

PHYSICAL ANTHROPOLOGY OF THE JEWS. I.—THE CEPHALIC INDEX

By MAURICE FISHBERG

The physical anthropology of the contemporaneous Jews has been one of the most debated questions in anthropology. From the comparatively large number of measurements taken on living subjects, authorities have drawn different conclusions. Some, like Jacobs, Andree, and others, have maintained that the Jews are a pure race, the descendants of the primitive Semites, and almost entirely unmixed with foreign blood, while others have stated that the results of the study of the physical characteristics of the Jews are against this view. They argue that nearly all the contemporaneous peoples known to be of Semitic origin are dolichocephalic, as is the case of the Arabians, the Abyssinians, the Syrians, etc.; while the modern Jews of Europe are mesocephalic or even extremely brachycephalic.¹ Dr M. Alsberg² brings evidence that even the ancient Hebrews were already a mixed race. It is further alleged that anthropometric measurements reveal two types of head-form among the modern Jews,—the long and the round,—which evidently tend to indicate that the Jews are a mixed race.³ The fact that the brachycephalic

¹ I must emphasize that this is true of the Jews of Europe. Those of the Caucasus are hyperbrachycephalic. Pantukhof's measurements show a cephalic index of 85.2. ("Observations Anthropologiques au Caucase" (in Russian), *Publications of the Caucasian Royal Geograph. Soc.*, xv, pp. 35-38.) The Jews of Daghestan (mountaineers) have even a cephalic index of 87.0. On the other hand those of Africa and Syria have a purely dolichocephalic type of head. While this paper is passing through press I have succeeded in obtaining measurements of thirty-six Jews, natives of Tunis, Morocco, and Syria, not one of whom had a cephalic index above 78.

² *Rassenmischung im Judenthum*, Hamburg, 1891.

³ On this point see particularly Stieda, "Ein Beitrag zur Anthropologie der Juden," *Archiv für Anthropologie*, xiv, pp. 167-182.

type by far exceeds in number those of the dolichocephalic type is explained by Stieda, who states that this points to a long, lasting, and successful interbreeding of both types. Majer and Kopernicki¹ conclude that the Jews constitute physically two types, and add that the brachycephalic Jews are usually dark brunette and the dolichocephalic Jews are blond—a point of importance, as they think it tends to show that the long-headed blond Jews have their origin in Indo-Germanic intermixture. In the same sense we find Weisbach² speaking of two cranial types of the Jews—one long and with a narrow face, narrow but very long nose, and thin lips; the other a round-headed type with a broad face, short, broad, small nose, and thick lips. Lombroso,³ again, basing his deduction on the results obtained by measuring 112 Italian Jews, concludes that they are a mixed race, which manifests itself in a great variability and differentiation of their head-form, a condition which is the most important sign of racial intermixture.

TABLE I.—STATISTICS OF MEASUREMENTS OF 2373 INDIVIDUALS

Country	Number	Cephalic Index	Dolichocephaly — 75	Mesocephaly 75 — 80	Brachycephaly 80 +	Observer
Galicia	413	{ 83.6 81.7	3.63	17.67	78.69	Majer and Kopernicki
Russia	100	83.11	1.00	13.00	86.00	Blechman
Russia	100	82.5	1.00	18.00	81.00	Weissenberg
Russia	67	82.2	—	17.90	82.1	Stieda
Lithuania	69	81.7	—	15.94	84.06	} Talko-Hryniewicz
Ukraine	438	82.9	0.91	13.47	85.61	
Italy	112	82.14	2.68	19.64	77.68	Lombroso
Various	19	82.2	—	26.3	73.8	Weisbach
Russia	139	80.9	2.16	31.65	66.19	Yakowenko
Bosnia	55	80.1	7.3	34.5	58.2	Glück
Baden	86	83.5	—	11.6	87.8	Ammon
Caucasus	53	85.2	—	1.7	98.3	Pantukhof
England	363	80.0	—	—	—	Jacobs
Poland	325	81.9	—	—	—	Elkind
Italy	34	81.6	—	—	—	Livi

¹ *Charakterystyka fizyczna ludności galicyjskiej*, Krakow, 1877 and 1885.² *Körpermessungen verschiedener Menschenrassen*, Berlin, 1878, pp. 212–225.³ *L'antisemitismo e le scienze moderne*, Torino, 1894.

By a careful examination of the accompanying table I, which gives the results of anthropometric measurements, it will be seen that there is a remarkable uniformity in the cephalic index of modern Jews. Setting aside the Caucasian and also the African Jews, we find that the cephalic index of nearly all European Jews is between 81.5 and 83., showing only a limited variability, which may be attributed to the usual discrepancies between the different series of measurements of a single and homogeneous race. Another remarkable fact is the striking absence of dolichocephaly, varying from one percent in Blechman's to 7.3 in Glück's series; and at the same time there seems to be a marked preponderance of the brachycephalic type—the results of all observers show that over 60 percent of the individuals measured had a cephalic index of over 80.

This is about as far as we can go while attempting to study the head-form of the Jews from the accumulated anthropological literature of today. But, as is well known to every student of anthropology, the average and even the median is no safe criterion of the physical characteristics of a given race, for we now know that this is quite often misleading. What is of most interest is the distribution of the units obtained by the anthropometric measurements of the body, which give us an idea of the degree of variability. This is best obtained by seriation and coordination of the figures; in other words, by arranging the figures in an ascending or descending order, each expressing the cephalic index. And what will be of more use in conveying an idea of the relative distribution of the various values obtained, is a seriation expressed graphically by means of curves, for by such means we may frequently find one or even several indices around which are clustered the largest number of heads, and we can then often discover two or even more cranial elements in a population—a result which can never be obtained by a mere statement of the average or median cephalic index.

