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## INDIAN-WHITE AMALGAMATION AN ANTHROMETRIC STUDY

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## PREFACE

The Congress of the United States passed an act June 21, 1906, amended March 1, 1907, authorizing mixed-blood Indians on White Earth Reservation, Minnesota, to sell the lands which the Government had previously allotted to them. Many Indians enrolled on that reservation have, as mixed-bloods, sold all or part of their allotments since the passage of the act.

In time the Government suspected that in the sale of certain lands fraud had been committed intentionally by the original purchaser or seller, or both. Through its Department of Justice the Government in August, 1910, began to bring suits against the present owners of more than 1300 pieces of such land,—whether or not the present owners were the original purchasers.

Both the Government and the defendants in these suits spent much time trying to ascertain the facts as to the blood status of the original Indians who sold as mixed-bloods. The method followed was to take Indian testimony, wherever available, covering the physical appearance, geneologies, and family reputation as to geneologies and blood status of the original sellers. It was soon discovered that information so gathered was not very trustworthy.

The defendants then sought to determine the blood status by anthropometric methods. In October, 1914, the writer was called upon for an opinion by Mr. R. J. Powell, attorney for the defendants. I first visited Indians on the White Earth Reservation near the end of November, 1914. The holiday recess of 1914-1915 was spent among the Bois Fort Indians at Pelican Lake and Nett Lake Reservation, Minnesota. Much of the summer of 1915, and all of the first semester of the academic year of 1915-1916 have been given to the studies in hand. In this investigation I have visited, besides those bands of Indians already named, bands on the following reservations: Red Lake, Mille Lacs, Cass Lake, Leech Lake, Lake Winnibegoshish, and Bowstring Lake,—all in Minnesota, and most of which have been visited several times. Turtle Mountain Reservation, North Dakota, was also visited. All individuals studied were measured as to head breadth and length, face breadth and height, nasal breadth and length, color of eye, skin and hair, texture and quantity of hair, and nature of incisors. Detailed examination of the hair could not be made in the field. It is being prosecuted at the present time.

The accompanying paper embodies the first published results of this study in an effort to determine the blood status of certain persons whose



ancestry is in question in the government suits. Only two of the several measurements made are presented in this paper, namely, that of breadth of face as measured from side to side through the zygomatic arches, and that of breadth of head as measured from side to side through the widest diameter of the parietals. In particular a relationship between these two measurements is presented; it is named the "face-breadth head-breadth index." This index is obtained by multiplying the actual breadth of the face in millimeters by one hundred, and dividing the product by the actual breadth of the head in millimeters.

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## INDIAN-WHITE AMALGAMATION

Among the hereditary physical factors of Indians and whites which are inherited in the mixed-blood offspring of the two peoples are the following: skin color; eye color; hair color and texture; percentage of hairiness of the body, including beard growth; shape of the incisors; length and breadth of nose, and form of the nasal orifices; length, breadth, and height of the head, and also of the face. These are modified independently probably, and some of them probably in relation to one another.

In the present paper attention is called to a factor so constantly modified that it appears to be fully as determinative as any of the above. It is the relation of the breadth of the face to the breadth of the head, which will be called the face-breadth head-breadth index.

### FACE BREADTH

Even casual observers have noticed the broad face of the Indian; no popular description of the Indian is complete without a mention of his "high cheek bones." Studies of physical measurements of the Indians have recorded the broad faces of many tribes of American aborigines, such as the studies of Boas,<sup>1</sup> Starr,<sup>2</sup> Hrdlička,<sup>3</sup> and others. Boas called attention to the relatively broader faces of the pure-blood Indians than of the mixed-bloods, and of the relatively broader faces of the mixed-bloods than of the whites, but the relation of breadth of face to breadth of head was not mentioned. Among 3018 pure-blood Indian men, Boas found the narrowest face was 132 millimeters. Whereas he found among 217 white men faces as narrow as 120 millimeters, and among 594 mixed-bloods the narrowest face was 126 millimeters, or about midway between the measurement of the narrowest Indian and the narrowest white. Again, among his 3018 pure-blood Indians he found faces 169 millimeters broad, but among the 217 white men he found none broader than 163 millimeters; among the 594 mixed-blood men were faces 165 millimeters broad. Boas' frequency curve shows the "typical" pure-blood Indian has a facial breadth of from 150 to 151 millimeters. The typical mixed-blood Indian has a facial breadth of from 148 to 149 millimeters, with a much larger secondary type ranging from 143 to 145 millimeters. His "typical" white man has a facial breadth of 140 to 141 millimeters. Thus the

<sup>1</sup> Franz Boas, "Zur Anthropologie der nord-amerikanischen Indianer," in *Zeitschrift für Ethnologie*, 1895, pp. 366-411.

