Atti Accademia Nazionale dei Lincei

Classe Scienze Fisiche Matematiche Naturali

Rendiconti

Sergio Sergi

Position of the temporal bone in the neandertalian skull of Mount Circeo

Atti della Accademia Nazionale dei Lincei. Classe di Scienze Fisiche, Matematiche e Naturali. Rendiconti, Serie 8, Vol. **46** (1969), n.4, p. 475–480.

Accademia Nazionale dei Lincei

<http://www.bdim.eu/item?id=RLINA_1969_8_46_4_475_0>

Atti della Accademia Nazionale dei Lincei. Classe di Scienze Fisiche, Matematiche e Naturali. Rendiconti, Accademia Nazionale dei Lincei, 1969.

SEZIONE III

(Botanica, zoologia, fisiologia e patologia)

Paleoantropologia. — *Position of the temporal bone in the neandertalian skull of Mount Circeo* (*). Nota (**) preliminare del Socio SERGIO SERGI.

RIASSUNTO. — Presento una breve relazione su alcune mie ricerche che riguardano la posizione dell'osso temporale nel cranio neandertaliano del Monte Circeo.

Notizie sulla scoperta del cranio furono da me pubblicate nei Rendiconti dell'Accademia dei Lincei, vol. XXIX, fasc. I, 1939.

La parte principale del temporale umano è stata da me assimilata ad un tetraedro: *tetraedro temporale*. Di questo si è determinata la posizione nel cranio.

Sul temporale del cr. del Circeo, orientato su l'asse basion–bregma, asse di rotazione verticale del cranio umano, ho compiuto le stesse osservazioni fatte su gli uomini delle razze attuali. Da queste osservazioni era risultato che il baricentro dell'osso temporale, negli uomini attuali, si trova centrato nel piano frontale che passa per l'asse basion–bregma.

Adottando lo stesso metodo, per la stessa ricerca, sul cr. neandertaliano del Circeo, si è trovato che il baricentro del temporale, in questo cranio, si comporta come quello di tutti gli uomini attuali.

Con questo risultato si trae la conclusione fondamentale che, per la posizione del baricentro del temporale, l'uomo del Circeo aveva la stessa posizione eretta degli uomini viventi.

Following up what I have demonstrated in previous papers, I wish here to set forth my observations concerning the Neandertalian skull of Mount Circeo.

These observations lead one to consider the place occupied by the Neandertalian human fossil finding, compared with present-day human types, as regards the significance of the functional conditions of the temporal bone.

In a first large series of investigations I have already examined the variations in the position of the temporal bone which I have schematized as a tetrahedron. The vertices of this tetrahedron have been individuated by four points making the extreme limits of the bone where I believe that the mechanical factors influencing its evolution converge.

The points chosen are:

1) *The upper zygo-temporal point* (*Zts*) corresponding to the foremost point of the zygomatic process of the temporal bone where it joins the temporal process of the zygomaticus.

2) *The apical point* (*ap*) corresponding to the apex of the pars petrosa where, in the endocranium, it comes into contact with the lateral extremities

(*) The research reported in this paper was supported by the National Research Council.

(**) Presentata nella seduta del 19 aprile 1969.