The results shown in the accompanying diagram (A) were ob-

tained by the measurement of 715 Jews living in New York City, 500 of whom were men and 215 women. All were over twenty years of age, many over fifty. Their nativity was:

Russia and Poland.....	235,
Austria.....	180,
Roumania.....	68,
Hungary.....	57,
United States.....	76,
Other countries.....	99.

Those mentioned as born in the United States were, as a rule, of foreign parentage; among those of "other countries" were Jews from England, Germany, France, Italy, Sweden, Palestine, some even from Africa; but the number of each is too small to be classified by their country of birth.¹ The importance of investigating Jews from all countries will appear later.

The cephalic index was obtained by taking first the long diameter of the head from the glabella to the most distant point of the occiput; second the widest diameter, obtained by searching with the points of the calipers along the temples over the ears and somewhat posteriorly. The width $\times 100$ divided by the length equals the cephalic index.² In order to avoid error the measurements were always repeated and the mean of the two recorded.

Of the 500 men we find that the *arithmetic average* cephalic index is 82.12; the *median* 81.77, a difference of but 0.35. Between the one having the *average* cephalic index and the one having the *median* index were nineteen individuals. The minimum index was 73.60, the maximum 94.76. Arranged in groups

¹ So soon as I have obtained data representing a sufficient number of individuals from each country, I hope to publish the material arranged according to the country of birth.

² For the calculation of the cephalic index I have lately been using the tables published by Carl M. Fürst, entitled, *Index-Tabellen zum antropometrischen Gebrauche*, Jena, 1902. They have saved me much tedious labor.

according to Deniker's scheme, we find the following distribution :

<i>Type</i>	<i>Cephalic Index</i>	<i>Number</i>	<i>Percent</i>
Dolichocephalic.....	less than 77	26	5.2
Subdolichocephalic....	77 to 79.6	63	12.6
Mesocephalic.....	79.7 to 81.9	111	22.2
Subbrachycephalic.....	82 to 85.2	228	45.6
Brachycephalic.....	85.3 to 86.9	50	10.0
Hyperbrachycephalic...	87 and more	22	4.4
Total.....		500	100

Each individual index is found to be distributed as follows :

<i>Cephalic Index</i>	<i>Number</i>	<i>Percent</i>
73	3	0.6
74	6	1.2
75	5	1.0
76	12	2.4
77	29	5.8
78	32	6.4
79	41	8.2
80	63	12.6
81	59	11.8
82	74	14.8
83	56	11.2
84	46	9.2
85	34	6.8
86	18	3.6
87	4	0.8
88	10	2.0
89	3	0.6
90	1	0.2
91	1	0.2
92	1	0.2
93	1	0.2
94	1	0.2

To render the results of these figures more graphic, it is advisable, as we have said, to construct a curve. If they represent a true homogeneous type, which is more or less characteristic of the Jewish race, that fact will be made clear. If the Jews are a mixed race, as a result of intercrossing of the long and the round types of head-form, the effects of such interbreeding will be

shown boldly either by the curve having a double apex or by being flattened at the top, at the same time showing an expansion in one or both sides. In the diagram (A) each index is marked on the axis of the abscissæ, and the percentage of persons

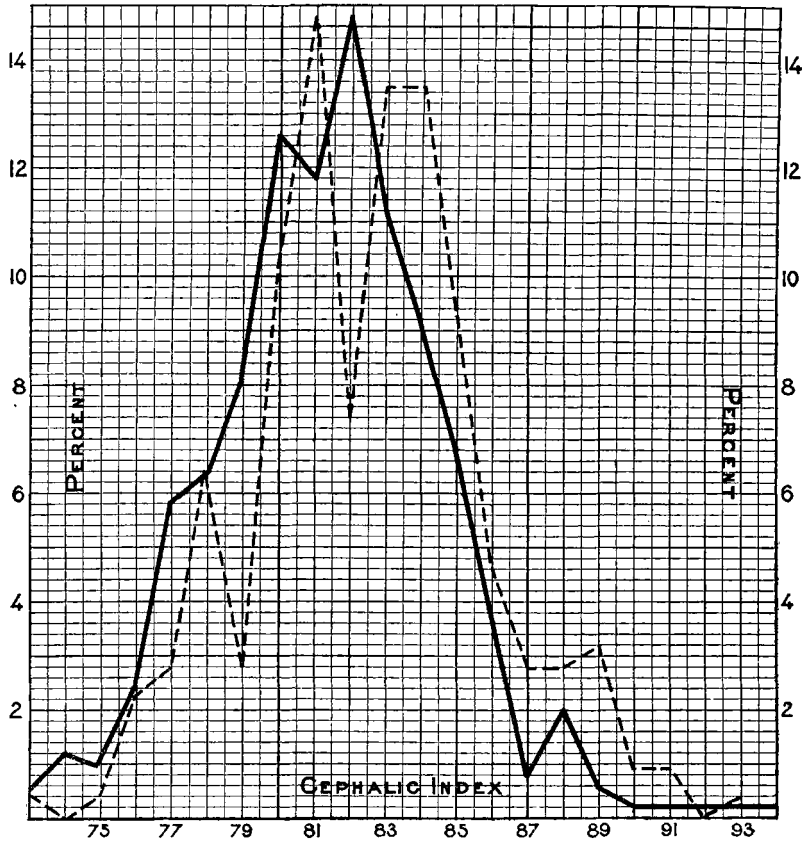


DIAGRAM A.—Cephalic index of 500 Jews (—) and 215 Jewesses (---).

