

**Anthropology.** — *Contributions to the Anthropology of the Near-East.*  
VI. *Turks and Greeks.* By C. U. ARIËNS KAPPERS.

(Communicated at the meeting of October 31, 1931.)

Of all the nations in the Near-East the Turkish is the most difficult to analyze. The "Turki", from whom it derives its name, form only a small part of the population. They descend from the Osmanli, who preceded by Seljuk tribes, invaded Anatolia in the 13th century A. D. under Ertogrul and his son Othman<sup>1)</sup>. These Osmanli Turki are supposed to be closely related either to the Tatars or to the Kirghese Mongols<sup>2)</sup>.

What is the typical index of the Mongol elements among the Turks, and do they give an outstanding peak in the frequency curve of Turkish indices?

ELISIEFF<sup>3)</sup> found an average index of 84.40 with 131 Osmanli Turks from Anatolia, and CHANTRE<sup>4)</sup> found a similar one (84.33) with 120 Osmanli. As the term Osmanli, however, is used by several people whose ancestry is rather doubtful, I took an other way of inquiry in this matter. Considering as Mongol Turks only those of the 138 individuals I measured, who had an indication of an epicanthus<sup>5)</sup> (about 7 % of my dossier), I found their average measurements and indices to be as follows :

Group	length	width	height	l. w. i.	w. h. i.	l. h. i.
Epic. Turks	17.81	15.28	12.81	85.53	83.83	71.98

The length-width index of this group comes very near the average index figure of the Osmanly Turki as reported above, and it seems quite possible that the Mongol element among the Turks is related to some group of Mongols still living in Turkestan.

<sup>1)</sup> Hence the names Osmanli and Ottoman empire.

<sup>2)</sup> cf. KEANE. *Man past and present.* Cambridge University Press 1899 and PITTARD, *Race and history* p. 317. RIPLEY (*Peoples of Europe*, 1890, p. 415) supposes the Osmanli to be related to the Turkomans among whom, however, he also classifies the Kirghese. It seems to me that RIPLEY uses the expression Turkoman in too wide a sense (cf. my fifth contribution; these *Proceedings*, 1931, Vol. 34, p. 531).

<sup>3)</sup> ELISIEFF. *Journal de la Société des sciences naturelles de Moscou*, Tome 63 and 71. Quoted from CHANTRE, the original not being at my disposal.

<sup>4)</sup> CHANTRE. *Recherches anthropologiques dans l'Asie occidentale.* Arch. du Museum d'histoire naturelle de Lyon, Tome VI, 1895, p. 199.

<sup>5)</sup> I am fully aware of the fact that the epicanthus also occurs with Caucasian children but CHOUKE found it very rarely with adults. Cf. CHOUKE. *The epicanthus in Caucasian children.* *Journ. of physical Anthropol.* Vo. 13, 1929, p. 255.

If we now look at my frequency curve of 138 Turks, which I superposed on VON LUSCHAN's curve of 796 Turks <sup>1)</sup>, the index 84—85 does not stand

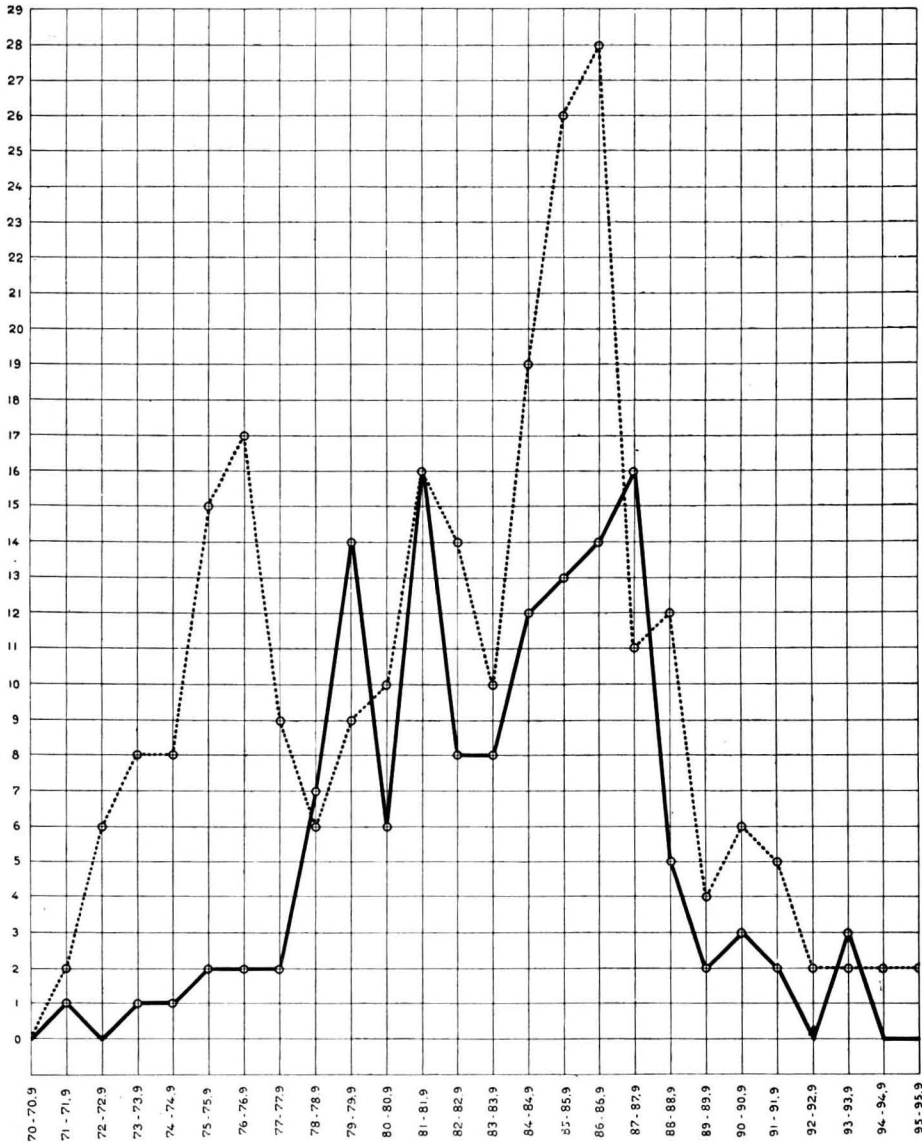


Fig. 1. The dotted curve gives the head indices of 796 Turks measured by VON LUSCHAN, the continuous curve the head indices of 138 Turks measured by the author.