<sup>2</sup> Frederick Starr, "Physical Characters of Indians of Southern Mexico," in *Decennial Publications of the University of Chicago*, 1st series, 4:51-109 (1903).

<sup>3</sup> Alés Hrdlička, "Physiological and Medical Observations among the Indians of Southern United States and Northern Mexico," as *Bulletin 34, Bureau of American Ethnology*, 1908.

relative breadth of face of the pure-blood Indian, pure-blood white, and Indian-white mixed-blood was clearly noted and demonstrated by Boas in 1895. His complete table of data follows:

TABLE I  
FACE BREADTH OF MEN, FROM BOAS<sup>4</sup>

Millimeters	3018 Indians	594 mixed-bloods	217 whites
	per cent	per cent	per cent
120-121	....	....	0.3
122-123	....	....	0.5
124-125	....	....	0.6
126-127	....	0.2	0.5
128-129	....	....	0.8
130-131	....	0.3	3.2
132-133	0.1	1.5	4.0
134-135	0.3	1.3	4.9
136-137	1.0	3.4	10.3
138-139	1.6	6.7	10.3
140-141	3.4	9.6	15.6
142-143	6.1	12.6	14.1
144-145	8.9	12.8	10.0
146-147	12.8	11.6	10.8
148-149	13.7	14.1	6.3
150-151	15.1	10.6	2.5
152-153	12.0	8.2	1.2
154-155	9.1	2.9	1.4
156-157	7.0	1.7	0.5
158-159	4.6	1.7	0.5
160-161	2.3	0.3	0.6
162-163	1.0	0.2	0.3
164-165	0.6	0.2	....
166-167	0.1	....	....
168-169	0.1	....	....

#### HISTORICAL SKETCH OF AMALGAMATION

During the past year I have examined some more than three hundred Ojibwa Indians, mainly in Minnesota, in a deliberate effort to ascertain whether the different individuals are pure-blood Indians, or mixed-bloods—as, Indian-white, Indian-negro, or Indian-negro-white mixed-bloods. It was soon discovered that the pure-blood Indian type was noticeable chiefly by its absence. Let me suggest the historical foundation for such a condition. Mr. W. W. Warren in his excellent study of his own people (Warren was a mixed-blood Ojibwa) tells us that the Ojibwa Indians first became acquainted with the white man about the

<sup>4</sup> Table xvii, p. 405 of "Zur Anthropologie der nord-amerikanischen Indianer," in *Zeitschrift für Ethnologie*, 1895, pp. 366-411.





*Photo by Jenks*

Izola Warren (Mrs. George Wah-we-ay-cumig) on the left;  
her mother on the right



year 1612.<sup>5</sup> In 1618 Stephen Brulé, one of Champlain's reckless and enterprising voyageurs, brought to Quebec a description of Lake Superior, as well as a specimen of native copper.<sup>6</sup> In 1634, Jean Nicolet became acquainted with the Ojibwa near Sault Ste. Marie. In a letter dated Quebec, September 21, 1654, Father Le Mercier speaks of a flotilla of canoes loaded with furs guided by French traders but manned by Indians from four hundred leagues to the west. From the year 1660, largely due to the explorations and trading successes of the two Frenchmen, Radisson and Groseilliers, the Lake Superior Ojibwa have been exploited for their rich catches of fur. No anthropologist making a first-hand study of the Ojibwa Indians to-day will long doubt that from the date last mentioned, or for the past two hundred and fifty years, the amalgamation of the Indians and whites has been continuous and cumulative in the Lake Superior region. In 1670, the Hudson's Bay Company was organized and for two hundred years dominated the upper Ojibwa area. It early entered the field of the Minnesota Ojibwa with its force of hardy French and Scotch traders. In 1787, the Northwest Company of Montreal was formed. The American Trading Company was started in 1809. The thousands of traders from the above large companies, and many others from smaller and from private trading organizations, were stationed in or roamed over the lands of the Lake Superior Indians. To-day their lineal descendents are traders in or near every Indian village throughout that extensive lake area. It was the rare and exceptional trader who did not have at least one Indian wife.