having a given index is indicated on the ordinates; in other words, the height of the curve at each point indicates the number of heads (per 100) having the cephalic index marked at the base of the vertical lines. Thus it is shown that 12.6 percent of the heads measured had an index of 80; 14.8 percent an index of 82, and so on. It will also be observed that the curve

culminates at its apex with the index of 82, corresponding with the average and also with the median. At this point also, it is observed, is the largest percentage of persons, and around them are clustered the majority of heads,—those having larger indices on the right side, and those having smaller indices on the left. This is shown graphically by the steady descent of the curve on both sides, forming a more or less acute pyramid whose apex points almost in the middle. "A sharp pyramid generally denotes a homogeneous people. If they were all precisely alike, a single vertical line, one hundred percent, would result."¹ The slight indentation of the curve at the index of 81 is due merely to chance—there happened to be a few more individuals among those measured which had an index of 80. It is so slightly elevated, and the interval between this and the real apex is so small (only one unit), that we cannot ascribe it to be due to racial intermixture. These minor apices are discussed in detail by Livi and Ammon, and are shown to be usually the result of unavoidable error in observation and calculation of the groups of indices, which errors have an influence on the appearance of the curve by showing here and there a lower percentage with an indentation of the line, and an occasional elevation of the curve as a result of a higher percentage of a given index. The smaller the number of observations, the more irregularity in the curve; the larger the number of observations, the smoother the curve, although the irregularities never disappear entirely.²

These minor apices are obliterated by "smoothing" the curve as advised by Livi and Ammon. This is best done by drawing the curve on a scale having two units on every abscissa, i. e., by adding the units of two indexes and drawing the curve accordingly. This we have done, and the result is a fairly

¹ W. Z. Ripley, *The Races of Europe*, N. Y., 1899, p. 114.

² For a detailed mathematical treatment of these questions see R. Livi, "L'indici cefalico degli Italiani," *Archivio per l'Antrop.*, XVI, pp. 223-303; also *Antropometria militare*, Roma, 1896; Otto Ammon, *Die Natürliche Auslese beim Menschen*, Jena, 1893, pp. 27-29; *Zur Anthropologie der Badener*, Jena, 1899, pp. 104-111.

smooth pyramid (as shown in diagram B) in which two apices cannot be discerned. If the Jews were a mixed race of two or

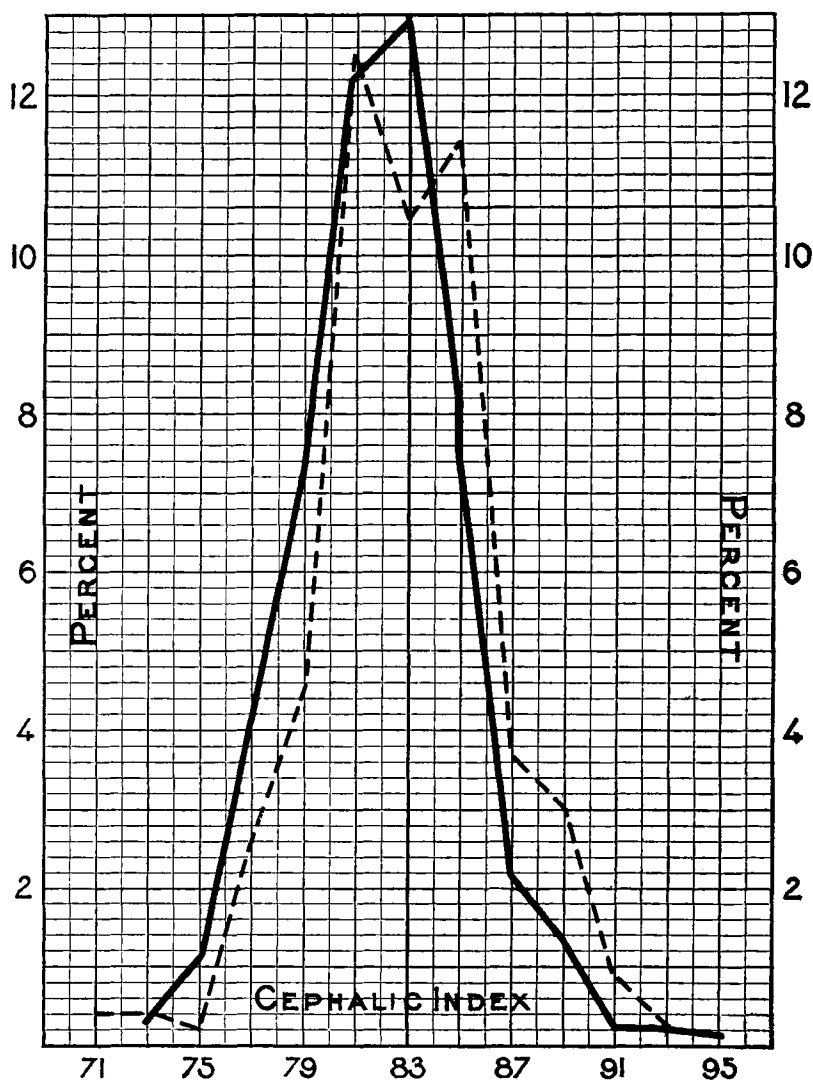


DIAGRAM B.—Cephalic index of 500 Jews (—) and 215 Jewesses (---).

more types of head-form, as Stieda, Majer and Kopernicki, Talko-Hryniewicz, Lombroso, and others claim, we should not obtain such a narrow pyramid; the various racial elements entering

into the composition of the modern Jews would manifest themselves by either a flattening of the curve at the top with an extension of one or both of its legs sidewise,—in fact, showing no apex at all,—or the curve would indicate two or more apices according to the types of racial elements that made up the population investigated. But as we find our curve to be a fairly smooth and narrow pyramid, with its apex at the cephalic index of 82 (the median index), we may infer that our contemporaneous European Jews are a homogeneous race, showing no intermixture of foreign blood.

