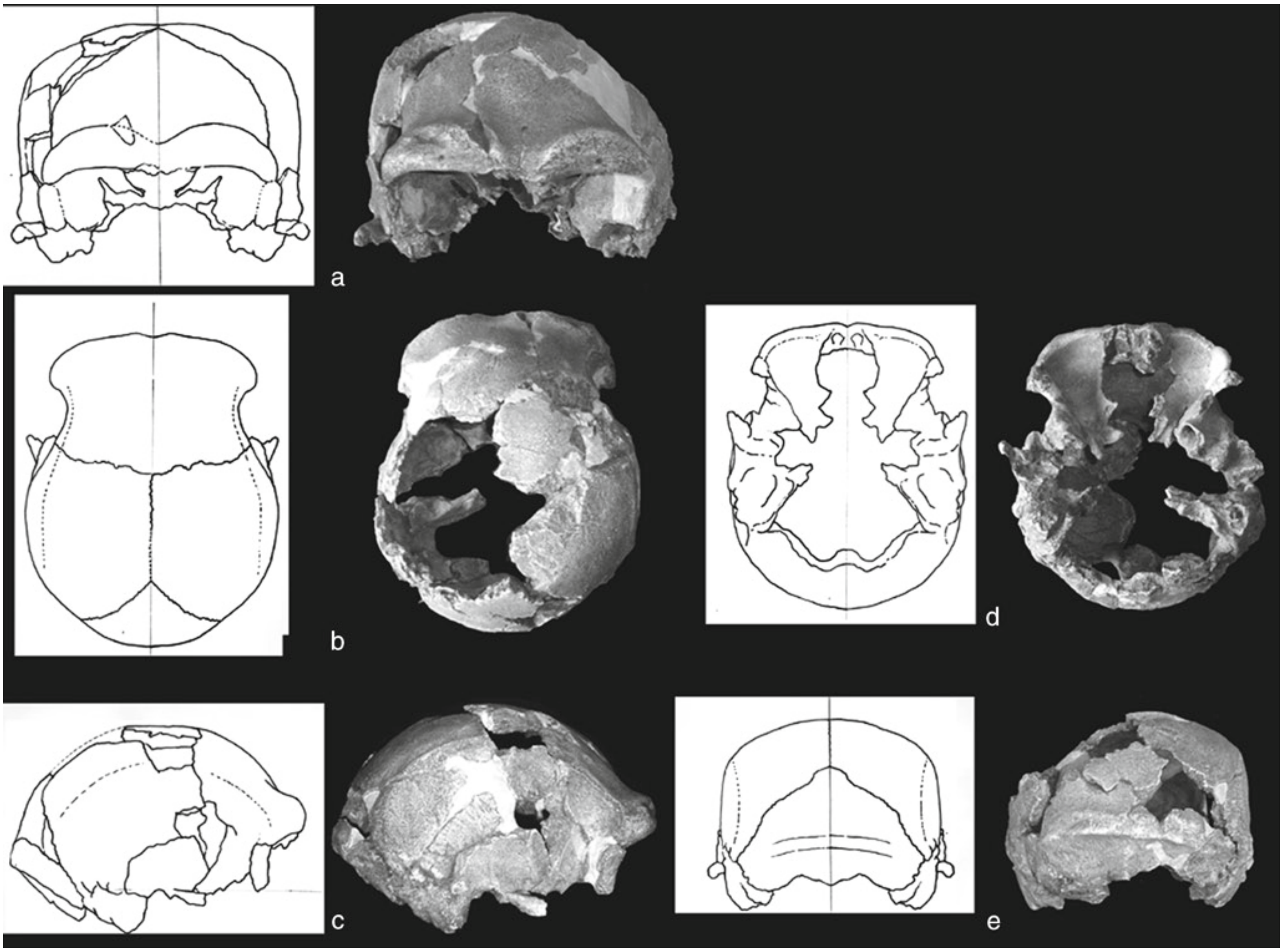

Fig. 5.1 The Ceprano calvarium, viewed in norma anterior (**a**), superior (**b**), lateralis (**c**), inferior (**d**), and posterior (**e**). In addition, some profiles obtained by means of the Mollison's dioptograph

which were synthesized in a single tree called "*strict consensus tree.*"

From the cladogram, it is possible to deduce that the Asian forms of *Homo erectus* (Zhoukhoudian and Sangiran) constitute a well-identifiable clade, separated from the rest of the taxonomic sample. The Asian *Homo erectus* is the "sister group" of a large clade including two main branches. The first branch includes Steinheim and the remains of Atapuerca and of Sima de los Huesos, while the second one includes Ceprano, Arago, Petralona, Kabwe, Saldaña, and Bodo. The samples coming from Dmanisi are definitely closer to the root of the whole cladogram (represented by OH-9), compared with these remains.

The bootstrap analysis provided a statistic support to these results, showing that the clade which includes Ceprano, Arago, Petralona, Kabwe, Saldaña, Bodo, Steinheim, and the remains of Atapuerca is clearly separated from *Homo erectus* Asiaticus, by the remains of Dmanisi and by OH-9.

On the basis of these results, we hypothesized the existence of a new species, *H. cepranensis*, due to the fact that the features which allowed us to identify this species appear for the first time in this specimen. In addition, they are also present in the later African specimens, and sometimes in the remains of the European ambit. On the other hand, these traits do not have anything in common with the fossil record of *H. erectus* coming from the Asian areas.

More detailed observations on the singular cranial elements of the remains of Ceprano emphasized some features which are not comprised in the list of Wood (1991) used for the cladistic analysis exposed above. These new characters are also different from those seen on the rare adult remains found at La Gran Dolina of Atapuerca. For example, the temporal bone (Fabbri and Mallegni 2005) presents an open digastric scissure, without bone bridges, and is not obliterated on the front side (Fig. 5.2), as we have noticed in numerous earlier specimens (KNM-ER 3733 and 3883). The Neanderthals and the so-called European pre-Neanderthals, as well as ATD 6–57 which was ascribed to *H. antecessor* (Arsuaga et al. 1993), almost always present a digastric scissure with the presence of a bone bridge. Therefore, we can