out separately but continues in the 86—87 peak. Besides only part of the 84—85 indices are to be ascribed to Mongol elements, as this index also

<sup>1)</sup> VON LUSCHAN (Völker, Rassen und Sprachen, p. 147) reduced the size of his curve to one third of the original, in order to make it more easily comparable to the curve of his Asiatic Greeks to which I shall return later.

occurs with the Armenoid element in the population, an element that is certainly much more numerous among the Turks than the Mongol element, since long before the invasion of the Mongols, Anatolia was populated by the Armenians, and the high elevation between 84 and 87 in both VON LUSCHAN's and my curve is certainly more due to Armenoid influence, especially to the Armenoid group with an index of 86.0—87.0 (average 86.53;  $\pm 1.49$ ).

Apparently this index is by far the prevailing one in Turkey. Also CHANTRE (l.c. p. 246) found a prevailing 86—87 index with the Kizilbachi Turks, and VON LUSCHAN found an average index of 86.5 with the Bektachi Turks. Even with the Tachtadschy in the Lykian part of Anatolia he found <sup>1)</sup> an average of about 86 (85.95).

It is a pity that NOUREDDINE BEY and his collaborators <sup>2)</sup> in their account of 500 Turkish skulls do not give the exact amount of hyperbrachycephalics which must have been very numerous also among their material.

That the hyperbrachycephalics among the Turks are of Armenoid, probably of Hittite descent, would not be strange considering the fact that Armenia major together with Armenia minor covered a large part of Anatolia, while also both capitals of the Hittite empire, Boghaz Keui and Carchemisch, were located here and the relation between the Armenians and Hittites is very probable. Apart from historical arguments, however, there are direct indications proving that the highest peak among the Turks is of Armenoid origin. This results from the fact that the Turks giving the length width indices of this peak agree also in their average height and height indices with the real Armenians of my second contribution, as the following figures show :

Groups	length	width	height	l. w. i.	w. h. i.	l. h. i.
Hyperbr. Turks	18.17	15.68	13.31	86.35	84.88	73.75
Real Armen.	18.14	15.62	13.11	86.11	83.93	72.27

From this it appears that the average measurements and indices of this Turkish group coincide with the average measurements and indices of my real Armenians and that these Turkish Armenoids are even rather more

<sup>1)</sup> VON LUSCHAN. Die Tachtadschy und andere Überreste der alten Bevölkerung Lykiens. Arch. f. Anthropol. Bnd. 19, 1891, p. 31.

<sup>2)</sup> NOUREDDINE BEY, NECHET OMER BEY, MOUCHET and SUREYA BEY. Craniologie des Turcs. Revue anthropologique 1928 p. 321. Instead of making a frequency curve these authors divided the l.w. indices they found in the following groups of BROCA: Up to 75 (5.4 %); from 75.01, —77, 77 (8.4 %); from 77, 77 to 80.00 (15 %); from 80—83, 33 (18.2 %); above 83.33 (53 %). From the latter figure may be deduced that also their result shows a prevailing hyperbrachycephaly although the exact amount of hyperbrachycephalics (i.e. with a head index above 85) cannot be deduced from it.

than less hypsicephalic than the real Armenians<sup>1</sup>). I may add to this that with the Turkish hyperbrachycephalics as well as with the real Armenians the female length width index is slightly smaller than the male. This also supports the thesis of the Armenoid (eventually Hittite) origin of those Turks<sup>2</sup>), who are also characterized by a large hooklike nose, large ears, and short postauricular head length.

In my second contribution I stated (p. 808) that amongst the present Armenians we may distinguish two groups, one with a l.w. index of 83.48 ( $\pm 1.16$ ), the other with a l.w. index of 86.53 ( $\pm 1.49$ ). Also CHANTRE's Armenian curve shows two peaks, at about the same places, viz. at 84 and 86, the latter being more frequent near lake Urmiah. Even VON ERCKERT's<sup>3</sup>) figures of only 21 Armenians, when arranged in a curve, show two peaks, one at 84, the other at 87.

Now it is striking that with the Anatolian Armenoids the 86—87 index is so largely prevailing above the 83.5 index<sup>4</sup>), while the latter is more frequent in North-Persia and in some parts of the Caucasus.

As Anatolia is a more typical Hittite and Armenian centre this might indicate that the ancient Hittite—Armenian index was 86—87, not 83.5. This may find support in the fact that also among the Khaldeans and Assyrians (Aissori or Syriani) which probably represent a very old stock of the Armenians (who in the ancient times called their country Khaldea or Khai), the higher index is the prevailing one<sup>5</sup>). So the additional "Armenian" stock of 83.5 might be a foreign admixture to this people, perhaps an admixture from the Caucasus (Mitanni?).

BUNAK<sup>6</sup>) who examined a great many (104) Armenian skulls, even distinguishes four brachykran Armenoid types (l.c. infra p. 230), and also accepts with RUGGERI<sup>6</sup>) a small dolichokran Armenian type, which I doubt to be pure Armenian.

The second peak, also occurring as well in VON LUSCHAN's as in my Turkish curve is at 81—81.9. It is quite probable that this peak which is so

<sup>1</sup>) If the peak of 86 were due to Mongol influence the heads causing this peak would be less hypsicephalic (cf. the index table of the epicanthus Turks on page 1085).