The homogeneity of the cranial type of the modern Jews was rather unexpectedly disclosed by these figures. To test their accuracy it was decided to analyze in seriation and coördination the figures of other investigators of the anthropology of the Jews, thus obtaining from available literature 571 measurements of Jewish heads. These, in addition to our own figures, are collated in table II.¹ The curve drawn from these measurements (diagram D) shows a yet more striking homogeneity of the cranial type; the pyramid is smoother and narrower than that drawn from only five hundred heads. Notwithstanding the fact that it represents Jews from various countries, of various social conditions, living under different climates and environments, we find that over 80 percent of the heads are within the limits of seven units (between the cephalic index of 78 and 85); 70 percent are within the limits of five units (from 79 to 84), and 50 percent of all the observations are between the limits of three units (80 to 83). Such homogeneity of the cranial type has not been observed in any other civilized race.

¹ The figures in this table were taken from Stieda, "Ein Beitrag zur Anthropologie der Juden," *Archiv für Anthropologie*, XIV, pp. 61-71; Blechman, *Ein Beitrag zur Anthropologie der Juden*, Dorpat, 1882; Weissenberg, "Die südrussischen Juden," *Archiv für Anthropologie*, XXIII, pp. 347-443, 531-579; Lombroso, *L'antisemitismo e le scienze moderne*, appendix, Torino, 1894; Yakowenko, *Materials for the Anthropology of the Jews* (in Russian), St Petersburg, 1898; and Pantukhof, *Anthropological Observations in the Caucasus* (in Russian), Tiflis, 1893.

The importance of the study of anthropological data by means of seriation will be more appreciated when we cite the following example: Lombroso,¹ in his study of the physical anthropology of the Jews of Turin, Italy, as compared with the Catholics amongst whom they live, concludes that the Jews are a mixed

TABLE II.—CEPHALIC INDEX OF 1071 JEWS OF EUROPE AND THE CAUCASUS

Index	Stieda	Blechnan	Weissenberg	Lombroso	Yakowenko	Pantukhof	Fishberg	Total	Percent
70		1						1	0.09
71				1				1	0.09
72				2				2	0.18
73			1		1		3	5	0.46
74					2		6	8	0.74
75	1	2		1	1		5	10	0.93
76	1		2	2	5		12	22	2.05
77	3		3	4	10		29	49	4.57
78	4	1	4	5	12	4	32	62	5.80
79	2	10	8	10	16	5	41	92	8.60
80	6	9	12	5	15	2	63	112	10.46
81	13	13	12	13	18	3	59	131	12.23
82	12	12	16	15	20	3	74	152	14.20
83	8	16	7	11	12	8	56	118	11.01
84	4	8	14	11	6	2	46	91	8.50
85	4	8	12	9	10	5	34	82	7.65
86	6	9	6	8	3	5	18	55	5.13
87	1	8	1	6	1	1	4	22	2.05
88	2	1	2	2	2	1	10	20	1.86
89		2		3	1	3	3	12	1.12
90				2		4	1	7	0.65
91				1	1	3	1	6	0.56
92				1		1	1	3	0.28
93					2		1	3	0.28
94						3	1	4	0.37
95					1			1	0.09
Total	67	100	100	112	139	53	500	1071	99.95

race, because the higher forms of brachycephaly occur among them less frequently than among the Catholic population of Turin, while the dolichocephalic type is met with amongst Jews about eight times more often. This, according to Lombroso, points to a great variability and differentiation of the type of Jewish head-form, and is due to racial intermixture. If Lombroso

¹ Loc. cit.

had arranged his figures in an ascending order and then observed their percentage of distribution in seriation, he would not have fallen into such a grave error. Fortunately, Lombroso records in his monograph the figures expressing every individual cephalic index, and we may utilize these for the purpose of constructing a curve. The percentage of distribution of each index is as follows:

<i>Cephalic Index</i>	<i>Jews Percent</i>	<i>Italians Percent</i>
71	0.9	—
72	1.7	—
73	—	—
74	—	1.0
75	0.9	—
76	1.7	—
77	3.5	2.1
78	4.5	5.2
79	9.0	2.1
80	4.5	5.2
81	11.6	4.2
82	13.3	7.3
83	9.8	10.5
84	9.8	10.5
85	8.0	6.3
86	7.1	7.3
87	5.3	6.3
88	1.7	11.5
89	2.6	6.3
90	1.7	4.2
91	0.9	3.1
92	0.9	3.1
93	—	3.1

The curves (diagram c) constructed from the above figures give a result quite contrary to that reached by Lombroso. The variability and differentiation are manifested by the zigzag curve which represents the Italians of Turin, but we cannot discern which is the real apex. The curve representing the Jews is a fairly regular pyramid, considering the small number (112) of heads measured. The minor apex can be observed to be evidently due to chance—there happened to be a smaller number of individuals than was expected with a cephalic index of 80. The real apex, it will be noted, corresponds to 82—the average and the

median apex. This is not the case with the curve representing the Catholics.

It is peculiar that while the Jews appear to have a homogeneous head-form, this is seemingly not the case with the Jewesses.