#### THE WARREN FAMILY

Let us briefly review the amalgamation process as illustrated in the famous Warren family which to-day has descendents well scattered over the reservations of the Lake Superior region, as well as some who are successful professional men in the largest cities of our Northwest. Richard Warren was a "Mayflower" pilgrim from Great Britain in 1620. A descendent, Abraham Warren, born in 1747, was the father of Lyman Warren, born in Hartford, Connecticut, 1771. Lyman Warren's son, Lyman Marquis Warren, born in 1794, came to Lake Superior in 1818. In 1821, Lyman Marquis Warren married Mary Cadotte, who was said at that time to be three-fourths Indian. The Cadotte family is descended from M. Cadeau, who is said to have come to the Ojibwa country in 1671 in the train of the French envoy, Simon-Francis Daumont, Sieur de St. Luson. The son of this original Cadeau (without doubt by an Ojibwa woman) was John Baptiste Cadotte. This John Baptiste Cadotte married

<sup>5</sup> W. W. Warren, *History of the Ojibways, Based upon Tradition and Oral Statements*, as Volume V of *Minnesota Historical Society Collections*, 90.

<sup>6</sup> *Op. cit.*, pp. 399-400.



an Ojibwa woman named A-waus-e-clan. They had two children named John Baptiste, Jr., and Michel. Both of these Cadotte brothers married Ojibwa women,—Michel Cadotte being the father of Mary, who in 1821 became the wife of Lyman Marquis Warren. To this couple six children were born who reached maturity, among them being William Whipple Warren, born in 1825, the author of the study, *History of the Ojibways*, (see footnote, page 3). He was a member of the Minnesota legislature in 1851, and died in 1853 at the early age of 28 years. In 1842 William Whipple Warren married Mary Matilda Aitkin, the daughter of the well-known white Indian trader William A. Aitkin and an Indian wife. Two children who reached maturity and married were born to Mr. and Mrs. William Whipple Warren. They were William Tyler Warren and Mrs. Madaline Uran, both of whom lived on White Earth Reservation. A daughter of William Tyler Warren by Nay-nah-cah-wub-e-quay, a woman of some white blood, was born in 1897. She is Izola, shown on the left in plate A with her mother. This picture was taken at their home at Twin Lakes on the White Earth Reservation, Mahnomen County, Minnesota, July, 1915. Izola is about one-half white. In the early autumn of 1915 she was married to George Wah-we-ay-cumig, the son of Chief Wah-we-ay-cumig of the Elbow Lake band, also on White Earth Reservation. The mother of George Wah-we-ay-cumig shows unquestionable evidence of having white blood. George is probably about one-thirty-second white, so that the children which may be born to Mr. and Mrs. George Wah-we-ay-cumig will be about one-fourth white and three-fourths Ojibwa. Some other branches of the Warren family have bred out practically white. Some such members have left the reservations and after graduating from colleges and universities are successfully competing with other white men in high-grade professional work. Still other branches of the Warren family have bred into the Bonga family,—an extensive old Indian family with negro blood, only two members of the third generation of which are still living. Members of the fourth and fifth (and possibly the sixth) generation are numerous and scattered widely over Lake Superior reservations.

The Warren family was selected to illustrate Ojibwa-white amalgamation only because it was typical, and was historically well known. A score of other families might have been presented, some of which are equally well attested by historical data and many of which, like the Fairbanks and Beaulieu families, are probably more widely scattered.

#### FRENCH AND SCOTCH MIXED-BLOOD FAMILIES

The following lists of French and Scotch mixed-blood families on the White Earth Reservation are taken as typical of many others. They were printed by the United States Government in 1911, when it listed by

name the 3357 Indians enrolled on that reservation. It will be noted that each list is taken from a single initial letter of the alphabet:

TABLE II

## CERTAIN MIXED-BLOOD FAMILIES ON WHITE EARTH RESERVATION

<i>French Patronymic</i>		<i>Scotch Patronymic</i>	
Beauchamp	Bondreau	McArthur	McNiff
Beaudreau	Boucher	McCauley	Mason
Beaulieu	Branchaud	McDonald	Mayhew
Beaupre	Brisbois	McDonnell	Merrell
Bellanger	Brunette	McDougall	Melvin
Bellecourt		McGillis	Miller
Bellefeuille		McIntosh	Monroe
Benoist		McKeig	Moore
Bibeau		McKenzie	Morrison
Bisson		McLean	Mudgett
Bottineau		McMartin	Murray

With scarcely an exception the names listed above represent old and established families having collateral branches. Inter-marriages among the various families have been so extensive that it is believed there is no mixed-blood family of three generations of adults on the White Earth Reservation which is not enmeshed by kinship with ninety per cent of the other mixed-blood families of equal or greater age.