<sup>2</sup>) This conclusion does not agree with the racial blood index for the "Turks" as found by HIRSCHFELD and HIRSCHFELD, which was 1.77 (the Armenian blood index being 2.31, see below). These authors, however, state: "for the Turks we used Macedonian Mohammedans. These last must certainly contain a large admixture of slav blood and the statistics should be confirmed in Turkey" (Serological differences between the blood of different races. The Lancet, Vol. II, 1919, p. 677).

<sup>3</sup>) VON ERCKERT. Kopfmessungen Caucasischer Völker, Arch. f. Anthrop., Bnd. 19, 1891, p. 242.

<sup>4</sup>) That these differences in length-width index should be due to a more or lesser degree of compression of the head during childhood, as assumed by CHANTRE, I do not believe. They are far too constant for such a secondary deformation.

<sup>5</sup>) Also the blood index of the Khaldeans and Assyrians (2.19) comes very near the Armenian blood index (2.31). cf. PARR Die Blutgruppenverteilung in der Bevölkerung des Nahen Ostens und Nord-Afrika's. Ukrain. Zentr. bl. f. Blutgruppenforsch., 1930 (IV, p. 82).

<sup>6</sup>) BUNAK. Crania armenica. Untersuchungen zur Anthropologie Vorder Asiens, Moscow, 1927 (Russian with German resumé). RUGGERI's conclusion, however, is based on the Armenian skulls in the Museum at Vienna, collected by WEISBACH round the sea of Marmara at Ismid, Brussa and Mudania which is not at all a typical Armenian region. Cf. GIUFFRIDA RUGGERI. Contributo all' antropologia fisica delle regioni dinariche e danubiane e dell' Asia anteriore. Arch. per l'Antropologia e la Etnol., Vol. 38, 1908, p. 127.

characteristic of the Circassians and Georgians — of the Western Caucasian people in general — is to be ascribed to the influence of these peoples on the Turks. It is a well known fact that Circassian and Georgian women were frequently found in Turkish harems. About 10 % of my Turks (chiefly students of the financially better situated class) admitted to have a Circassian or Georgian mother or grandmother. That this should have remained without influence on the anthropology of the Turks as VON LUSCHAN supposes ('22 p. 62) is not probable, at least not for the financially better off classes that I examined.

Besides there are certainly a good many Western Caucasians also among the male Turkish population.

Whereas VON LUSCHAN's and my curve agree in both the hyper- and sub-brachycephalic peaks, they disagree in the mesocephalic peaks, VON LUSCHAN finding a high elevation at 75—76.9, which I did not find at all. Also NOUREDDINE BEY and his collaborators (l.c. *supra*) found only 5.4 % of their skulls to have an index up to 75, corresponding with a living head index up to 76.5, which agrees with my result (7 on 138). VON LUSCHAN himself is inclined to ascribe his 75—76.9 peak to semitic influence. This is the more probable as VON LUSCHAN measured his Turks before the war, when Turkey still included a large part of Syria, involving the possibility of a greater Adnan Arab influence on the population.

On the other hand, my curve shows a distinct 79—79.9 elevation, failing in VON LUSCHAN's curve. It is difficult to account for this 79—79.9 index, also found by VIRCHOW (l.c. *infra*) near Renkoi. One might think of a Kurdish or similar Iranian influence here, a large part of Kurdistan being Turkish territory <sup>1)</sup>).

On the other hand, this peak may perhaps be caused by mediterranean mesocephalics as a similar peak occurs with the Greeks (see fig. 2), more especially with the Cretans <sup>2)</sup> as also in Southern Italy <sup>3)</sup>. Probably this mesocephalic race was among the oldest inhabitants of Asia minor (see below.) Besides the Greeks and Romans were represented by considerable colonies in Asia minor.

Superposing my Asiatic Greek and Turkish curves (fig. 2), two elevations of my Greek curve coincide with Turkish elevations viz. at 78—79.9 and at 81—81.9.

The superposition also shows where the chief difference between the Greeks and Turks comes in. Whereas the 84—87.9 top is very outstanding with the Turks it is much less prominent with my Greeks who are less mixed with (Mongol and) Armenoid blood.

<sup>1)</sup> That in later times Turkish—Kurdish marriages are not frequent does not of course exclude such mixtures in periods long ago, though the people I measured, — all students — had as far as they knew no Kurdish ancestry.

<sup>2)</sup> Cf. the works of HAWES, DUCKWORTH and VON LUSCHAN, quoted below.

<sup>3)</sup> Whereas the prevailing index in North Italy is obviously brachycephalic (85, the index in Calabria is 78.4).

Although the number of the Greeks from Asia minor I measured is only small I thought it worth while to publish my results. In the first place