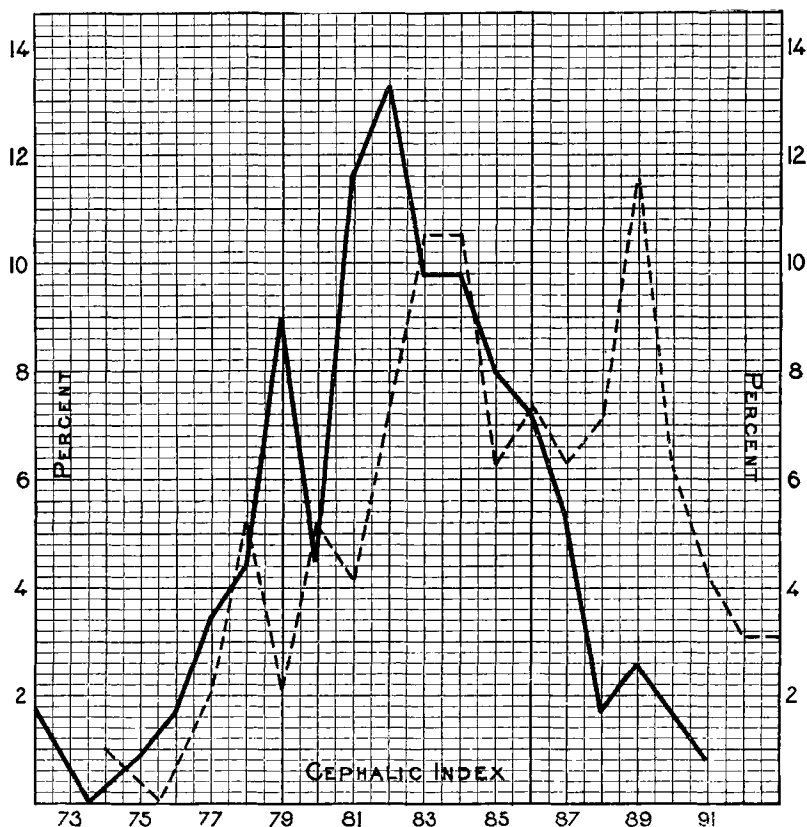


DIAGRAM C.—Cephalic index of 112 Jews of Turin (—) and of 95 Italians of Turin (---).
After Lombroso.

This will be seen by an analysis of our measurements of Jewish women. Of the 215 heads of women, we find that they are slightly more brachycephalic than the men, the former having a cephalic index of 83, against 82.12 for the latter. The results of other observers concerning the differences in the cephalic index of Jewish men and women will be seen in the following table:

TABLE III.—CEPHALIC INDEX OF JEWS AND JEWESSES

	Cephalic Index	
	Men	Women
Talko-Hryniewicz ¹	82.20	83.00
Majer and Kopernicki ²	81.70	80.30
Weissenberg ³	82.50	82.40
Elkind ⁴	81.90	82.90
Yakowenko ⁵	80.90	81.24
Fishberg	82.12	83.00

These figures show that no definite conclusion can be drawn as to whether the Jewesses are more brachycephalic or dolichocephalic than are the Jews. While those measured by Yakowenko and Talko-Hryniewicz agree with ours, showing the women more round-headed than the men, the rest show the reverse, and those of Weissenberg are practically equal. This confirms Deniker's observation that "the difference between the cephalic index of men and women hardly exceeds one unit—that is to say, the degree of personal error in the observation. This difference is, in any case, less than the discrepancies between the different series of a single and homogeneous race."⁶

The median cephalic index of the Jewesses measured by us is 83.33. Between the average and the median there were seven individuals. Grouping the indices as for the men we find the following distribution :

¹ "The Anthropology of the Jews in Ukraine and Lithuania," *Proc. Russian Anthropological Society*, St Petersburg, 1892, p. 80.

² "Charakterystyka fizyczna ludności galicyjskiej," *Zbiór wiadom. do antropol. Krajowej*, IX, pt. 2, Krakow, 1885, p. 84.

³ "Die südrussischen Juden," *Archiv für Anthropol.*, XXIII, 1895, p. 98 of reprint.

⁴ *Centralblatt für Anthropol., Ethnol. und Urgeschichte*, III, p. 66.

⁵ *Materials for the Anthropology of the Jewish Population of Mogilew* (in Russian), St Petersburg, 1898, p. 183.

⁶ Deniker, *Races of Man*, London, 1900, p. 75.

Dolichocephalic,	8 = 3.8 percent,
Subdolichocephalic,	21 = 9.8 “
Mesocephalic,	58 = 26.8 “
Subbrachycephalic,	85 = 39.6 “
Brachycephalic,	19 = 8.8 “
Hyperbrachycephalic,	24 = 11.2 “

which shows a smaller percentage of long-headedness (13.6 percent had an index below 80, against 17.8 percent in men) and a larger percentage of round-headedness (20 percent in Jewesses, 14.4 in Jews).

The distribution of the individual indices was as follows:

<i>Cephalic Index</i>	<i>Number</i>	<i>Percent</i>
72	1	0.4
73	1	0.4
74	—	—
75	1	0.4
76	5	2.3
77	6	2.8
78	14	6.5
79	6	2.8
80	22	10.2
81	31	14.7
82	16	7.4
83	29	13.5
84	29	13.5
85	20	9.3
86	10	4.6
87	6	2.8
88	6	2.8
89	7	3.2
90	2	0.9
91	2	0.9
92	—	—
93	1	0.4

Carefully examining the above figures in connection with their graphic representation in our curve (diagrams A, B), we find that the Jewesses do not represent such a homogeneous type of head-form as do the Jews. We notice two apices—one at 81 and one at 84; the minor apex at 78 may be considered as due to chance for the reasons explained above while describing the curve for the men. The striking irregularity in the curve of the

head-form of the Jewesses is remarkable from another viewpoint. Throughout the animal kingdom the males are always known to show wider limits of variation in mental and physical character than do the females. Darwin¹ has brought together many examples to this effect, both in man and the lower animals; and Havelock Ellis² also shows that there is a greater tendency in man to diverge from the type than in woman. With the Jews, however, the reverse of the rule, so far as the head-form is concerned, seems to apply, since it is the women who show the greater variability and differentiation. Mr Joseph Jacobs lays great stress on the comparatively small variation of type among Jewesses as compared with that of the Jews.³ This is probably true of pigmentation and facial features, as we shall see when we come to speak of these subjects in presenting the results of our next studies. But we want to point out at present that pigmentation and facial features are racial characteristics which are known to be influenced by environment, and particularly by social selection, as has been so ably shown by Ripley.⁴ The head-form, on the other hand, is a racial character influenced but little, if at all, by environment, nutrition, social selection, etc., and when we find a greater variability in women in this regard we may consider it to be characteristic.