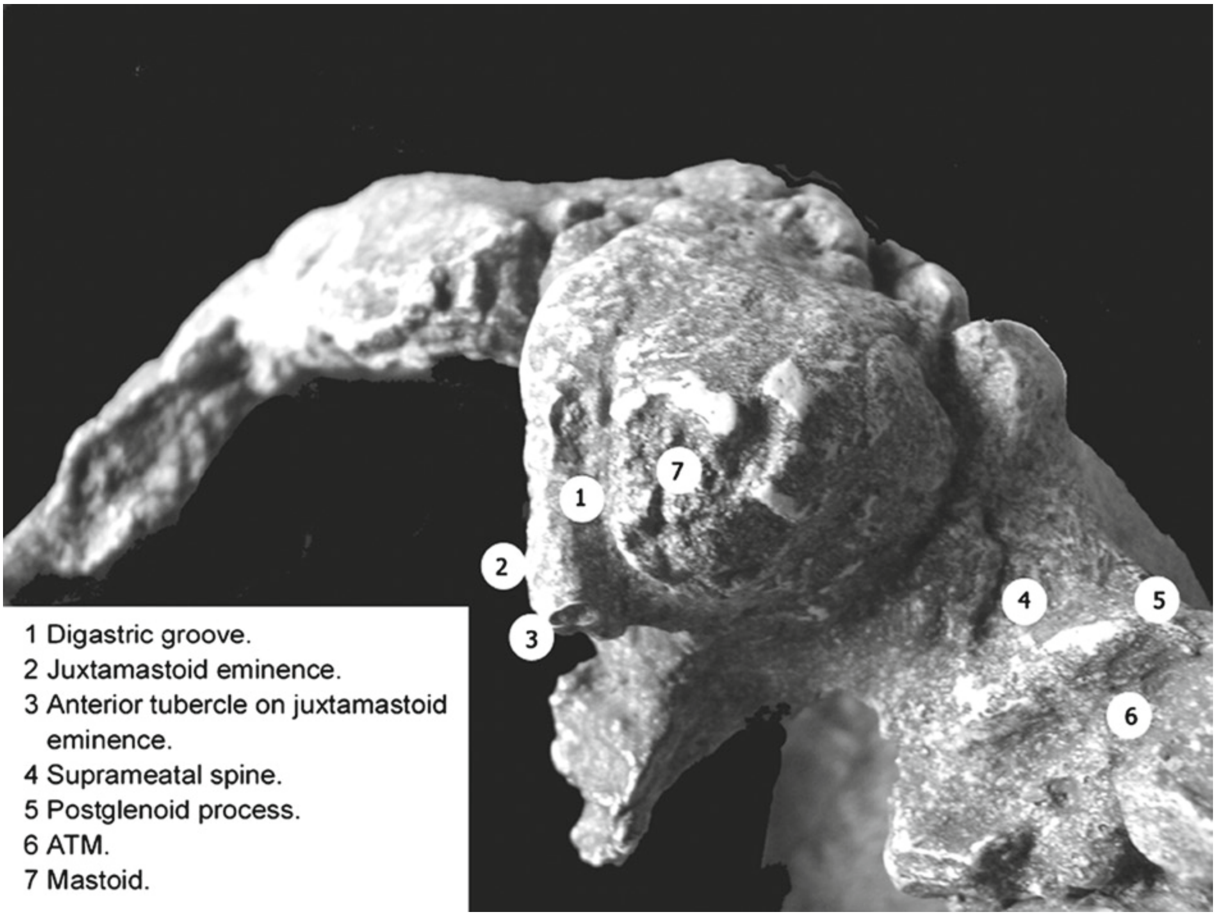

Fig. 5.2 The right mastoid region of Ceprano

only suppose that the future discoveries of adult temporal bones at Atapuerca could show the same features observed in the skull of Ceprano. It is interesting to note that some traits of Ceprano, especially those observable on the frontal and occipital bone, are present in the European specimens defined as *Homo heidelbergensis* (Petralona, Arago XXI and XLVII), as well as in the African specimens of the same species (Kabwe, Bodo, Saldaña) (Mallegni et al. 2003) (Figs. 5.3 – 5.7).

If the possibility of the phenomena of convergence is excluded, we must assume that the bones of Ceprano, which are more ancient than the other two European remains by at least 300–400 thousand years, are their ancestor, and of the African remains, as well (Kabwe, Bodo, Saldaña), following the cladistic results.

In addition to the cladistic analysis, we tried to carry out another examination based on the study of the physical dimensions of the skulls. The investigation was performed on the basis of six measurements which we compared with those of the 25 cranial remains belonging to modern humanity and to human fossil species. We employed the same data that Dean et al. (1998) utilized for the study of the cranial remains of Reilingen to which we added the data of *cepranensis*. The characters observed are: the maximum length of the cranium (this is a new datum, not utilized by Dean et al. (1998) due to the fact that the skull of Reilingen did not present the frontal bones), the maximum width of the skull, the biasteric width, the parietal arch, the parietal cord, and the lambda-inion cord. We analyzed these features simultaneously through the analysis of the principal components carried out by means of the program XLSTAT. The first two principal components are sufficient to interpret 77% of the variance. The first principal component is essentially determined by the parietal arch, by the parietal cord, and by the lambda-inion cord. The second principal component is determined by the maximum length of the cranium and by the biasteric width. The graphic with the two first main components shows a taxonomic distribution of the variables. In the remains of ER 3883, ER 3773, Zhoukhoudian X, XI, and XII, Sangiran 2 and 10, Sambungmachan 1, Solo I and Solo VI, the values of the first main component are lower than all the other values, approaching slightly to *Homo neanderthalensis* (La Quina 5). The Neanderthal remains and the remains of *Homo sapiens* usually have values which are lower compared with those of the second principal components.