CIRCEO NEANDERTALIAN SKULL

Temporal tetrahedron

Lateral projection

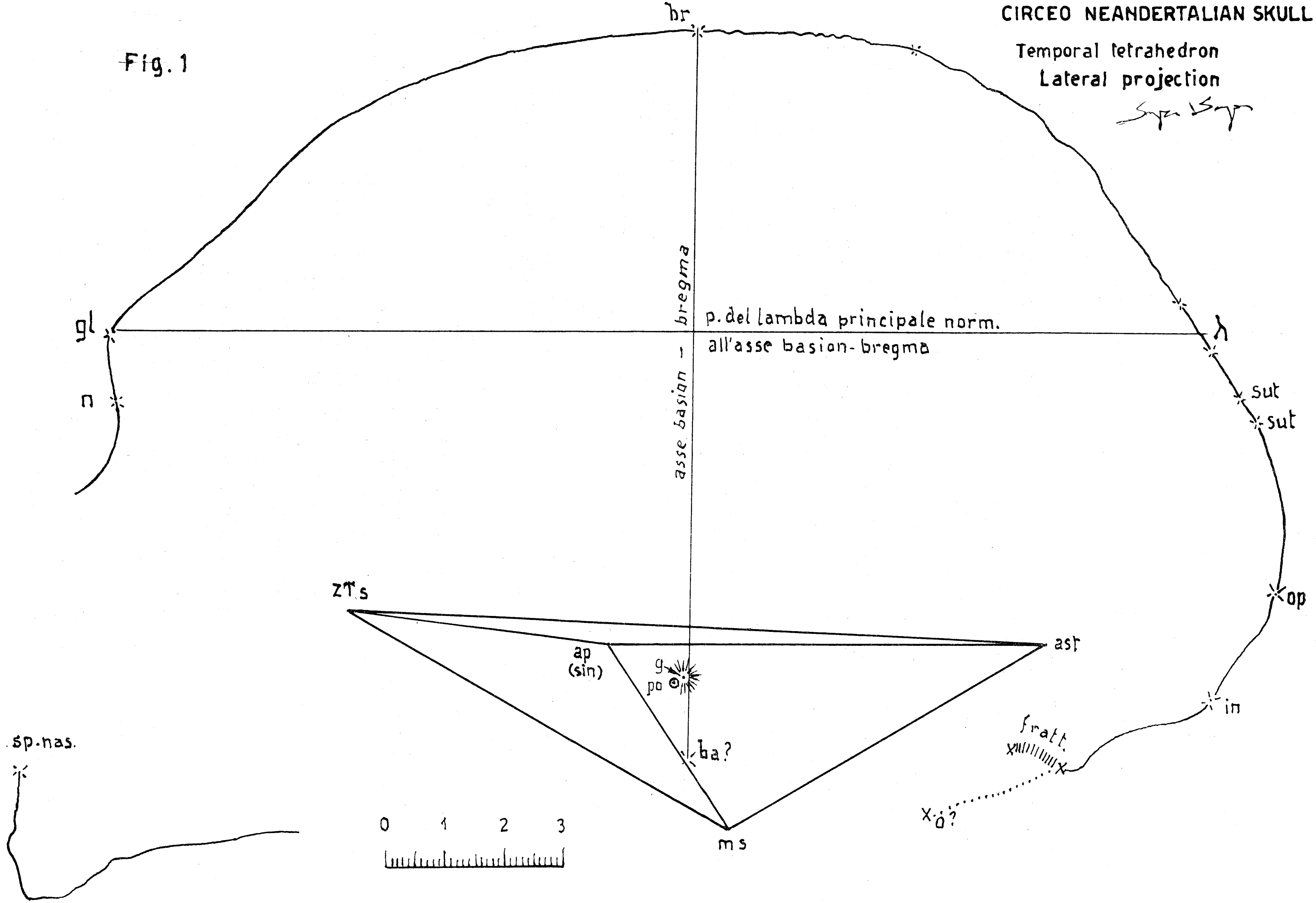
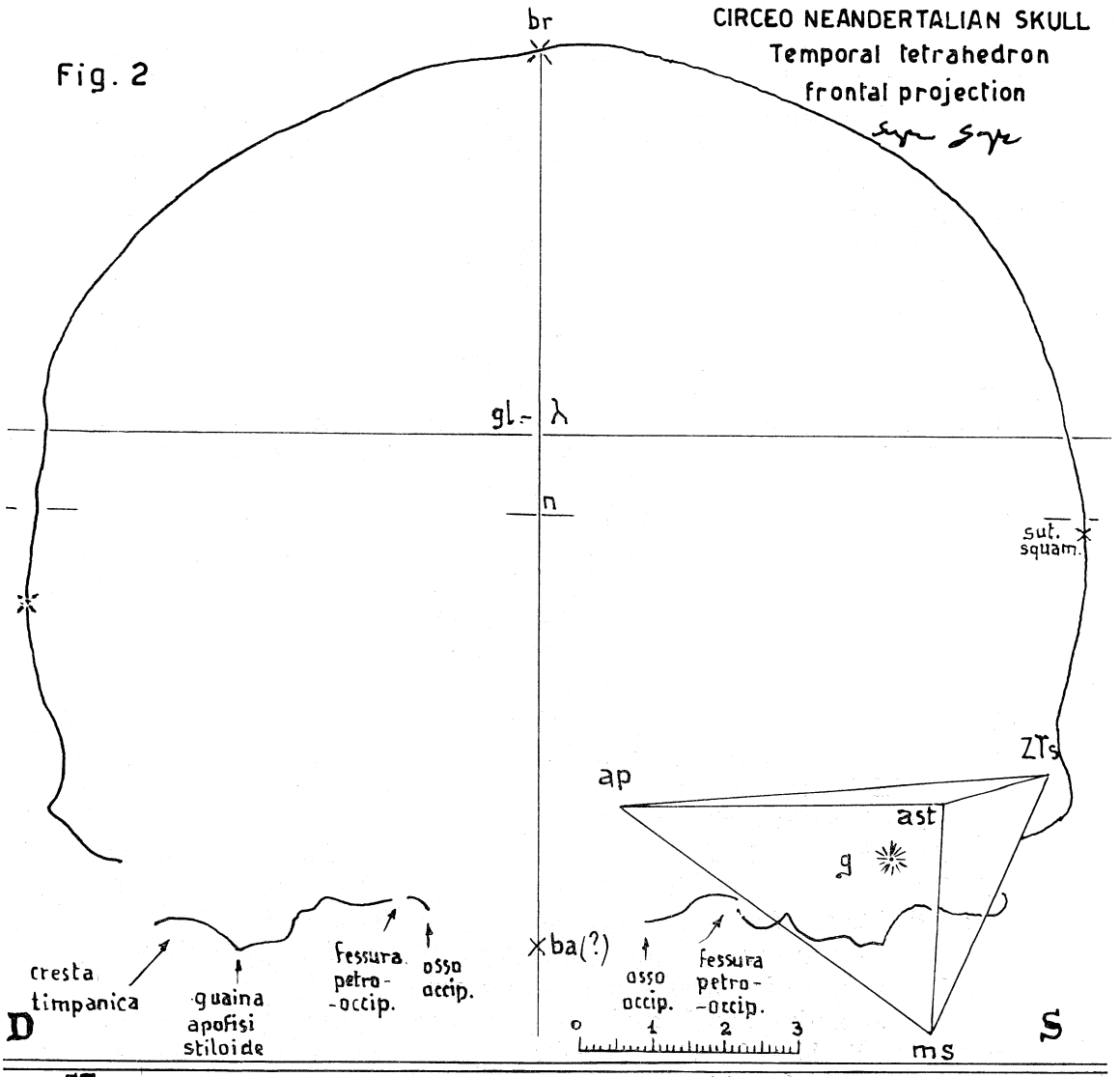