In order to test our own results, we constructed a curve from the measurements recorded by other writers — the fifty Jewesses of southern Russia measured by Weissenberg⁵ and the eighty Jewesses of Mogilew, Russia, measured by Yakowenko.⁶ These 130 heads were combined with those of our 215 Jewesses, making

¹ *Descent of Man*, chap. viii; *Variation of Animals and Plants under Domestication*, vol. II, chap. xiv.

² *Man and Woman*, London, 1893, chap. xvi.

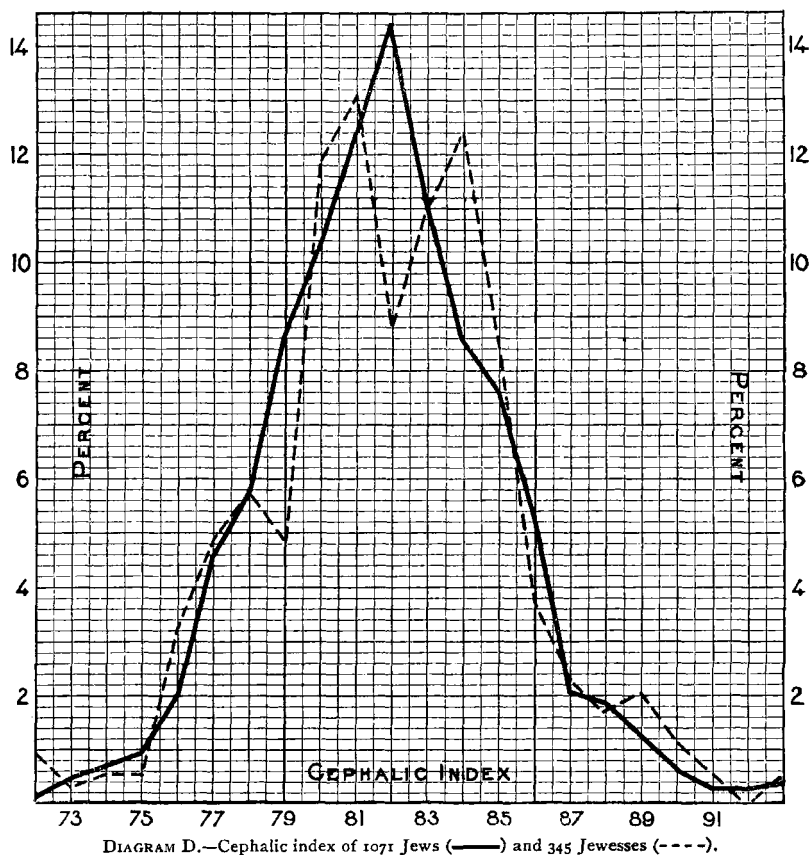
³ "On the Racial Characteristics of Modern Jews," *Four. Anthropol. Inst.*, xv, p. xxviii of reprint.

⁴ *The Races of Europe*.

⁵ "Die südrussischen Juden," *Archiv für Anthropologie*, xxiii, p. 98 of reprint.

⁶ *Materials for the Anthropology of the Jews* (in Russian), St Petersburg, 1898, p. 183.

a total of 345 heads of Jewish women, a number that may be expected to give definite results. The curve agrees with our own in that it shows great variability, as may be seen by the two apices which it presents (diagram D). This peculiarity of the



cranial type of the Jewess is of sufficient interest to merit further investigation.

From our study of the head-form of the modern Jews we find that they present a homogeneous type, having a cephalic index of about 82. From a study of the seriations of the cephalic index, we can safely state that no racial intermixture can be discovered. How are we to account for the homogeneity of the

modern Jews? All the peoples known to be of Semitic origin, as the Syrians, Arabians, Abyssinians, etc., are found to be at the lower limits of variation as to head-form, having an index ranging from 74 to 77, i. e., they are extremely dolichocephalic. We know by analogy with other races which have originated from a mixture of brachycephalic and dolichocephalic elements, that the resultant race, during the course of persistent intermarriage, presents either one or the other type of head-form. This is considered to be the result of a process of natural selection — one of the types sooner or later succumbs in the struggle for existence, and by its extinction gives way to the other type. This hypothesis is ably expounded by Otto Ammon¹ for the brachycephaly of the contemporaneous inhabitants of Baden, faced by the fact that the skulls of the ancient Germans (Reihengraber) of the same region are of dolichocephalic type.

But the most frequent result of interbreeding of two types of head-form is known to be the continued coëxistence of both types, notwithstanding uninterrupted intermarriage for centuries. F. von Luschan,² in his study of Greeks in Lycia, shows that such is the case. The curve drawn for that population shows that there are two apices — one culminating at a cephalic index of 75 and the other at 88, while heads with indices between 78 and 84 are practically absent. Von Luschan's explanation is that the higher index corresponds to the Armenians, Turks, and other brachycephalic races of Asia Minor, who have continually intermarried with the descendants of the primitive dolichocephalic Greeks.

Prof. Franz Boas, in his study of the physical anthropology of the American Indians, has shown that the variability of the type of head-form is greater in every race in which it can be shown that an intermixture of two types has taken place. Thus, the curve for the western Ojibwa presents two apices, one at 80 and

¹ *Die Natürliche Auslese beim Menschen*, Jena, 1893.