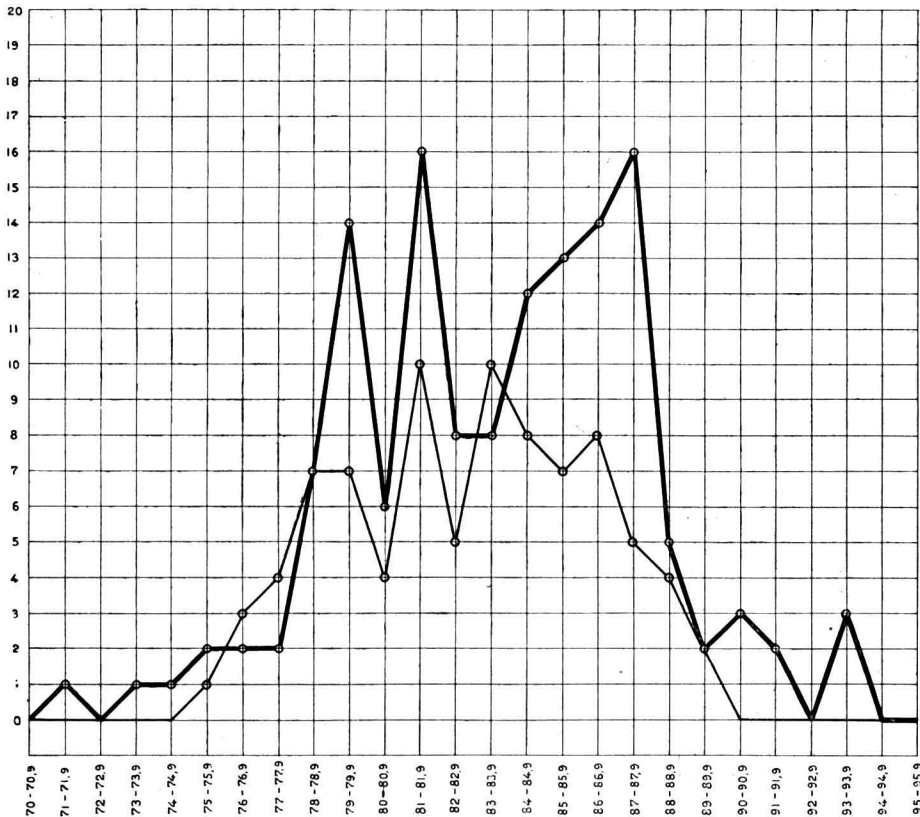


Fig. 2. The strong lined curve gives the head indices of 138 Turks from Anatolia, the thin lined curve the head indices of 85 Asiatic Greeks.

because the Greek origin of the individuals measured was well controlled, both their father and mother being Greek, secondly because my data may serve as a criticism on VON LUSCHAN's<sup>1)</sup> curve of his Asiatic Greeks, reproduced by RIPLEY<sup>2)</sup>, and MYRES<sup>3)</sup>.

The fact is that VON LUSCHAN's curve of Asiatic Greeks contains very little that is characteristic of Greeks. It shows practically the same components occurring in his Turkish curve.

There are three distinct peaks in VON LUSCHAN's Asiatic Greek curve, an outstanding 75 index peak, a less outstanding one of 85 and the highest peak occurring at 88. The intermediate indices, especially those between 80 and 84, that are so characteristic of the present Greek population are hardly present in it, and the 78—79 peak fails entirely.

As far as concerns the 85—88 peaks amongst his "Asiatic Greeks", VON LUSCHAN himself had already stated that this peak was probably influenced by Armenoid or

<sup>1)</sup> VON LUSCHAN. *Völker, Rassen und Sprachen*. Berlin 1922, p. 131a, 147.

<sup>2)</sup> RIPLEY. *The peoples of Europe*, 1900, p. 116.

<sup>3)</sup> J. H. MYRES. *Who were the Greeks*. California Univ. Press 1930, p. 58.

pseudo-Armenoid (Turkish) influence. This agrees with the fact found by NEOPHYTOS<sup>1)</sup> that with the "Greeks" in North East Turkey (Kerasun) such indices prevail. Also the 75 peak is not typically Greek but as with his "Turks" may be due to Adnan Arabic influence, a good many members of the Greek orthodox church being of Semetic descent. Also this conclusion agrees with the results of NEOPHYTOS as this peak (75) entirely fails with the 142 Greeks measured at Kerasun (cf. also LUSCHAN '91, p. 47).

Whereas in my Asiatic Greek curve (fig. 2) the dolichocephalics and hyperbrachycephalics are not conspicuous the most typical peaks are at 81—81.9 and 83—83.9. In both respects this shows a great conformity with the data gathered on the mainland of Greece (and on some islands) by APOSTOLIDES<sup>2)</sup> and STEPHANOS<sup>3)</sup> with 366 males, and by DUCKWORTH<sup>4)</sup> with 100 males. By arranging the data of these three authors in one curve (fig. 3) it appears that this curve has very outstanding 82 and 84 peaks and besides a smaller 78 peak.

The result of the last named authors as well as my own make it very probable that the majority of the present Greeks in Greece as well as in Asia minor belong to GIUFFRIDA RUGGERI's *Homo brachymorphus* Indo-Europeans (or Caucasicus), HADDON's *Homo Georgianus*, the sub-brachycephalic caucasian race.

There is, however, a 78—79.9 component, clearly expressed in my Asiatic Greeks as well as in the curve of European Greeks made after the data of APOSTOLIDES, STEPHANOS and DUCKWORTH.

That this elevation is more pronounced in my curve of Asiatic Greeks is in conformity with the results of ZABOROWSKY<sup>5)</sup> and WEISBACH<sup>6)</sup>. The former examined 16 skulls of a Greek cemetery in Asia minor of the 3rd century A.D., in fifteen of which the cephalic index could be taken. He found the mesocephalic index prevailing (10 being between 75.5—78.9, 3 dolichocephalic and 2 subbrachycephalic), the average skull index being 76.56 or about 78 on the living. Similarly WEISBACH with 45 Asiatic and 50 European Greek skulls found — in addition to a 81—83 peak, an equally large 76—78 peak, coinciding again approximately with my result on the living (82—84 and 78—79.9).

Curiously the 78—79.9 index is still prevalent in Crete (HAWES, l.c. *infra*, and VON LUSCHAN<sup>7)</sup>), especially in its mountainous inlands.

So the question arises what is this mesocephalic people, still fairly

1) NEOPHYTOS. *Le Grec du Nord-Est de l'Asie mineure*. l'Anthropologie T. II, 1891, p. 25.

2) APOSTOLIDES. *Quelques mesures sur le vivant prises en Grèce*. Bull. Soc. d'Anthrop. de Paris, T. IV, 1883, p. 614.

3) STEPHANOS. *Grèce*. Dictionnaire encyclopédique des Sciences médicales. Paris, Tome X, 1884, p. 435.