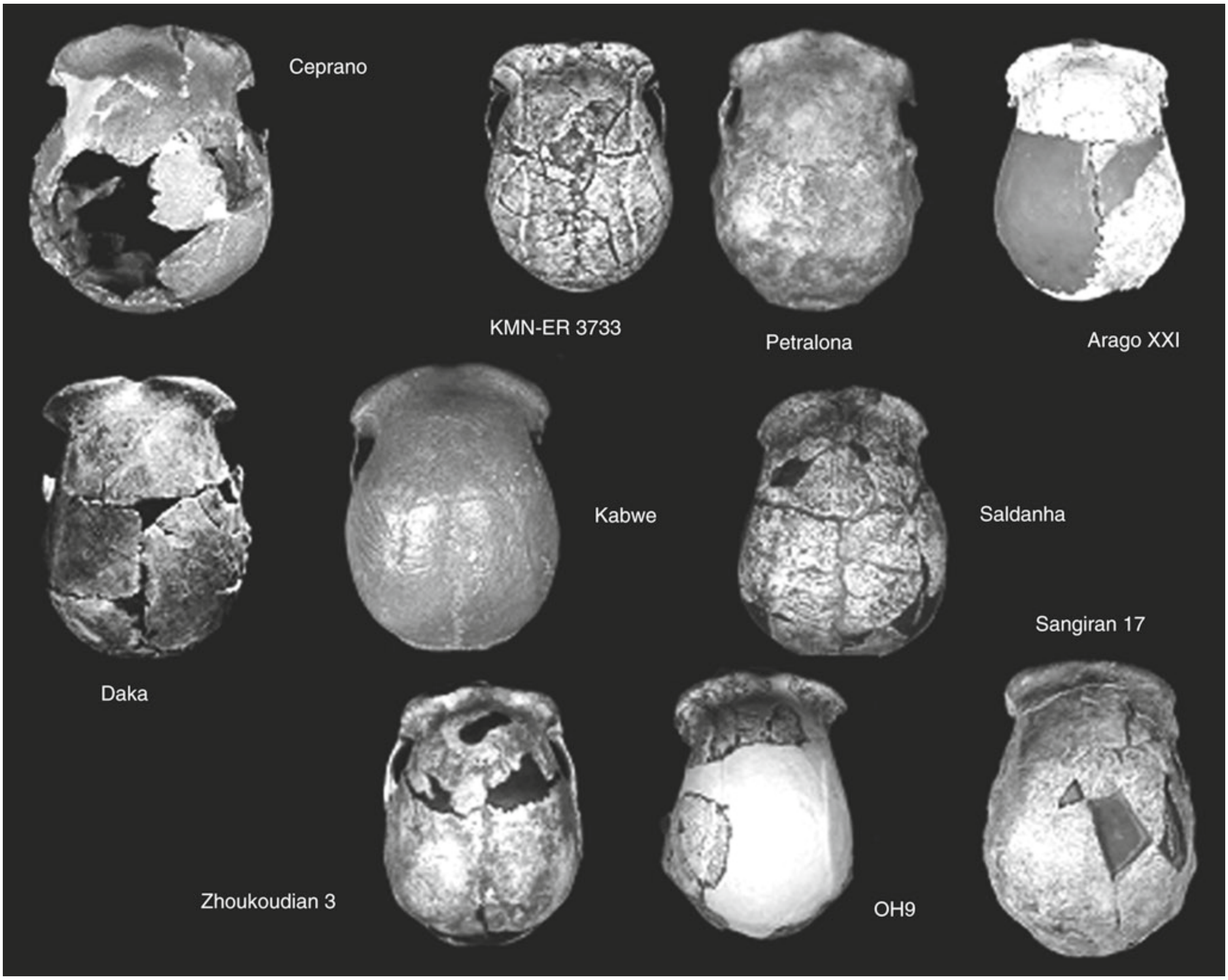

Fig. 5.3 Early and Middle Pleistocene crania in norma verticalis; it is possible to note the morphological affinities of the Ceprano cranium with those of Kabwe and Saldanha, and possibly with that of Petralona as well

The first principal component, in the remains of Solo VIII, IX, X, and XI, is similar to that of the Neanderthals and to that of *H. sapiens*, while the values of the second principal component remain higher. *Homo cepranensis* presents the highest ever observed values in the second principal component, while the value of the first component is positioned in the interval of the variation of the Neanderthal remains, of *H. sapiens* and of Solo VIII, IX, X, and XI. This fact indicates that the values of the parietal arch, parietal cord, and lambda-inion cord in *Homo cepranensis* and in the remains of Solo VIII, IX, X, and XI are homogeneous with those of *Homo neanderthalensis* and *Homo sapiens*. Anyway, the cranial maximum length and the bi-asterion width provide a different assessment to the morphometry of these species, rendering *H. cepranensis* and the remains of Solo well distinguishable from the remains of *H. neanderthalensis* and *H. sapiens*.

It is difficult to understand the significance of the morphometrical affinities between *Homo cepranensis* and the remains of Solo. The age of *H. cepranensis* has been estimated at about 800–900 thousand years, while that of the remains of Solo has been evaluated between 40 and 100 thousand years. The morphology of the calvarium does not indicate a close relationship between *H. cepranensis* and the remains of Solo. In light of these facts, we can surmise that the remains of Solo and *H. cepranensis* developed convergent dimensions of the bi-asterion width and of the maximum cranial length (Fig. 5.8). The results of this analysis are not different from those verified in the study carried out by Dean et al.(1998) on the skull of Reilingen, nor from those performed on the remains of Sambungmachan (Baba et al. 2003).

Obviously, it is not possible to make a comparison of the metrical data, nor of the morphological features, between the skull of Ceprano and the eponym of *H. heidelbergensis*