² "Die Tachtadschy und andere Ueberreste der alten Bevölkerung Lykiens," *Archiv für Anthropologie*, XIX, pp. 31-35; *Reisen in Lykien, Milyas und Kibyratis*, Wien, 1889.

one at 83. The same is the case with the eastern Ojibwa and also with the Ottawa and Menomoni Indians, all of whom show two maxima of cephalic index. "That these maxima are not due to chance," says Professor Boas, "is conclusively proven by the fact that it appears in each of the three curves, and also by the comparison of the curves for men, women, and children. The distribution of these indices must be explained by the distinctive characters of the laws of heredity, which imply that in the case of an intermixture of two types no middle type arises, but that generally there is a reversion (*rückkher*) to the parental form. By implication I am consequently justified in believing that we deal here with a mixture of two types, one with a cephalic index of about 80, the other with an index of about 83."¹

Applying the same principles to the Jews which we have studied, we must assume that if there occurred any intermixture with other races, it was with the inhabitants of Asia Minor and the Slavonians of eastern Europe (both mostly brachycephalic), among whom they have dwelt for centuries. The resultant race of Jews should, under the circumstances, show a curve with a double apex — one culminating somewhere at 75 to 78, corresponding with the Semitic element, the other pointing at an index somewhere above 82, corresponding with the cephalic index of the races with whom the Jews have intermarried. As we have seen in the course of this paper, this is not the case, since the Jews present a homogeneous type of head-form without any indication of racial intermixture. If the modern Jews were Semites, we should find them to be long-headed; if the Semitic element was represented amongst them to any appreciable degree, we should find it in our study of the seriation of their cephalic index. But the small percentage of long-headedness we do find among modern Jews is readily accounted for by ascribing it to the result of individual variation and the unavoidable personal error of observation.

¹ Franz Boas, "Zur Anthropologie der nordamerikanischen Indianer," *Zeitschrift für Ethnologie*, 1895, XXVII, p. 401.

This anomalous condition can be explained by the assumption that the Jews may have been round-headed originally. This is at present difficult to prove, because we have almost no skulls of the primitive Hebrew to verify this assertion. Lombroso¹ brings the measurements of five Hebrew skulls obtained from the catacomb of Saint Calixtus in Rome, dating back to 150 A.D., and he aptly remarks that these skulls are of great importance because, at the period from which they are derived, there could not yet have been any considerable racial intermixture of the Jews with others, hence the cranial type which they represent should be considered pure. The *cranial* indices of these skulls are 80, 76.1, 78, 83.4, and 75.1, which means an average cephalic index of the living of 80.5, differing by far from the cephalic index of the non-Jewish Semites. Of course no conclusion can be drawn from only five skulls, still the fact that among these we find not one dolichocephalic and two brachycephalic skulls, points strongly against the opinion that the ancient Hebrews were a purely dolichocephalic race. In this connection it should be mentioned that Luschan has suggested that a greater part of the ancient Hebrews may have been derived from the Hittites, a brachycephalic race which flourished in Syria and Asia Minor about 1500 B.C. Their descendants in modern times are shown by the same authority, and recently also by Jensen,² to be, besides the Jews, the Armenians, the Turks, the Greeks, and others. Luschan shows that even the physiognomy of the modern Armenians, particularly the convex aquiline nose, considered at present to be peculiarly Jewish, is, in fact, Armenian, and the same is true of the pigmentation, etc.³ Lombroso⁴ accepts this view in its entirety.

¹ *L'antisemitismo e le scienze moderne*, Torino, 1894, appendix.

² *Hittiter und Armenier*, p. 63.

³ F. von Luschan, "Die anthropologische Stellung der Juden," *Correspondenz-Blatt für Anthropologie, Ethnologie und Urgeschichte*, XXIII, 1892, pp. 94-102. He summarizes that the modern Jews are composed, first, of the Amorites, whom he considers as Aryans; second, of the Semites; third, and chiefly, of the descendants of the ancient Hittites. With these three important elements are also to be mentioned other racial intermixtures which the Jews acquired during their diaspora for the last two thousand years.

⁴ Loc. cit.

We will discuss it in detail in a later paper, after discussing the other physical traits of the modern Jews. It is enough for the present to show that there are some reasonable grounds for assuming that even the ancient Hebrews were to some extent brachycephalic, that is, not Semitic.¹

There are also recorded twelve skulls from a Jewish cemetery in Basel of the thirteenth and fourteenth centuries. The individual indices are 76.8, 79.6, 81.4, 82.1, 82.8, 85.9, 86.0, 86.2, 86.4, 87.3, 88.2, 94.2. The average *cranial* index is 84.66, i. e., a cephalic index on the living of 86.66, which is even more brachycephalic than that of the modern Jews.² This series of skulls, although more extensive than that of Lombroso, is also insufficient to form a basis for any positive opinion. It is hoped that with the publication of the anthropological researches of the Archeological Expedition to Syria in 1899, by Henry Minor Huxley, which consist of the measurements taken on forty-three Samaritans and on twenty-five skulls from a Samaritan cemetery at Nablus, our knowledge of the head-form of the ancient Hebrews may be greatly augmented and may place us in a position to form definite conclusions.³

Another possible explanation of the broad-headedness of the modern Jews is that the original stock may have been of a dolichocephalic type similar to other Semites, but after their dispersion the Jews crossed with other races of round-headed types. As a result of a process of natural selection, the brachycephalic type has survived, while the dolichocephalic Semitic type has

¹ Dr Otto Ammon, speaking of the homogeneous head-type of the Jews in Baden, says that there can be no doubt that the Jews are a mixed race. But he adds that *the intermixture of foreign elements were mainly introduced a very long time since* (the italics are Ammon's). If the intermixture were recent, it would be *impossible* to obtain a curve with such a slender appearance. The height of the curve also confirms this opinion.—*Zur Anthropologie der Badener*, Jena, 1899, pp. 650-651.