4) DUCKWORTH. Report on anthropological work in Athens and Crete. Report of the British Association for the advancement of Science, 1903, p. 404. The index figures of the 100 male Greeks measured in Athens are found in his report for the Brit. Ass. of 1912, p. 265.

5) ZABOROWSKY. *Sur seize crânes d'un tombeau Grec d'Asie mineure*. Bull. Soc. d'Anthrop. de Paris. T. IV, 1881, p. 234.

6) WEISBACH. *Die Schädelform der Griechen*. Mitteilungen der Anthropologischen Gesellschaft. Wien. Bnd. IX. (N. F. Bnd. I), 1882, p. 72.

7) VON LUSCHAN. *Beiträge zur Anthropologie von Kreta*. Zeitschr. v. Ethnologie, Bnd. 45, 1913, p. 307.



numerous with the Turks as well as with the Greeks in Asia minor and further in Crete and Southern Italy, but less so on the Greek continent?

There is some controversy concerning the origin of the longheaded people, that prevailed in the whole mediterranean region before the sub-brachycephalic invasion (see the small additional curve in fig. 3).

SERGI<sup>1)</sup> considered the longheaded (dolicho- and mesocephalic) mediterranean people as an Eurafrican race and recorded several archeological arguments as did Sir ARTHUR EVANS proving that the oldest population of Crete and Hellas was related to the Proto-Egyptians and Proto-Lybiens. Also DUCKWORTH<sup>2)</sup> (l.c. 1912) emphasized the analogy between the Minoan Cretans and the ancient Egyptians.

Among the ancient prehellenic skulls there are at least two groups, one with an index of 73—74, the other with an index of 76—77, as appears from the small additional curve of fig. 3 in which I registered all the middle and late helladic, protogeometric and early geometric skulls found in Greece and the indices of which are mentioned in literature.

Now in upper Egypt the average index of the ancient skulls according to ELLIOT SMITH<sup>3)</sup>, who has the greatest experience in this matter, was 73. In lower Egypt, however, two indices prevailed, a 73 and a 75.4 skull index, the latter of which according to ELLIOT SMITH was of alien i.e. of non-Egyptian origin. Apparently the same relation as in lower Egypt occurred in prehellenic Crete and Hellas.

The real Proto-Egyptians with the hamitic skull index of 73 may be represented by the small 73 peak in the additional curve of fig. 3. They may have been more numerous in Crete than on the mainland of Greece, as according to DUCKWORTH the average index of the Minoans was only 73.4<sup>4)</sup>, 65 % of them being dolichocephalic, only 26 % mesocephalic.

The ancient mesocephalic (76) skull index race, apparently more numerous in Greece itself, was probably another race. Whether this race is still represented there by the small 78 peak of the main curve in fig. 3 is difficult to tell, more so as we are not sure which race was responsible for the 76 skull index in ancient Crete and Greece. Most probably, however, it contains the same "alien" element that also occurred in lower Egypt which most likely is Semitic, especially Phoenician, a 76 skull index being so typical for the Phoenicians (cf. my third contribution), who lived so near<sup>5)</sup> and established so many colonies abroad.

<sup>1)</sup> SERGI. Primitive inhabitants of Europe. The Monist, Vol. 9, 1899, p. 321. The Mediterranean Race, Scott, London, 1901, and The Mediterranean culture and its diffusion in Europe. The Monist, Vol. 12, 1902, p. 161.

<sup>2)</sup> DUCKWORTH. Report on the work in Athens and Crete. Brit. Assoc. f. the Advanc. of Science. 1903 and 1912. Cf. also the Cretan cup bearer, reproduced by SALAMAN.

<sup>3)</sup> ELLIOT SMITH. The ancient Egyptians, Harper Bros. London, 1923, p. 122 a. f.

<sup>4)</sup> According to HAWES also here the majority was mesocephalic cf. his reports on Crete for the Brit. Assoc. f. the advancement of Science. 1908 and 1910.

<sup>5)</sup> It is an interesting fact that considerably later in Carthage a similar mixture of a