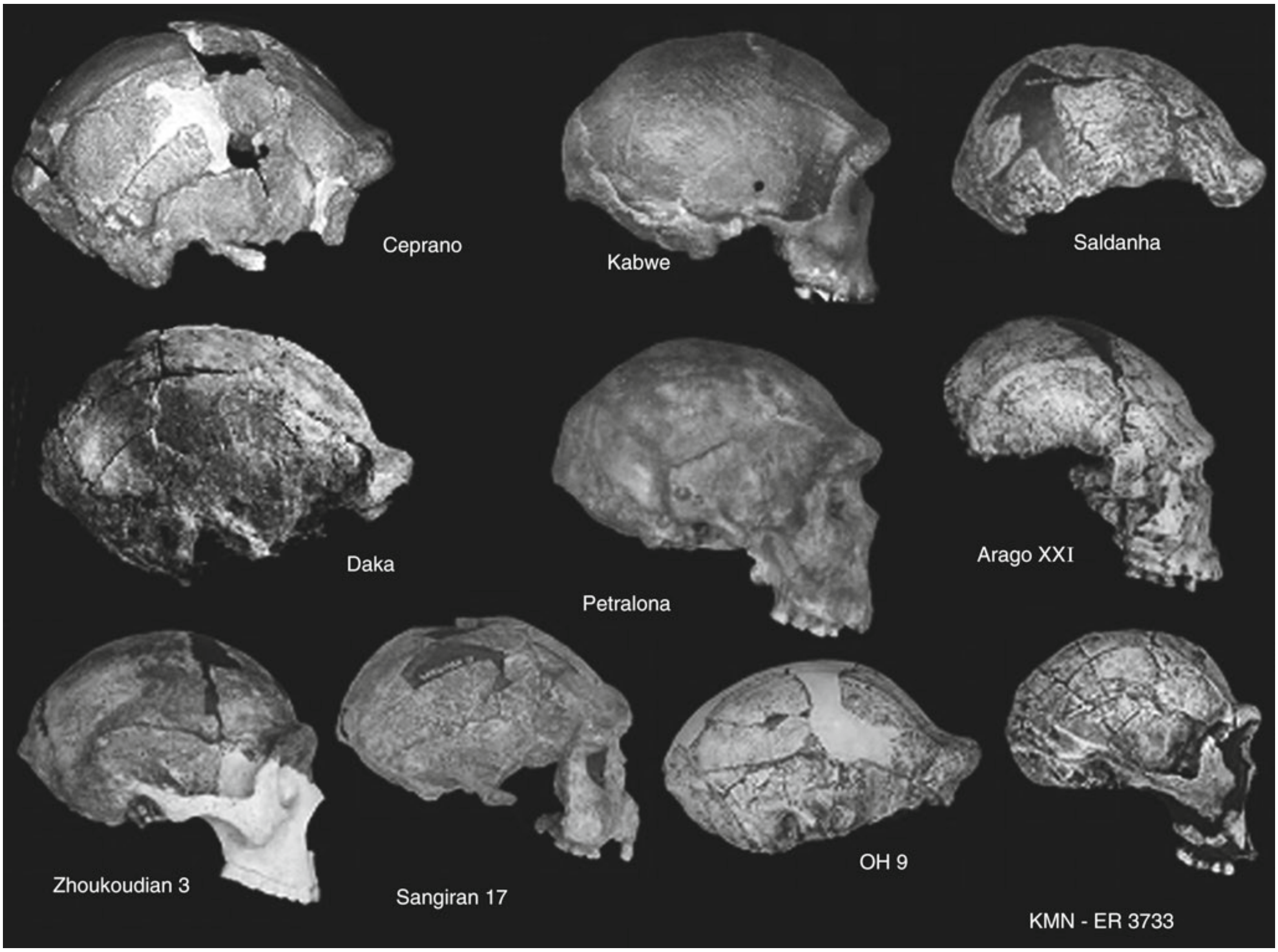

Fig. 5.4 Early and Middle Pleistocene crania in norma lateralis. Note how the lateral contour of the Ceprano cranium is morphologically close to those of Daka and Kabwe, while it differs (in the shape of the occipital profile) from Saldanha and partially from Petralona. The contour of the Ceprano frontal torus, which tends forward, is similar to those of the crania in the first two rows, as well as OH9, but differs from those of Asian *H. erectus* and of KNM-ER 3733

(that is the Mauer mandible), due to the fact that they are represented by different cranial parts. Perhaps the presence of the facial side of Ceprano could have permitted us at least to compare its dimension with the dimensions of the mandible (i.e., the distance between the two ATM), or the profile of the alveolar process and the denture of the two specimens (Fig. 5.9).

It is common knowledge that the species *heidelbergensis* was named and identified on the basis of the features of the mandible of Mauer (Schoetensack 1908), and this definition has been extended to the other two more recent European specimens as well (Petralona and Arago). The habit of naming and identifying new species on the basis of the mandible study is still widely diffused, even though we often have other parts of the cranium from the same sites at our disposal. The case of the remains of Mauer is different as they are the unique cranial remains from the site, and because they were the earliest European remains at the time of their discovery. In fact, the holotype of *H. antecessor* is a juvenile mandible, ATD6–5 and ATD6–96 (in spite of the presence of the facial bones and of the neurocranium of ATD6–69 and ATD6–15, which are both juvenile) (Arsuaga et al. 1997); the holotype of *H. georgicus* is the mandible D2600, despite the preceding discovery of the remains D2280, D2282, and the succeeding discovery of the remains D2700 and D3444 which are quite well preserved (de Lumley et al. 2006).

An excellent study carried out by Fabbri (2006) on some Pleistocene mandibles tends to demonstrate that this is not the most appropriate bone to use for the purpose of identifying a new species, because it does not present any unique and significant features. For example, *H. georgicus* D2600 differs mainly in two characteristics (its large dimensions and the protrusion of the inferior transversal torus) which are absent in the other lower jaw, D211, that is identified as the same species. However, these features are present in other mandibles assigned to *H. erectus* from South-Eastern Asia (i.e., Sangiran 6).