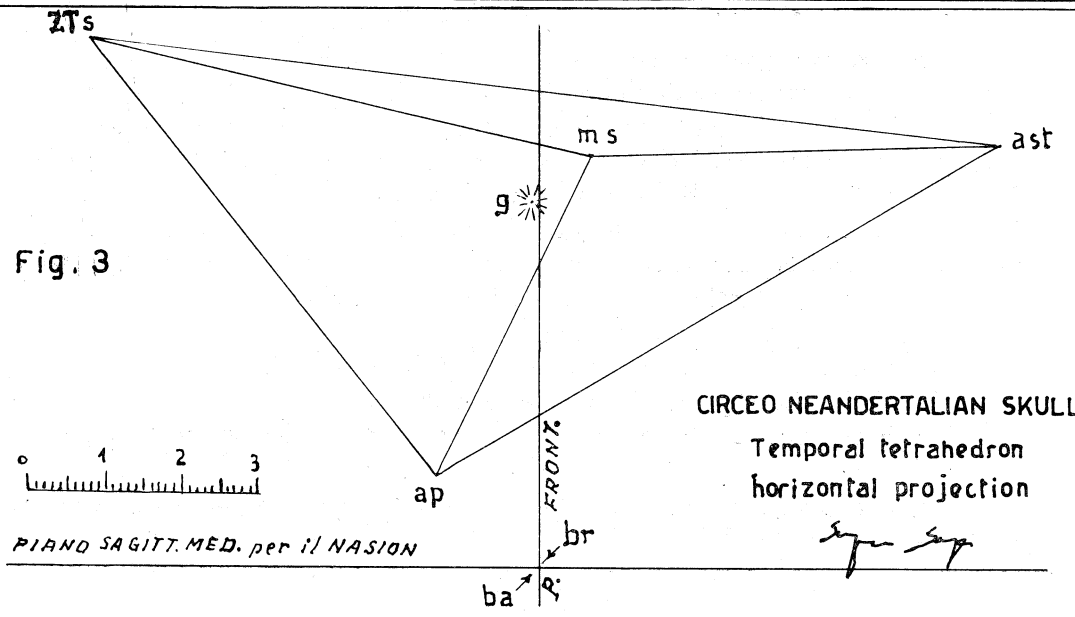
Fig. 1

Fig. 2



CIRCEO NEANDERTALIAN SKULL
Temporal tetrahedron
frontal projection

Fig. 3



CIRCEO NEANDERTALIAN SKULL
Temporal tetrahedron
horizontal projection

of the spheno-basilar synchondrosis or with the point corresponding thereto when the body of the sphenoid has become fused with the basioccipital bone.

3) *The asteroid point* (*ast*) at the asterion, the point at which the parietal, the occipital and the temporal bones meet.

4) *The mastoidal point* (*m*) at the apex of the mastoid.

All these points have a well defined significance owing to their position.

Each of these points, with its respective coordinates relating to the fundamental horizontal plane of orientation of the skull connected with the basion-bregma axis, individuates a stable position of the temporal bone, which is thus correlated with that of each vertex of the tetrahedron.

Usually the skull has been orientated according to a horizontal plane, normal to the basion-bregma axis.

The three points, basion, bregma, lambda, individuate the median sagittal plane. The horizontal (or transverse) plane taken into consideration is the plane at the level of the lambda. The frontal plane is the one normal to the former at the meeting point with the basion-bregma vertical axis.

Research carried out on one hundred temporal bones of skulls belonging to the most different races has proved that the temporal tetrahedron differs in shape and in size in the various serious of skulls considered. These differences concern the various morphological types distinguished according to the cranial index, dolicocephalic and brachycephalic, the different ethnical types and infantile skulls of different ages.

These investigations were completed by the determination, in each skull of all the series, of the position of the barycentre of the temporal tetrahedron in relation to the three fundamental planes. The distance of the barycentre from the three fundamental planes chosen as orientation and referring to the position of the basion-bregma axis was measured.

The comparisons made so far on present–day human types have shown that, as far as this point is concerned, they differ from one another as regards the differences of position peculiar to each ethnical group.

But a more synthetic comparative survey relating to the aggregate position of the barycentre of the temporal bone in the skull shows that the temporal bone of all present-day adult human beings behaves in the same way as regards the position of the barycentre of the temporal tetrahedron in the skull. Orienting the skulls of all present-day human types on the basion-bregma axis, that is to say, the barycentre is seen to behave in the same way for all types. In all present-day human groups it is always to be found, with few fluctuations, around the basion-bregma vertical axis, in the frontal plane, centered in the temporal tetrahedron.

This observation was made by me and published a long time ago and since then it has been placed in relation with the acoustic-vestibular organs contained in the temporal bone and occupying a fixed position in the skull (1).