## PHYSICAL CHARACTERISTICS OF PURE-BLOOD INDIANS

In order to ascertain whether the different individuals on White Earth Reservation are pure-blood Indians or Indians of mixed blood it was desirable to establish the pure-blood Indian type, and also the pure-blood white types which have largely been the source of the white blood in the mixed families. The American Indian type is well known to scientific students of primitive people. The patent physical characteristics are as follows:

*Skin.* Dark skin color, ranging from lighter yellowish brown in areas humid or high to darker chocolate brown in drier or lower areas. The brown skin color of the Indians in the United States whom I have seen has also noticeably more of the red and less of the yellow tint than the various brown-skinned Malayan peoples I am familiar with. Dr. Hrdlička says the skin on the back of the hands of aged Indians appears to wrinkle more and the skin on the back of the neck to wrinkle less than that of white persons living under similar conditions; my observations tend to confirm those of Hrdlička.

*Hair.* The head hair is black, straight and coarse in texture, and grows long, lank, and not abundantly. With extreme age (as 70, 80, or 90 years) the hair may turn somewhat gray—usually yellowish gray, but

not pure white. The hair may also thin on the crown, but well-defined areas of baldness do not occur. The body is only scantily covered with hair, except in the pelvic and axilla areas. The beard growth is thin and scraggly, never covering the surface of the skin on which it grows. It is most abundant on the upper lip and chin, but is particularly absent on the sides of the face, and the hairs seldom or never grow more than three inches long, even on the chin.

*Face.* The face is angular and rugged, the upper part usually retreating over a low and broad, rather than a high and narrow, forehead. It is wide between the zygomatic arches, while the lower part (from chin to nasion) is high, and cut across by an unusually long mouth opening. The entire face becomes a net-work of deep wrinkles in old age.

*Eyes.* The iris of the eye is always brown, either dark brown or very dark brown. It is never light brown, and even in the aged is possibly never as light as medium brown in healthy eyes. There is almost a universal disappearance of melanin pigment from the outer rim of the iris of the aged until the brown iris becomes encircled with a band of blue. The sclerotic coat has a slight tendency to exhibit yellow granules—a tendency more than the white man and less than the negro. The Mongolian fold is frequently seen in children, but seldom does it persist in the eyes of adults.

*Teeth.* Certain teeth are concave on the posterior or inner surface. This concavity is most noticeable in the upper central incisors, though it occurs in the lateral upper, and also in a less extreme manner in the lower incisors. In some individuals it is present in the cuspids also.

*Head.* The Indian has no distinguishing or typical head-form. Some tribes have the predominant form called dolichocephalic, others brachycephalic, and others mesocephalic.

*Nose.* In spite of the eagle-beak nose famous in literature as Indian, there is no typically Indian form about Indian noses, except that they are coarse—crudely moulded rather than finely chiseled. All types are found, as concave, concavo-convex, and convex—as Roman and aquiline.

*Hands and feet.* The Indian has the slight, delicate hands and feet of people who do little hard manual labor. Their hands are of the so-called aristocratic type; while their feet are shorter, rather than narrower, than those of the white and negro peoples.

*Other patent physical characteristics.* There is nothing characteristic in the stature of the Indian. The women during their prime carry much more adipose tissue than do American white women; they are large, strong, and well-nourished, and are never gaunt and slender.

## PHYSICAL CHARACTERISTICS OF MIXED-BLOOD INDIANS

All of the above characteristics tend to become modified in the offspring of the Indian and white amalgamating stocks. The skin tends to become lighter colored; this is especially noticeable in areas relatively unaffected by climatic conditions, as under the clothing. The difference in skin color is well shown in the faces in plate A. The body becomes hairier; the beard growth increases in quantity and length—as all three faces in plate E illustrate. The head-hair becomes lighter in color, finer, softer, and more abundant; often it is wavy—as figure 2 in plate E well shows. It becomes gray earlier in life, not infrequently it is white, and the head often exhibits typical baldness—as figures 2 and 3 in plate D suggest. The face tends to smoothness and to uprightness at the expense of the larger lower part. It tends to become narrower—both absolutely and in relation to the breadth of the head. The iris of the eye lightens, frequently exhibiting the light brown shade, the still lighter hazel, and even the gray and the blue. The concavity of the teeth gradually disappears and the increasing tendency to caries is most persistent. The hands and feet get larger, especially broader and coarser. A slender figure is frequently developed, especially in the women. The tendency is for the individual to assume the physical characteristics of either of the two parent stocks in direct ratio with the preponderating inheritable influence of that stock over the other parent stock. In general, therefore, a hybrid individual of three-fourths Indian and one-fourth white blood will bear measurable physical characteristics more like the Indian parent than the white, and a hybrid individual of three-fourths white and one-fourth Indian blood will bear measurable physical characteristics more like the white parent than the Indian.