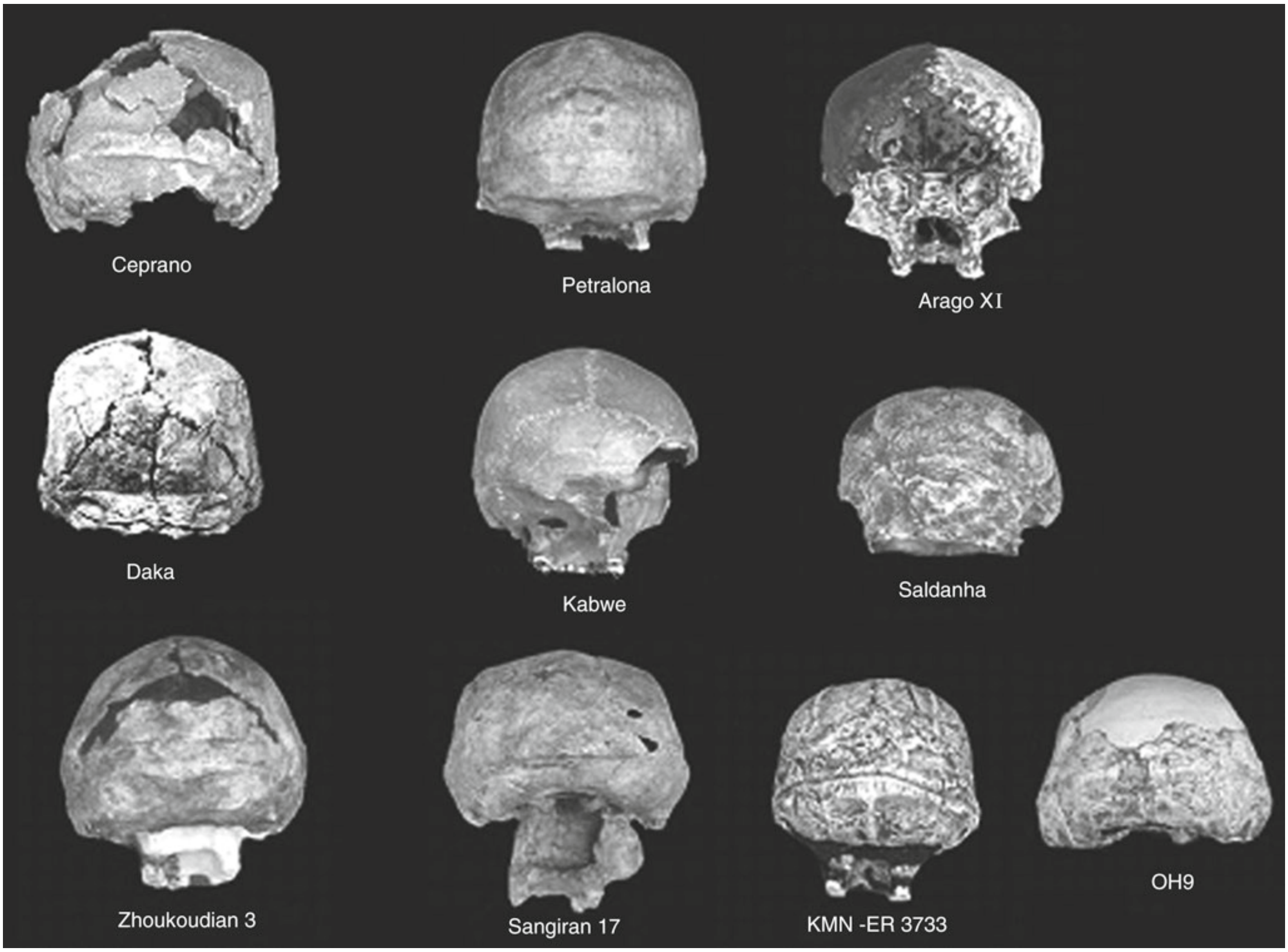

Fig. 5.5 Early and Middle Pleistocene crania in posterior view. The parietal bones begin to become vertical in the Ceprano and Daka crania, while in Petralona the *pars mastoidea* is still marked

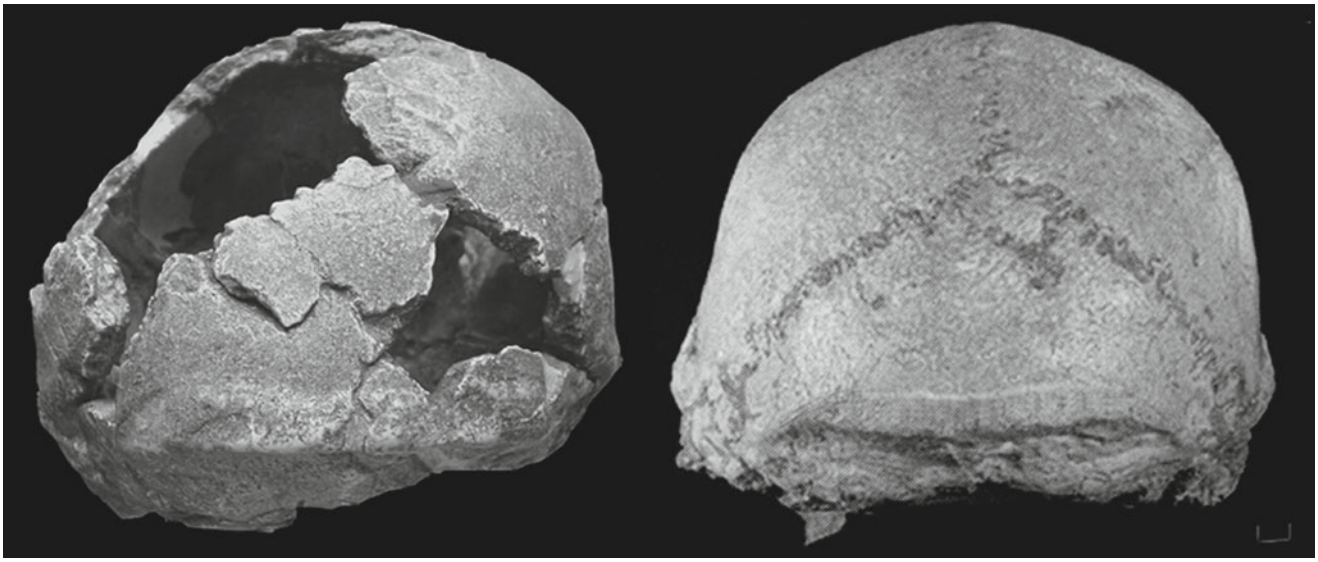

Fig. 5.6 Crania of Ceprano and Petralona in posterior view; the superior profiles of the occipital tori are similar in shape, even though in Ceprano the torus is more firm