² J. Kollmann, "Schädel und Skeletreste aus einem Judenfriedhof des 13 u. 14 Jahrhundert zu Basel," *Verhandl. der Naturforschenden Gesellschaft*, Basel, VIII, pp. 115-126.

³ See the Preliminary Report of the Archeological Expedition, in the *American Anthropologist*, Jan.-Mar., 1902.

succumbed in the struggle for existence. This hypothesis would account for the Jews of eastern Europe, the great majority of whom are known to have entered Europe by an eastern route, thus having an opportunity to cross with the round-headed inhabitants of Asia Minor, particularly Caucasia. But the Jews of southern and western Europe cannot be said to have intermixed with markedly brachycephalic races. The majority are known to have entered by a western route, intermingling mostly with dolichocephalic races along the shores of the Mediterranean. These Jews are known as "Sephardim," and are mostly the descendants of the Jews expelled from Spain and Portugal during the dark Middle Ages. Measurements taken on them by Joseph Jacobs, C. Lombroso, Leopold Glück, and R. Livi¹ show that they are also brachycephalic, the cephalic index being above 80, and even above 82 of Lombroso's series of 112 Italian Jews, as we have seen above. How can we account for the round-headedness of the Sephardim?

We have failed to find recorded in anthropological literature of today any measurements of the Sephardim inhabiting Tunis, Morocco, and other parts of Africa, or of the Jews in Syria—the Yemenites and others; we are consequently not in a position to determine whether these Sephardim are also brachycephalic. From the measurements of Oriental Jews which we have succeeded in obtaining (these are not included in the figures presented in this paper, but they will be published in due time), we find them to be distinctively dolichocephalic. Ripley² argues that the only modern Jews who approach the Semitic type of head are those actually residing in Africa, and that upward of 90 percent of the nation have widely departed from the parental type in Palestine. But we must mention in this connection that

¹ J. Jacobs and I. Spielman, "On the Comparative Anthropometry of English Jews," *Fourn. Anthropol. Inst.*, xv, pp. 76-88; Lombroso, loc. cit.; L. Glück, "Beiträge zur physischen Anthropologie der Spaniolen," *Wiss. Mitt. aus Bosnien und der Hercegovina*, iv, pp. 587-592; R. Livi, *Antropometria militare*, pt. 1, Roma, 1896.

² *Races of Europe*, p. 390.

the African origin of the ancient Hebrews, and even of the Semites generally, is not an established fact. There are good reasons for believing that the majority of the ancient Hebrews were of Asiatic origin, and consequently were brachycephalic, as has been asserted by Luschan and others, above cited. It may therefore be argued that it is the African Jews who diverged widely from the parental type. Ripley quotes Chantre to the effect that many of the living Syrians of Semitic speech are as brachycephalic as the Armenians. It must also be recalled that the Semitic race has only a linguistic foundation. The somatological traits of the ancient Semites are thus far unknown to us.

Some inhabitants of Asia Minor, particularly of the mountainous region of the Caucasus, are considered by all authorities to be of Semitic origin. Pantukhof¹ considers the Armenians, the Lesghians, and, to some extent, the Georgians and Greeks to be of Semitic derivation. Their brachycephaly (cephalic index 85-87) is one of the reasons for ascribing them to the Semites according to Pantukhof. More recently Kurdoff² has suggested that the Lesghians of Daghestan are closely related to the Jews and their brachycephaly was derived from their intermixture with the latter. Uslar has shown that the Jews in the Caucasus are not recent arrivals, but have been there from time immemorial, and he adduces good linguistic evidence to support his view that the cradle of the Semites was southern Armenia.³

Travelers who have visited Caucasia almost invariably comment on the close similarity to the "Jewish" facial expression of many aboriginal inhabitants. Many portraits of Armenians, Greeks, Aisors, Ossets, etc., are often mistaken for Jewish. All this tends to show that the Asiatic origin of the modern Jews is supported by substantial evidence, and their brachycephaly may thus be explained.

¹ Loc. cit., and also *Les races du Caucase* (in Russian), Tiflis, 1900.

² "Anthropology of the Lesghians," *Russian Anthropol. Journ.*, 1901, No. 3-4, pp. 165-176.

³ Quoted from Pantukhof, *Observ. Antropol. au Caucase*, pp. 53-55.

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It will be noted that the problem becomes more complicated the more thoroughly we attempt to analyze it. The only way in which we may be able to get more light on the question is by a study of the other tests we have for the identity of races, namely, pigmentation, stature, the form of the face, and expression; and by a study of the association and correlation of these various traits we may be in a position to eliminate the elements which disturb the unity of the racial type and discern more clearly the elements which make up the contemporaneous Jews.

We will therefore speak of pigmentation in our next study.

NOTE.—The difficulty of reaching people who will submit to anthropometric measurements is well known to every one who has attempted to study physical anthropology on the living. I am therefore greatly indebted to Lee K. Frankel, Ph.D., Manager of the United Hebrew Charities of New York, for affording me the opportunity of obtaining anthropometric measurements in connection with my work as medical examiner for the Charities. Without Dr Frankel's assistance this work could not have been done. Dr D. Blaustein, of the Educational Alliance, has also greatly contributed to the work by granting permission to measure the Jewish young men who attend the gymnasium in the institution under his care. The interest in the work and the courtesy extended by Mr Joseph Jacobs I also mention with appreciation.



1.—MODERN OUTRIGGER CANOE OF GUAM



2.—GUAM FISHERMAN WITH CAST-NET OF PINEAPPLE FIBER