## FACE-BREADTH HEAD-BREADTH INDEX OF AMERICAN INDIANS IN GENERAL

The earliest measurements of Indian face breadth and head breadth available to me at this time are the skeletal measurements made by Samuel George Morton, published in 1839 in his monumental work, *Crania Americana*.<sup>7</sup> His measurements were made in inches rather than millimeters. I present below, a face-breadth head-breadth index of 95.49 per cent derived from his table of "Mean Results" given on page 259. Morton there summarizes the mean head-breadth measurements of 147 skulls of the "American [Indian] race" and the mean face-breadth measurement of 113 of the same skulls, as follows:

<sup>7</sup> Samuel George Morton, *Crania Americana, or A Comparative View of the Skulls of Various Aboriginal Nations of North and South America*, 296 pp. (Philadelphia and London, 1839.)



TABLE III  
FACE-BREADTH HEAD-BREADTH INDEX OF "AMERICAN [INDIAN] RACE"  
DERIVED FROM MORTON

Number of skulls	Head breadth		Face breadth		Differential	Face-breadth head-breadth index
	inches	millimeters	inches	millimeters	millimeters	per cent
147 113	5.55 .....	140.97 .....	..... 5.3	..... 134.62	} 6.35	95.49

Dr. Morton also presented the head-breadth measurements of fourteen skulls of Great Lakes Algonquin (including Ojibwa and their near tribal kin) and the face-breadth measurements of twelve of the same skulls, from which I derive the average face-breadth head-breadth index of 96.06 per cent, as follows:

TABLE IV  
FACE-BREADTH HEAD-BREADTH INDEX OF GREAT LAKES ALGONQUIN SKULLS  
DERIVED FROM MORTON

Tribe	Head breadth		Face breadth		Differential	Face-breadth head-breadth index
	inches	millimeters	inches	millimeters	millimeters	per cent
Sauk.....	5.9	149.86	5.6	142.24	7.62	94.91
Fox.....	5.9	149.86	5.8	147.30	2.54	98.29
Fox.....	5.9	149.86	5.4	137.16	12.49	91.52
Potawatomi.....	5.7	144.78	5.2	132.08	12.49	91.21
Ojibwa.....	5.8	147.30	5.5	139.70	7.62	94.84
Ojibwa.....	5.5	139.70	5.5	139.70	0.00	100.00
Menomini.....	5.6	142.24	5.4	137.16	5.08	96.43
Menomini.....	5.4	137.16	5.4	137.16	0.00	100.00
Menomini.....	5.7	144.78	5.6	142.24	2.54	98.24
Menomini.....	5.6	142.24	5.2	132.08	10.16	92.85
Menomini.....	5.8	147.30	5.8	147.30	0.00	100.00
Menomini.....	5.7	144.78	...	.....	.....	.....
Menomini.....	5.6	142.24	...	.....	.....	.....
Menomini.....	5.4	137.16	5.1	129.54	7.62	94.44

Average face-breadth head-breadth index, 96.06.

In 1903 Professor Frederick Starr published his physical measurements of one hundred Mexican Indian men and twenty-five women from each of twenty-three tribes.<sup>8</sup> I have produced a table giving a differential

<sup>8</sup> Frederick Starr, "Physical Characters of Indians of Southern Mexico," in *Decennial Publications of the University of Chicago*, 1st series 4:51-109 (1903).

and a face-breadth head-breadth index based upon his mean measurements of face breadth and head breadth for each of the twenty-three tribes, as follows:

TABLE V

FACE-BREADTH HEAD-BREADTH INDEX OF INDIAN TRIBES OF SOUTHERN MEXICO  
DERIVED FROM STARR

Tribe	2300 MEN				575 WOMEN			
	Mean head breadth	Mean face breadth	Differential	Face-breadth head-breadth index	Mean head breadth	Mean face breadth	Differential	Face-breadth, head-breadth index
	mm.	mm.	mm.	per cent	mm.	mm.	mm.	per cent
1. Otomis.....	147.2	140.7	6.5	95.5	144.6	135.1	9.5	93.4
2. Tarascans.....	146.5	139.1	7.4	94.9	142.2	133.7	8.5	94.0
3. Tlaxcalans.....	149.1	140.1	9.0	93.2	143.5	130.5	13.0	90.9
4. Aztecs.....	146.5	138.1	8.4	94.2	142.8	131.9	10.9	92.3
5. Mixtecs.....	149.4	142.5	6.9	95.3	143.9	135.7	8.2	94.2
6. Triquis.....	147.5	140.6	6.9	95.3	142.0	132.5	9.5	93.3
7. Zapotecs.....	148.7	141.0	7.7	94.8	144.3	134.8	9.5	93.4
8. Mixes.....	150.7	143.5	7.2	95.1	142.9	133.3	9.6	93.2
9. Zapotecs..... (Tehuantepecanos)	150.2	142.4	7.8	94.8	145.6	136.0	9.6	93.4
10. Juaves.....	153.1	145.0	8.1	94.7	148.2	137.4	10.8	92.7
11. Chontals.....	149.9	141.7	8.2	94.5	144.5	137.5	7.0	95.1
12. Cuicatecs.....	147.6	139.1	8.5	94.2	141.0	131.0	10.0	92.9
13. Chinantecs.....	151.9	145.0	6.9	95.4	146.0	135.9	10.1	93.0
14. Chocos.....	151.0	144.0	7.0	95.3	147.0	136.0	11.0	92.5
15. Mazatecs.....	150.9	142.1	8.8	94.1	147.0	136.0	11.0	92.5
16. Tepehuas.....	151.2	142.1	9.1	93.9	148.0	138.2	9.8	93.3
17. Totonacs.....	153.8	145.3	8.5	94.4	149.8	138.1	11.7	92.1
18. Huastecs.....	150.1	141.9	8.2	94.4	145.8	134.2	11.6	92.0
19. Mayas.....	154.1	144.2	9.9	93.5	148.7	136.9	11.8	92.0
20. Zoques.....	146.2	139.5	6.7	95.4	143.1	138.0	5.1	96.5
21. Tzotzils.....	144.6	140.9	3.7	97.4	138.8	132.7	6.1	95.6
22. Tzendals.....	144.1	140.8	3.3	97.7	137.0	131.1	5.9	95.6
23. Chols.....	147.5	141.2	6.3	95.7	141.6	130.2	11.4	91.9

Average face-breadth head-breadth index of the 2300 men, 94.9.

Average face-breadth head-breadth index of the 575 women, 93.3.

In 1908 Dr. Alés Hrdlička published face-breadth and head-breadth measurements of Apache and Pima men and women. It is from his data of said tribes that the following table is prepared, showing differential and face-breadth head-breadth index:<sup>9</sup>

<sup>9</sup> Alés Hrdlička, "Physiological and Medical Observations among the Indians of Southwestern United States and Northern Mexico." *Bulletin 34, Bureau of American Ethnology*, 1908.

TABLE VI  
FACE-BREADTH HEAD-BREADTH INDEX OF APACHE AND PIMA INDIANS  
DERIVED FROM HRDLIČKA

Tribe	Number	Head breadth	Face breadth	Differential	Face-breadth head-breadth index
		millimeters	millimeters	millimeters	per cent
Apache men.....	148	158	...	} 9	94.30
	174	...	149		
Apache women.....	41	155	...	} 14	90.96
	51	...	141		
Pima men.....	51	147	...	} 2	98.63
	53	...	145		
Pima women.....	30	144	138	6	95.83

The lowest face-breadth head-breadth index shown in any of the averages for men in the above four tables is 93.20 for one of the tribes of Mexico. It is impossible to know the per cent of Indian blood possessed by the individuals whose measurements are recorded in said tables. Since the Mexican people are an hybrid group of Indian-whites produced during the slightly less than four hundred years since Cortez's conquest, and since the white man has penetrated everywhere in Mexico, it is undoubtedly true that the tribes of Indians measured by Starr in southern Mexico have more or less white blood. The Pima are probably the purest Indians whose measurements we have. The United States Census for 1910 states that the tribe has 0.4 per cent of mixed-blood, or 19 individuals out of a total of 4236. From Dr. Hrdlička's measurements I derive the average face-breadth head-breadth index of 98.63 per cent for 51 Pima men, and of 95.83 per cent for 30 Pima women.