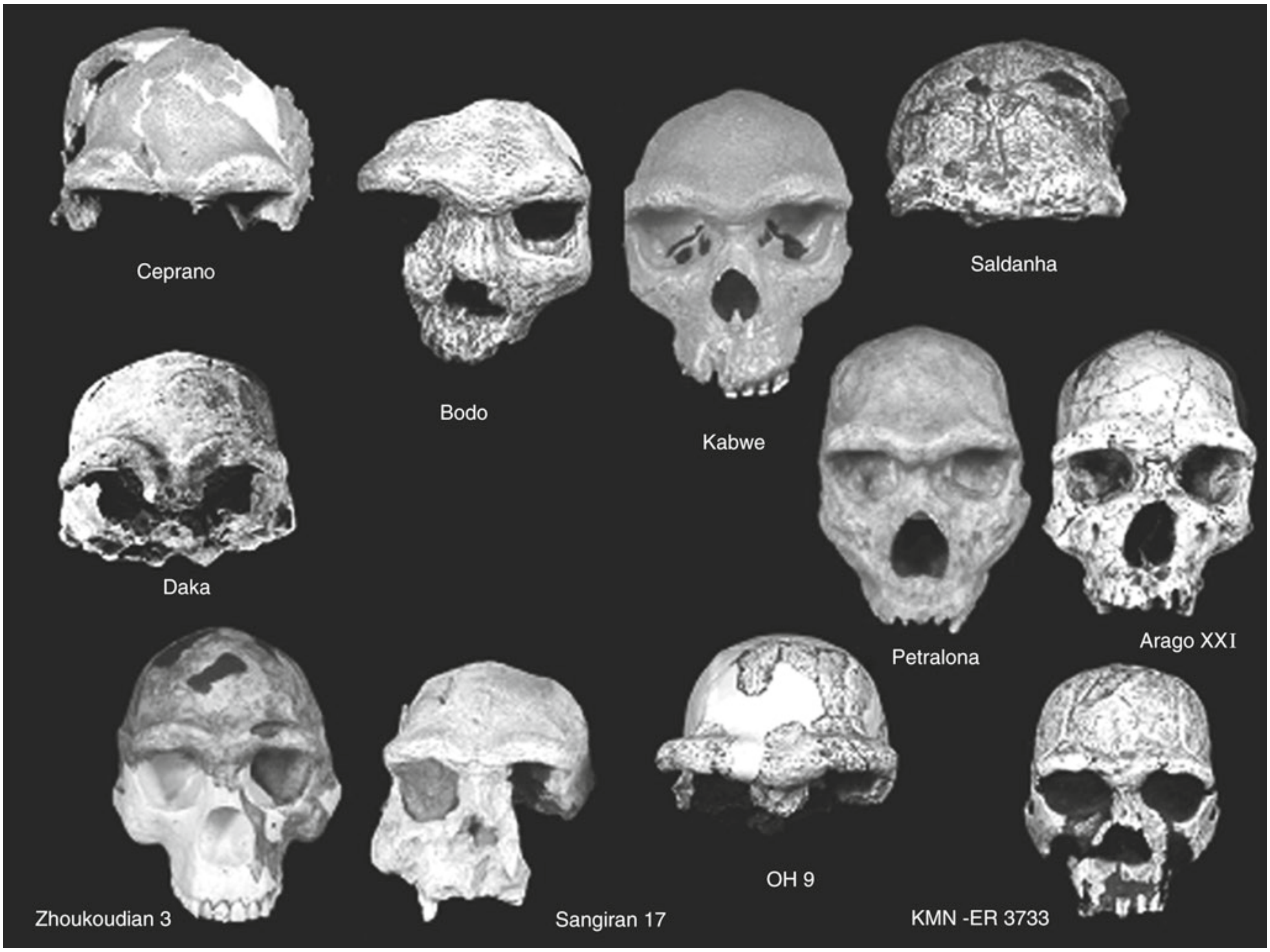

Fig. 5.7 Early and Middle Pleistocene crania in norma frontalis. The shapes of the frontal tori, the horizontal contour of the orbital superior margin, and the circumflex contour of the supraorbital margins are similar in Ceprano, Kabwe, Bodo, and Saldanha; there is also some similarity to Petralona

The distinctive traits of *H. antecessor* (mandible holotype ATD6–5 and ATD6–69) (Bermudez de Castro et al. 1997) are its small dimensions, a limited alveolar prominence, and the inclination of the mylohyoid sulcus. These features are present in a series of mandibles belonging to adolescent individuals from a wide geographical, taxonomic, and chronological range. We cannot exclude that among the remains found at Dmanisi and Atapuerca TD some species of the genus *Homo*, which have not yet been identified, are represented. The remains presently utilized to create these species do not present adequate characters. Recently Rightmire et al. (2006), as a result of their analysis on the cranial remains of D2280, D2282, and D2700, hypothesized that these bones belong to *Homo erectus* (subspecies *georgicus*), while in accordance with de Lumley et al. (2006), these remains still belong to *H. georgicus*.

The recent trend is to consider a certain number of remains of the European and African Middle Pleistocene, whose affinities with *erectus* and *neanderthalensis* are not clearly definable, as belonging to the *heidelbergensis* species. The latter has been revaluated in the last two decades (Rightmire 1985; Tattersall 1986). Inter alia, the species *heidelbergensis*, created on the basis of the Mauer mandible, is mostly formed by cranial remains which are not present in the findings of Mauer. The mandible, probably datable back to an early phase of the Middle Pleistocene (600 thousand years ago) (Schoetensack 1908), presents some features which are similar to those of the European fossils, which are considered by many scholars as the direct ancestors of the Neanderthals (i.e., Arago 2 and 3, Montmaurin, Bañolas). These features are: the *incisura submentalis*, the trace of the retromolar space, the tendency to uncover the tooth M3 in norma lateralis, horizontalization of the mental foramen, the value of the index of the distance mental foramen-M3 and of the distance mental foramen-incision.

The group of which this mandible is the holotype, i.e. the representatives (at least the European ones) of *H. heidelbergensis*, could be considered as the "stem group" which evolved into the European humanity of the Late Pleistocene. Dean et al. (1998) had already defined a similar evolution

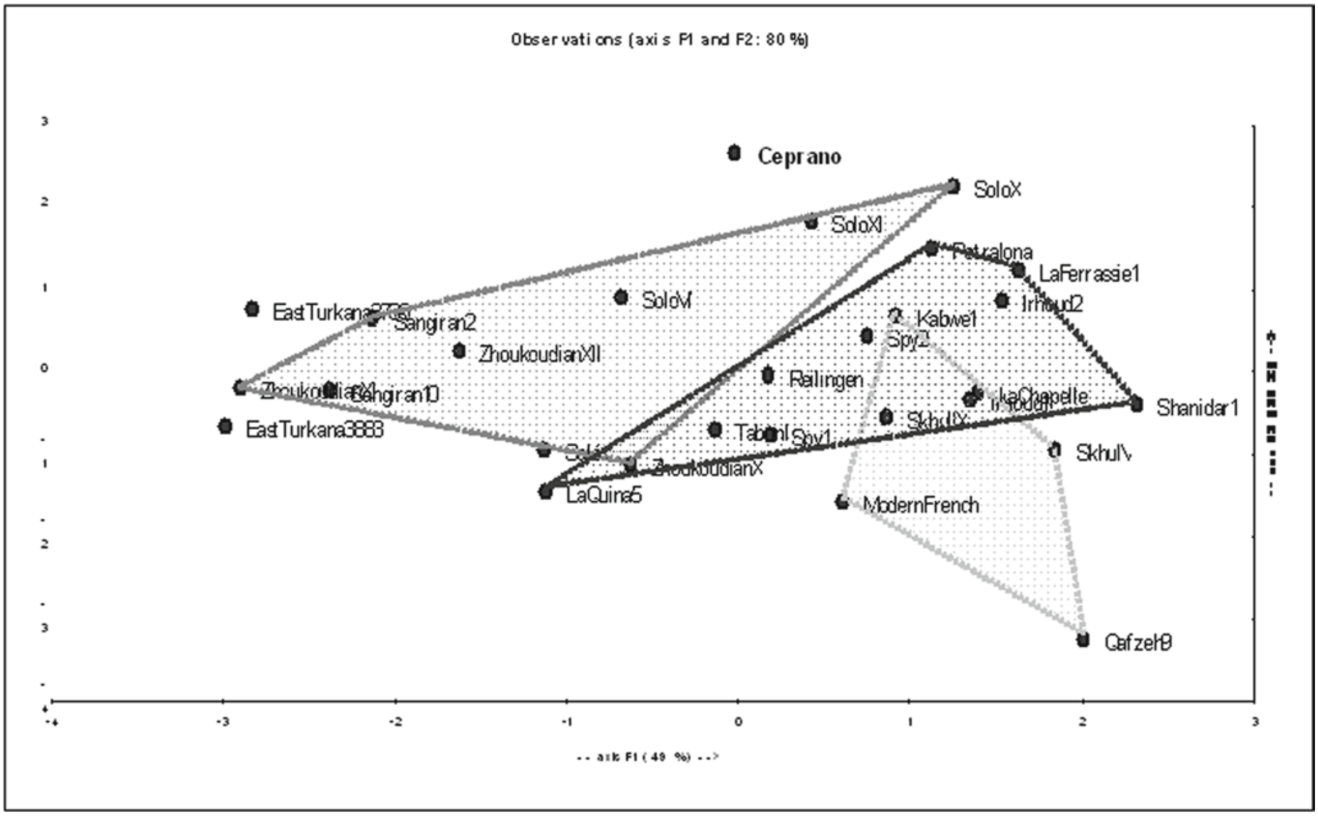

Fig. 5.8 Principal components analysis of 6 cranial variables on 25 Pleistocene and extant crania (following Dean et al. 1998) and Ceprano