(1) SERGIO SERGI, *Sulle variazioni di forma e di posizione dell'osso temporale nell'uomo*, « Riv. di Antropologia », Vol. XXXI, Roma 1935–36.

The object of the investigations I am now making is to establish the position of the temporal bone in the Circean skull in order to compare it, following the same method, with its position in present-day men.

The Krotaphs of the Mount Circeo skull.— In the case of the Circean skull I have had to limit my observations to one side only, the left side, as the right side is spoilt.

In the temporal bone on the left side I have determined the vertices of the temporal tetrahedron and measured the coordinates of the distances of the vertices, indicated by me with the term *Krotaphs* (Italian = *Krotafia*), in relation to the three fundamental planes of the Circean skull, with orientation on the basionbregma axis. These measurements are set forth in a table (see table of Krotaphs).

KROTAPHS IN THE MOUNT CIRCEO SKULL

Position of the vertices of the temporal tetrahedron-oriented basion-bregma axis.

TEMPORAL BONE	APOKROTAPHS Distance from the median sagittal plane		PROKROTAPHS Distance from the frontal plane		HYPOKROTAPHS Distance from the lambdic plane	
	absolute values mm.	relative values	absolute values mm.	relative values	absolute values mm.	relative values
Upper zygotemporal (*Zts*) .	70	36.26	+ 58	+ 41.72	46	20.00
Apex (*ap*)	12	6.21	+ 13	+ 9.35	51	22.17
Asterion (*ast*)	56	29.01	— 61	— 43.88	50	21.73
Mastoidal (*m*)	55	28.49	— 7	— 5.03	83	36.08
Barycentre (*gt*)	48.25	—	+ 0.75	—	57.5	—
Upper zygotemporal (*Zts*) .	67 (*)	35.26 (*)				
Apex (*ap*)	12	6.31				
Asterion (*ast*)	56	29.47				
Mastoidal (*m*)	55	28.94				
Barycentre (*gt*)	47.5	—				

(*) variant.

The Krotaphs are of three kinds: *apokrotaphs* for the distances from the median sagittal plane. *prokrotaphs* for the distances from the frontal plane and *epikrotaphs* for the distances from the horizontal plane. Figg. 1, 2, 3.

The observations have been made with orthogonal projections of the skull, oriented on the planes referring to the basion-bregma axis.

In this way have been measured: 1) the distances of the vertical from the median sagittal plane on the basion-bregma axis and at the lambdic median point: 2) the distances from the frontal plane passing through the basion-bregma axis and normal to the preceding; 3) the distances from the horizontal plane at the level of the lambdic point.

The changes in the position of the four vertices of the temporal tetrahedron in different groups of skulls cannot be explained by the absolute values of their distances from the planes of reference, owing to the differences in size of the temporal bones and of the skull as a whole.

Wishing to make a suitable comparison between different groups of skulls, it is therefore necessary to find a common denominator of the values of the four distances from each plane in all the cranial series examined. The *relative values* of these distances have therefore been calculated, proportioning the absolute distance of each point in hundredths of the sum of the absolute distances of the four points.

The *relative values* have been added in the same table that contains the *absolute values* of the Krotaphs. This makes it possible to compare the Krotaphs of the different ethnical groups.

Results of the comparisons of the Krotaphs of the Circean skull with the values of the Krotaphs of the phaneranthropes (Homo sapiens).

The most important and fundamental of these results is that of the relative values regarding the position of the vertices of the temporal tetrahedron in the frontal plane.

This value allows the significance and importance of the research carried out to be appreciated at once: the position of the barycentre in the frontal plane is centered at less than a millimetre (0.75 mm.) from the plane in the Circean skull.

The following fundamental conclusion may be drawn from this result: the Neandertalian skull of Mount Circeo is typically human, the position of the barycentre of its temporal tetrahedron being the same as in presentday men. It certainly belonged to an individual who walked upright on two legs.