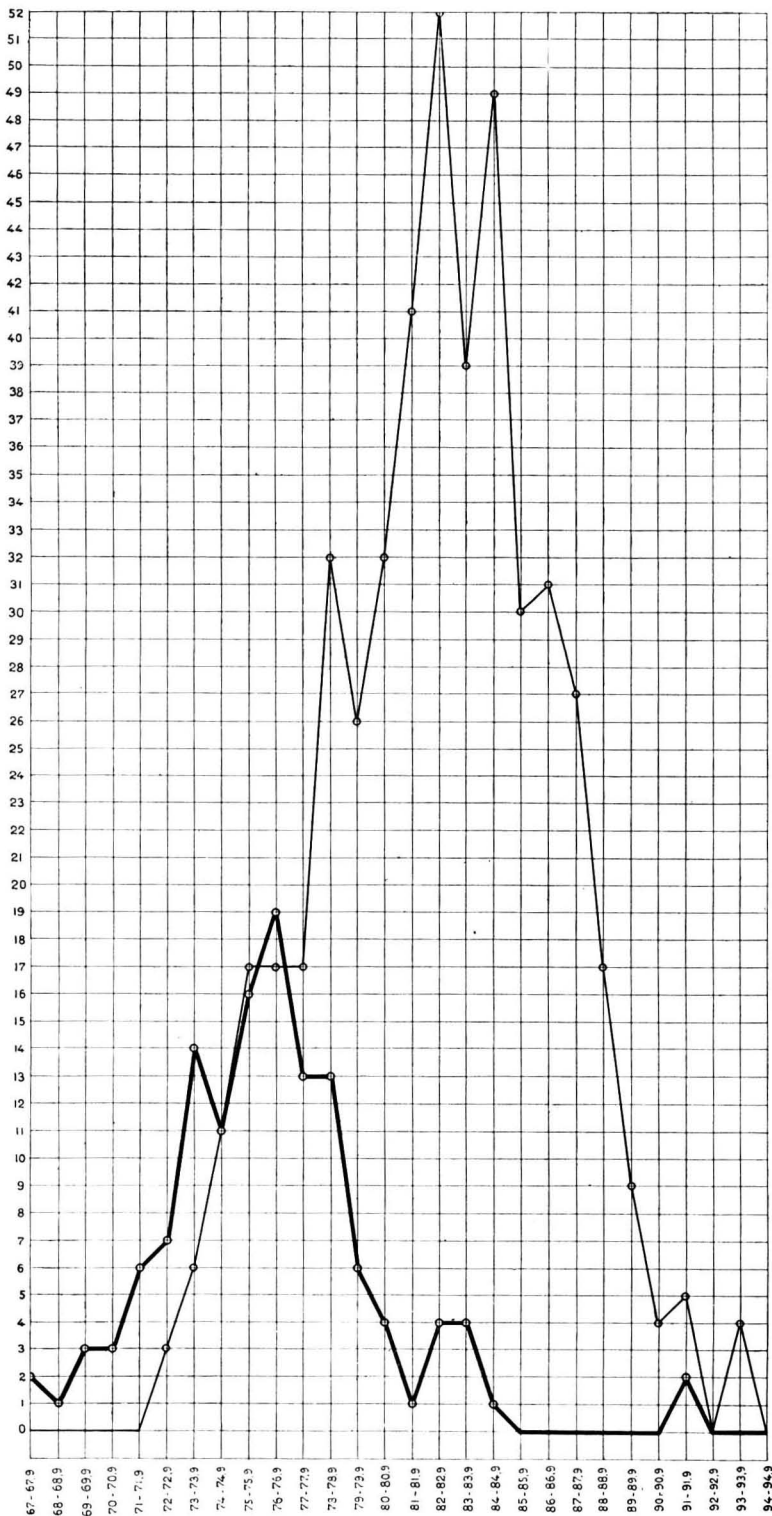


Fig. 3. The small thick lined curve gives the indices of 129 chiefly prehellenic skulls mentioned by STEPHANOS, KUMARIS and FÜRST. The large thin lined curve gives the head indices of 466 recent Greeks, measured by APOSTOLIDES, STEPHANOS and DUCKWORTH.

On the other hand, a living head index (77—78) very nearly corresponding with this skull index (slightly larger) occurs with some Aryan (better: non-mediterranean) mesocephalics in Anatolia, Kurdistan and North-Persia.

So, although a Phoenician influence on the ancient population of Greece cannot be doubted (also on account of semi-historical data), non-mediterranean mesocephalic elements in it may not be excluded (cf. also MYRES).

It is said that the ancient Phrygians, Carians, Lelegi, Galati and also the Philistines (SALAMAN)<sup>1)</sup> who may be grouped together as Pelasgians were nonmediterranean dolichocephalics. It should be emphasized though that very little is known concerning the anthropological features of these peoples living on the West coast of Asia. The three skulls found at Troy III, examined by R. VIRCHOW<sup>2)</sup>, had the indices of 67.7:74.3; 71.3. VON LUSCHAN<sup>3)</sup>, PEAKE<sup>4)</sup> and especially MYRES accept that these were skulls of Nordic dolichocephalics of Kurgan habits, related to the Dnjepper mound builders. This would agree with VIRCHOW's statement concerning the skulls of Khanai Tepe, a cemetery near Troy and also of an ancient, though probably not as ancient date as Troy III (the Khanai Tepe skull B I had an index of 71.5). Even the skulls of Ophryinion dating from about 500 B.C. had a similar index (74.5). The female 82.5 index skull found at Troy II might have been Achaean, as the Achaeans, are supposed to be subbrachycephalic (according to STEPHANOS Greek busts even usually have brachycephalic heads).

While skulls dating from the 9<sup>th</sup> to 5<sup>th</sup> century found at Athens are still prevailing dolicho- and mesocephalic<sup>2)</sup>, the subbrachycephalics added to the longheaded population, probably were related to the people of the Western Caucasus. Their invasion according to GLOTZ<sup>5)</sup>, FÜRST<sup>6)</sup> and MYRES<sup>7)</sup> coincides with the Achaean (i.e. Hellenic) invasion of Greece that may have started 2000—1500 B.C., reached his

---

dolichocephalic and mesocephalic population occurred, the former being also Hamitic and the latter Phoenician (cf. fig. 2 of my third contribution giving the frequency curve of the Carthaginian skulls, measured by BERTHOLON and CHANTRE).

<sup>1)</sup> SALAMAN. What became of the Philistines. Archives of the Palestine Exploration fund. January and April 1925. The Cretan cupbearer reproduced by SALAMAN, however, resembles the present Egyptian or Syrian Beduin.

<sup>2)</sup> R. VIRCHOW. Alttrajanische Gräber und Schädel. Abhandl. der Preuss. Akad. der Wissensch. 1882 Abh. II p. 1—167, SCHLIEMANN'S letzte Ausgrabung, ibidem, '91, p. 819, and Über Griechische Schädel aus alter und neuerzeit etc., ibidem 1893, p. 677.

<sup>3)</sup> VON LUSCHAN. Huxley Memorial Lecture, 1916.

<sup>4)</sup> PEAKE. Racial elements concerned in the siege of Troy. Journ. of the anthropol. Institute of Great Brit. and Irel. Vol. 46, p. 154.

<sup>5)</sup> GLOTZ. La civilisation égéenne, N<sup>o</sup>. IX de la Série l'Evolution de l'humanité, Paris, 1923.

<sup>6)</sup> C. M. T. FÜRST. Zur Anthropologie der prähistorischen Griechen in Argolis. Lunds Universitets Arsskrift N. F. Bnd. 26 N<sup>o</sup>. 8. Kungl. Fysiografiska Sellsk. Hand. Bnd. 41, 1930.