#### FACE-BREADTH HEAD-BREADTH INDEX OF LAKE SUPERIOR OJIBWA

The following tables are of measurements of adult individuals from my own data.

The head-breadth face-breadth differential (i.e. actual difference between head breadth and face breadth), and the face-breadth head-breadth index (i.e. the percentage which the face breadth is of the head breadth) are shown for each person considered in this study. The differential is relatively unimportant; it is of greatest value in the field because it can be computed at a glance, and one thereby obtains a suggestion of the face-breadth head-breadth index. The measurements of head breadth and face breadth were observed and recorded in half millimeters. The



*Photo by Jenks*

Figure 1

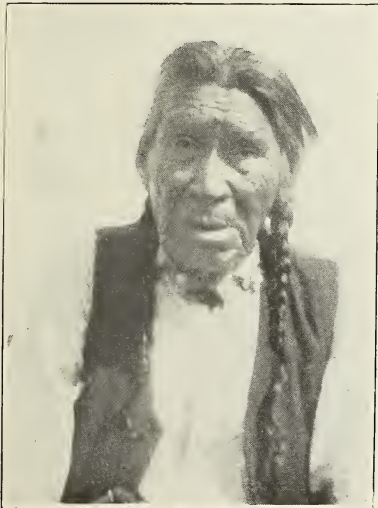


*Photo by Jenks*

Figure 2

Pure-blood Indian woman (blind)

Head breadth	- - - - -	153.5 mm.
Face breadth	- - - - -	144.5 mm.
Face-breadth head-breadth index	- - - - -	94.13 per cent



*Photo by Jenks*

Figure 3



*Photo by Jenks*

Figure 4

Pure-blood Indian man

Head breadth	- - - - -	156.0 mm.
Face breadth	- - - - -	154.0 mm.
Face-breadth head-breadth index	- - - - -	98.71 per cent





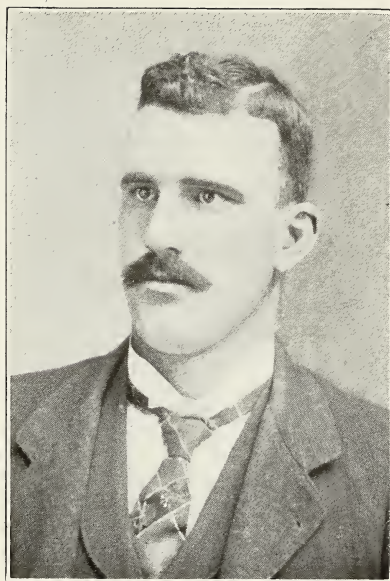


Figure 1

Pure-blood French man

Head breadth	- - - - -	149.5 mm.
Face breadth	- - - - -	137.0 mm.
Face-breadth head-breadth index	-	91.63 per cent

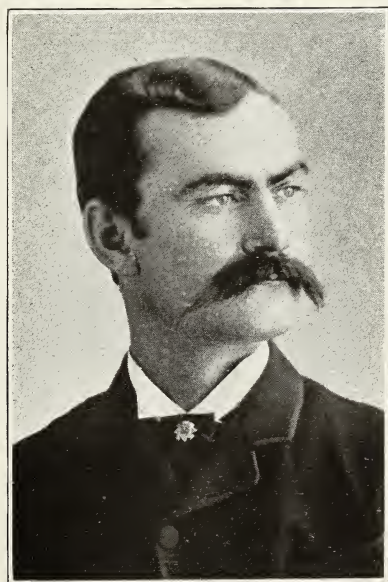


Figure 2

Pure-blood Scotch man

Head breadth	- - - - -	158.0 mm.
Face breadth	- - - - -	147.5 mm.
Face-breadth head-breadth index	-	93.35 per cent



average and the mean variation of each of the above named measurements (except the mean variation of the differential) are also given for each group of persons as shown in each table. The distributions of head breadth, face breadth, and face-breadth head-breadth index are also shown graphically on plate F, figures 1, 2, and 3, respectively.