model of the Neanderthals, which he called "Accretion Model." According to these authors, the mandible of Mauer could represent an "…early pre-Neanderthal," the very first phase of the evolutive history of this species. Fabbri assumes that considering the Mauer remains as a direct ancestor of *H. neanderthalensis*, would not provoke any confusion, such as considering the two different species, *H. heidelbergensis* and *H. neanderthalensis*, as pertaining to the same evolutive lineage. Therefore, we should consider *H. heidelbergensis* and *H. neanderthalensis* as belonging to a unique species. In Fabbri's opinion (2005) it is implausible to consider the possibility of the diffusion of the *heidelbergensis* species outside of Europe (in the African territories), because the majority of its remains cannot be compared to the holotype (the mandible of Mauer). The comparison is possible only between the European crania (Arago, Petralona) and the African skulls (Kabwe, Bodo, Saldaña) which are attributable to this species. The remains of Kabwe, Bodo, and Saldaña do not have many features in common with Arago and Petralona, especially in relation to the traits of the frontal bones, in particular the structure of the torus (which is more similar to that of Ceprano, particularly in Bodo, but in Saldaña and in Kabwe, as well). Also the structure of the face is different in the African remains of Kabwe and Bodo of which is possible to glimpse the canine fossa and the submalar incisure; however, the beginning of the extension of the maxillary sinus and the hint of the formation of a nasal bridge (due to the swelling of the frontal process of the upper jaw on both sides of the pyriform aperture) are absent. The nasal bridge begins to appear in the remains of Arago and Petralona and it is considered a characteristic of the Neanderthal forms.

There are some other considerations to keep in mind about the molecular analysis. Evidently, it is not possible to carry out the direct analysis between the DNA of the so-called European *heidelbergensis* and of the African homonyms. Nevertheless, quite recent data gave us some information about the analyses carried out on the remains of mt-DNA belonging to Neanderthal specimens (in the holotype of *Homo neanderthalensis*, in Mezmaiskaya and in Vindija – Krings et al. 1997; Ovchinnikov et al. 2000) and on other remains (the Gravettians of Paglicci 12 and 25 – Caramelli et al. 2003), which are slightly more recent than the first ones (but certainly belong to the *Homo sapiens* of the Italian Late Paleolithic). These data tend to demonstrate that there is a strong diversity between the two taxa; therefore, it is possible to hypothesize two different species, *neanderthalensis* and *sapiens*. The phenomenon of the differentiation probably ended about 200 Ka, but it could have started about 700–600 thousand years ago. We must ask ourselves how it is possible to hypothesize a specific affinity between the European remains of Arago and Petralona and the south-eastern African ones of Kabwe, Bodo, Saldaña, and Ndutu, if all of them

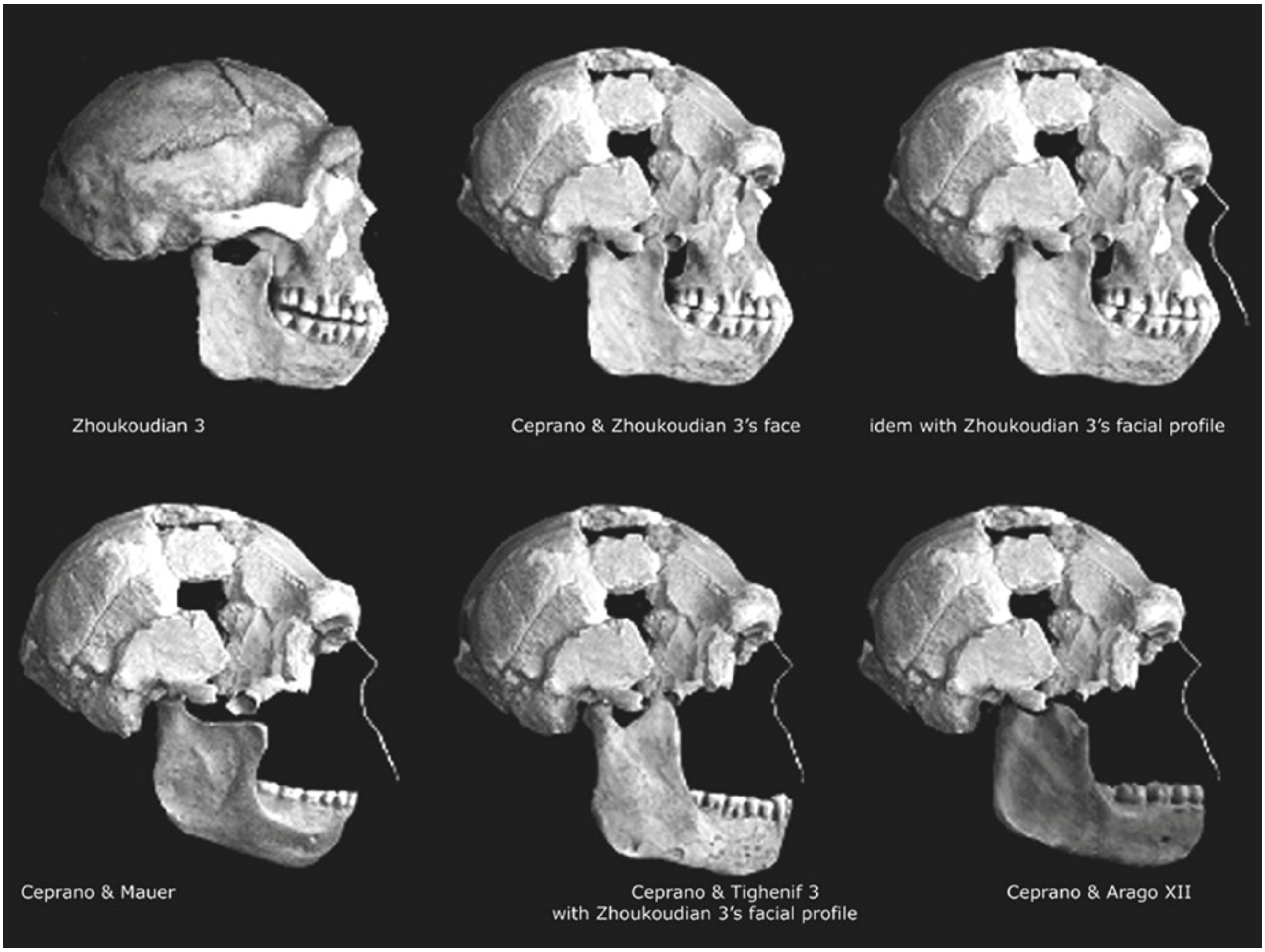

Fig. 5.9 The Ceprano calvarium, viewed in norma lateralis with a reconstructed face from Zhoukoudian 3 and/or mandibula from Zhoukoudian, Mauer, Tighenif III, and Arago XII

(except for Bodo) are datable at pre-600 thousand years. As already mentioned, it is in this period (700–600 thousand years ago) that we can theorize the beginning of the differentiation of the groups (occurred within 300–400 thousand years) in the two species, *neanderthalensis* and *sapiens*.