<sup>7)</sup> J. L. MYRES. Who were the Greeks. California Univ. Press. 1930, p. 343.

culmen about 1400 B.C., (1330 B.C. MYRES) but may have continued a long time.

In fig. 4A I registered separately the indices of the ancient skulls from Argolis, described by FÜRST, the dates of origin of which are better known than those of STEPHANOS' skulls. They belong to the middle Helladic (i.e. Pre-hellenic) period. From this it appears that nearly all the skulls of that period were dolicho- and mesocephalic<sup>1</sup>).

Only one subbrachycephalic and one hyperbrachycephalic-hypsicephalic male skull are amongst them.

According to FÜRST, who compared his skulls with the Armenian skulls described by BUNAK, the hyperbrachycephalic skull (F.A. 20) is distinctly Armenoid, which I can confirm. The brachycephalic male skull (F.A. 10) with an index of 83.7 was also hypsicephalic (length-height index 63.8). The living head index of this man would have been about 84 (R. MARTIN). FÜRST is not sure about his racial position (lc. p. 57). It may belong to my Armenian group with an average index of 83.48 ( $\pm 1.16$ ) but it may also belong to one of the Western Caucasian races, to which these 83.5 index Armenians probably are related (cf. p. 1088).

Fig. 4A. The upper figure gives the indices of the male (—) and male + female skulls (...) of the middle Helladic period examined by FÜRST.

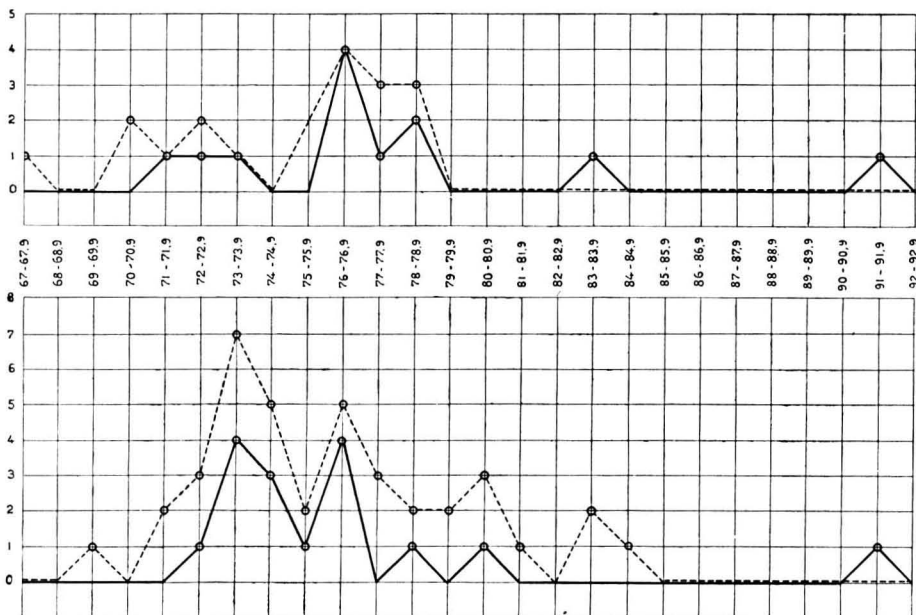


Fig. 4B. The lower figure gives the same for the late Helladic, protogeometric, early geometric described by FÜRST and Mykenai skulls described by KUMARIS.

In fig. 4B I registered FÜRST's skulls of the late *helladic* (25) protoge-

<sup>1</sup>) The dolichocephalic skulls originate from other burial places than the mesocephalic (lc. p. 43). This may be another indication that they were from different races or at least from different classes of the population.

ometric (3), early geometric (1) and early hellenistic (2) period, adding the nine *late helladic Mykenai skulls*, studied by KUMARIS<sup>1)</sup> and quoted by FÜRST.

Of these skulls the majority is again dolichocephalic and mesocephalic, but in addition to one hyperbrachycephalic evidently Armenoid skull (N<sup>o</sup>. 4 F.H., index 91.5), there are now four subbrachycephalic (female) skulls, one with an index of 81.9 (N<sup>o</sup>. 7 F.M.) two of 83 (N<sup>o</sup>. 2 F.D. and one of KUMARIS' skulls), and one of 84.2 (N<sup>o</sup>. 5 F.M.), which according to FÜRST has no pronounced Armenian characteristics (l.c. p. 101) nor have the other skulls of this group. As there are moreover three skulls in this curve with an index of 80 — which on the living head may correspond with an index of about 81 —, this may indicate that at that period the brachymorph Western Caucasian people had already become more numerous in Greece (as was also the case in Crete at the same period, cf. DUCKWORTH l.c.).

Although I believe that these subbrachycephalic Hellenic invaders of

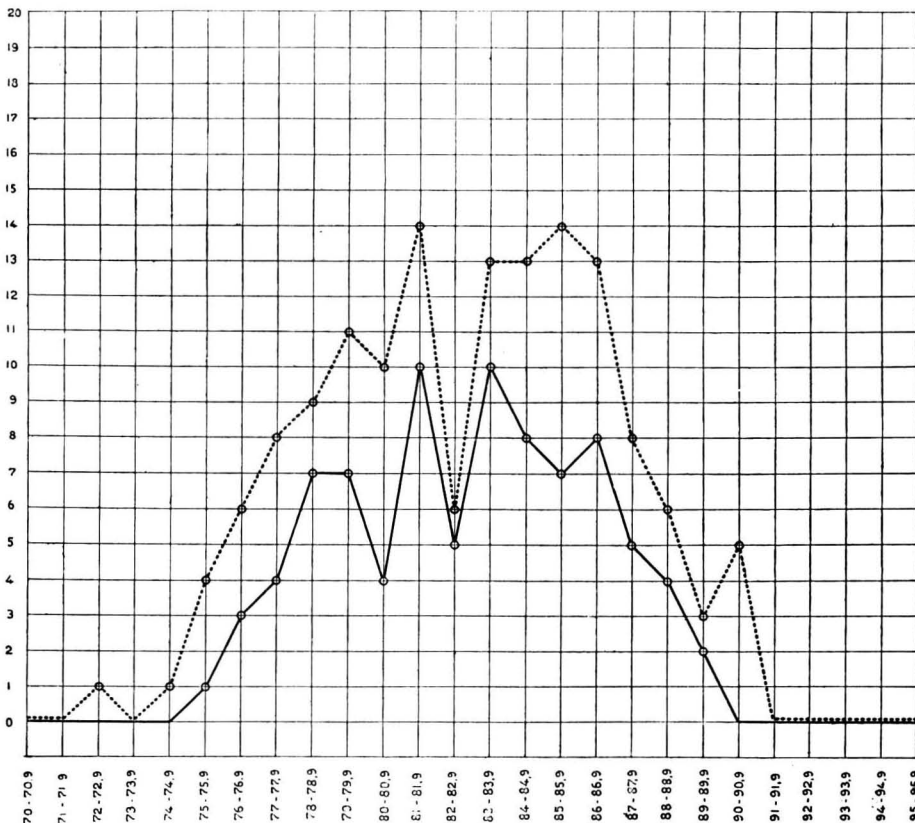


Fig. 5. The dotted curve gives the head indices of 146 inhabitants of the Balkans, the continuous curve the head indices of 85 Greeks.

<sup>1)</sup> KUMARIS. Prähistorische Schädel vom Griechischen Festlande. Arbeiten aus dem anthrop. Museum in Athen 1916 (Greek language, quoted from FÜRST).

Greece are related to the Western Caucasians this does not involve that they came directly from the Caucasus by the way of Anatolia, the Hellespont and the islands. They may have come just as well along the Northern route and the Danube Valley<sup>1)</sup>, or have split off from Caucasian groups in Hungary, as some archeologists suggest. Probably their immigration occurred along various ways.

Another point to be considered in the formation of the Greek people is the Dorian invasion ( $\pm 1100$  B.C.) that followed the Achaean (Hellenic) subbrachycephalic invasion.

Most authors who dealt with the origin of this invasion concluded that the Dorians came from the North (RIDGEWAY<sup>2)</sup>, HAWES<sup>3)</sup>, CASSON<sup>4)</sup>, probably from Illyria (the present Dalmatia).

At the present time the population of the Balkans North-West of the Greek peninsula, in Dalmatia, contains more brachycephalics and especially more hyperbrachycephalics than Greece proper does (cf. fig. 5). An influx of this hyperbrachycephalic dinaric race in Greece has certainly occurred and may account for the 86—86.9 elevation present in the curves of recent Greeks (see fig. 3 and 5), but more pronounced in the Balkan curve (fig. 5).

Whether, however, this dinaric race is identical with the Dorians is not sure since unmistakably Dorian skulls are not yet found, a consequence perhaps of the Greek (also Dorian) custom to burn the dead.

RIDGEWAY and GIUFFRIDA RUGGERI (l.c. supra p. 134—135) believe that at the time of the Dorian invasion Illyria was still inhabited by a mesocephalic race. This is doubted by HAWES, who considers the Albanians, especially those that speak the Gheg dialect, as the nearest relatives of both the old Illyrians and of the Dorians, whose Greek descendants he believes are the present Zakonians (in the former Lakonia or Sparta) who still speak a Dorian dialect (R. MEISTER<sup>5)</sup>). According to HAWES they also penetrated into Crete (in Sphakia especially).

With 23 Zakonians HAWES found an average index of 85, with 98 Sphakiotes 84.7. This comes very near the index occurring with the Albanians speaking the Gheg dialect<sup>6)</sup>. HAWES also stated that the absolute length and width and the sagittal contour

1) It should be emphasized, however, that they were no "Nordics" in the anthropological sense of the word, the latter being a longheaded race (see above).

2) RIDGEWAY. Who were the Dorians? Anthropological essays. Oxford, 1907, p. 303.

3) HAWES. Some Dorian descendants. Annual of the Brit. school at Athens, Vol XIV, 1909—1910, p. 258.

4) CASSON. The Dorian invasion reviewed in the light of some new evidence. *Man*, Vol. 21, 1921, p. 70. CASSON believes them to be related to the Hallstatt people.

5) R. MEISTER, Dorer und Achäer. Abhandl. der Sächs. Gesellsch. der Wiss. Phil. hist. Kl. N<sup>o</sup>. 3, 1904.

6) With the majority of the Albanians, a higher index is found (see my first contribution, these Proceedings. Vol. 33, 1930, p. 795). Even with the Gheg Albanians, GLÜCK, who measured 14 men, found an average of 86.3. PITTARD who measured 16 Gheg Albanians, however, found an index of 85.5 and HAWES himself 85.1. See GLÜCK Zur physischen Anthropologie der Albanesen. Wiss. Mitteil. aus Bosnien und Herzegowina, p. 375, PITTARD. Contribution à l'étude des Albanais. Revue de l'école d'Anthropologie, 1902, p. 240 and HAWES (l.c. supra).

of the head of these peoples are about the same. These arguments are certainly interesting but so long as no Dorian skull has ever been described we have no certainty in this matter. Besides DUCKWORTH (l.c.) rightly emphasized that for the hyperbrachycephalic elements in the population of Greece and Crete also mediaeval dinaric invasions have to be considered and those of the Venetians, who are closely related to the Dinarics. Curiously the Greek bloodindex (2.26, according to HIRSCHFELD and HIRSCHFELD, and 2.12 according to KUMARIS <sup>1)</sup>) comes very near the dinaric index (2.28).

---

<sup>1)</sup> cf. SNIJDER. Bloodgrouping in relation to Clinical and Legal Medicine. London, Baillière, Tindall and Cox, 1929.