The noteworthy study carried out by Dean et al. (1998) on the fossil remains of Reilingen summarizes the state of the evolution of the remains which appeared before the complete manifestation of the classic Neanderthals. The research highlights the distinctive characters (autapomorphies) that emerge as time passes, through stages defined by the authors as "Neanderthal Stages" (from a climatic point of view "Isotope Stages"). These forms do not appear simultaneously, as in the case of the classic Neanderthals of the Late Pleistocene. These characteristics are expressed through the "Accretion Model," a theory of these authors. The phenotipy of some European Pleistocene remains is, without any doubt, quite complex. For example, in some parts of the remains of Steinheim, Bilzingsleben, Vertésszöllös, and Swanscombe, we can clearly note a variety of signs indicating an almost complete "neanderthalization." The contour of the skulls of Swanscombe and Steinheim tends, in norma posterior, to be roundish; this feature is similar to that of the Neanderthals. Both of them present an incipient suprainiac fossa and an increasing convexity of the occipital plain, as we can note in the remains of Vertésszöllös, and of Atapuerca Sima de los Huesos, as well. The remains of Steinheim present receding zygomatic bone, while the submalar incisure is scarcely delineated. The remains of Vertésszöllös lack the suprainiac fossa, while the cranium of Bilzingsleben presents a noticeable thickness of the occipital bone. A large part of these remains is deformed (i.e., Steinheim) due to the pressure of the soil, or more or less fragmented, or incomplete (i.e., Bilzingsleben, Vertésszöllös, Swanscombe), lacking in some parts that, if present, would have allowed us to define these remains more precisely.

Evidently, we have to keep in mind that there are other points of view such as that of Wolpoff who emphasizes that a mixture of the features defined by the "Accretion Model" is present in other Asian remains as well. According to Wolpoff, the hypothesis defined by this model would not be valid. However, we must consider that these features are also defined as apomorphies of the Neanderthals and not of other contemporary taxa. We have no notion whether some paleogenetic analysis on the remains of Ngandong (dating back to between 40 and 100 thousand years) and on the remains of *Homo floresiensis*, are currently underway. These remains are considered to be the last forms of the species *erectus*; such analyses could permit us to compare them to the data obtained on the mt-DNA of the Neanderthals, in order to determine the validity of the "Accretion Model." In any case, the final result of the evolution of the Neanderthals in the West and in the Middle East could suggest the theory that the environment influenced the beginning of different species (that is *erectus* in the eastern zones of Asia, and *sapiens* in Africa).

Returning to the European mindel-rissian specimens, their profile remains more complex. In fact, we could hypothesize that in the lacking parts of some of the remains, the same traits were probably present, which were also visible in the preserved parts of another remains, and so on. At the present stage of the researches, this phenomenon is interpreted by the hypothesis of the so-called mosaic features. The most significant explanation of these mosaic features is probably attributable to the possible segregation of the human groups in the territories which were geographically isolated. In fact, the Pyrenean range, the Alpine range, and the Balkan range, during the periods affected by the colder phases of the isotope stages (glacial acmes), formed real land pockets which were isolated due to the glacier expansions, the latter probably constituting a natural barrier for the human groups. In this way, the Iberian and the Italian pockets developed, as well as another wider pocket in the northern side of Europe (which included the areas of France, Germany, and of a large part of the Sarmatian plain), and the pocket in the south-east (which also included the Balkan peninsula). We can hypothesize that some partial genic drifts could develop in the human groups living in these land pockets. This phenomenon of isolation could have produced the beginning of new traits which (when the migration of human groups recommenced, at the end of the glacial acme) spread in the genic pool of the populations facilitated by crossbreeding. The period that elapsed was probably not long enough to enable the creation of new species. In this light, we could explain the presence of these mosaics of features in the more or less synchronous remains mentioned above.

The African fossil record, (Kabwe, Saldaña, and Bodo), which was formerly defined as Neanderthaloid, effectively does not present any Neanderthal features. It differentiates from its (more or less) contemporary remains (Arago and Petralona) as well, and from other mindel-rissian (*sensu lato*) European remains which are comprised in the stages 11–9. The African forms differ significantly from the northern ones in the cranial profiles, the structures of the frontal bones, and other facial bones (also in the details), even though some traits of the African remains recall, for example, Petralona. They probably originated from the same strain (perhaps the same strain to which the remains of Ceprano belonged). The ecological horizon and the problems of territory segregation worked out in different ways in the singular human groups.

In conclusion, this paper tends to identify, beginning from the earliest European hominids of the Middle Pleistocene, the presence of apomorphic Neanderthal features, at least in an early stage of development, or the existence of features that even though not exclusive, are very common in this species. These traits, at the current stage of our knowledge, seem to be present *in nuce* in the remains of Ceprano, while they are definitely absent in the remains of Dmanisi.

The presence of some traces of Neanderthal features in fossils dated approximately 700–600 thousand years ago (Mauer, Arago, and Petralona), and more certainly in fossils earlier of 350 thousand years ago (Atapuerca SH, Swanscombe, Bilzingsleben, Steinheim SH) (Bischoff et al. 1997) is in surprisingly perfect concordance with the paleogenetic data (Ingram et al. 2000). These data suggest a more ancient date for the identification of the Neanderthal evolutive lineage. Therefore, we assume that the numerous plesiomorphic traits, which are observable in the remains of Mauer, Petralona, and Arago, are not sufficient to allow us to hypothesize the existence of different species, nor of various evolutive lineages. On the other hand, the few and rudimental characters, which evoke the typical morphologies of the classic Neanderthals in some European Middle Pleistocene fossils, show the phylogenetic continuity of the European settlement from the beginning of the Middle Pleistocene until the arrival of *H. sapiens*.

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