TABLE VII

## 24 PURE-BLOOD INDIAN MEN

Showing measurements of pure-blood Indians, and who are not identified as kin of known mixed-bloods

Head breadth	Face breadth	Differential	Face-breadth head-breadth index
millimeters	millimeters	millimeters	per cent
159.5	156.0	3.5	97.80
152.0	151.5	.5	99.67
160.5	152.0	8.5	94.70
159.0	152.5	8.5	95.28
160.0	156.5	3.5	97.81
156.0	154.0	2.0	98.71
152.5	148.0	4.5	97.08
158.0	149.0	9.0	94.30
148.5	151.5	+3.0	102.02
155.5	150.5	5.0	96.78
157.5	149.0	8.5	94.60
152.5	146.5	6.0	96.09
156.0	154.0	2.0	98.71
161.0	151.5	9.5	94.09
161.0	157.5	3.5	97.82
161.5	158.5	3.0	98.13
159.5	158.0	1.5	99.05
154.5	148.5	6.0	96.11
156.0	156.5	+ .5	100.30
156.5	152.0	4.5	97.12
158.0	152.0	6.0	96.20
146.5	144.0	2.5	98.29
154.5	149.0	5.5	96.37
159.0	151.5	7.5	95.28
Av. . . . 156.5	152.0	4.4	97.19 .
M. Var. . 3.06	2.87		1.61

Av.=Average; M. Var.=Mean variation.

Table VII, immediately preceding, contains certain measurements of twenty-four adult males from Lake Superior reservations who in my judgment, from all the measurements obtained, appear to be typical pure-blood Indians. Although the table (like all the others in this article) shows only the measurements of head breadth and face breadth—from which the face-breadth head-breadth differential and face-breadth head-breadth index are derived—yet all individuals studied were measured,



as was stated in the Preface, for head breadth and length, facial breadth and height, nasal breadth and length, color of eye, skin and hair, texture and quantity of hair, and nature of incisors. None of the twenty-four individuals show any evidence of being mixed-bloods except that among the men in table VII and the nineteen women, table VIII, six show by the Bradley Color Top, a skin color test of less than 50 per cent pigment (or more than 50 per cent white). The six are two brothers and a sister who test 50.5, 53.0, and 51.0 per cent white, respectively; two others are sisters who test 51.0, and 54.0 per cent white; and another is a woman who tests 52.5 per cent white. It seems probable that some family tendency toward relatively lighter skin exists among the individuals just mentioned. This tendency to lighter skin may be due to a slight infusion of white blood, or to some purely Indian ancestors whose skins were lighter than the type, perhaps.

TABLE VIII  
19 PURE-BLOOD INDIAN WOMEN

Showing measurements of pure-blood Indians, and who are not identified as kin of known mixed bloods

Head breadth	Face breadth	Differential	Face-breadth head-breadth index
millimeters	millimeters	millimeters	per cent
148.0	139.5	8.5	94.25
145.0	139.5	5.5	96.20
147.5	142.0	5.5	96.94
149.0	141.0	8.0	94.65
153.5	144.5	9.0	94.13
151.5	143.5	8.0	94.71
151.5	147.5	4.0	97.35
147.0	142.0	5.0	96.79
153.0	152.0	1.0	99.34
149.0	145.0	4.0	97.31
147.5	145.0	2.5	98.30
156.0	148.5	7.5	95.19
140.0	134.5	5.5	96.07
153.5	148.5	5.0	96.74
154.0	145.5	8.5	94.48
150.5	145.0	5.5	96.35
143.5	137.0	6.5	95.47
158.5	151.5	7.0	95.58
152.5	145.0	7.5	95.08
Av. . . . 150.0	144.0	6.0	96.05
M. Var. . . 3.58	3.47		1.20

Av.=Average; M. Var.=Mean variation.

FACE-BREADTH HEAD-BREADTH INDEX OF  
MINNESOTA FRENCH MEN

Table IX presents the measurements of one hundred French men, most of whom were born in Canada but now reside within thirty miles north of Minneapolis. Some of these are the first generation of Minnesota-born French. Seven were measured on or near Lake Superior reservations, and six were measured in Minneapolis. It is probable that a few have a slight infusion of Indian blood, since the French who have come from Canada to Minnesota are practically all from the area where the Pembina Half-breed Nation (French-Indian breeds) flourished during the palmy days of Red River trading posts. The table contains the first one hundred French men measured for this study.

TABLE IX  
100 FRENCH MEN

Head breadth	Face breadth	Differential	Face-breadth head-breadth index
millimeters	millimeters	millimeters	per cent
160.0	143.5	16.5	89.68
151.5	142.0	8.5	93.72
144.5	137.0	7.5	94.80
149.5	140.5	9.0	93.31
146.5	135.0	11.5	92.15
153.5	135.0	13.5	87.94
152.5	138.0	14.5	90.49
158.0	147.0	11.0	93.03
162.5	147.5	15.0	92.76
158.5	136.0	22.5	85.80
168.5	150.0	8.5	89.02
155.5	149.5	6.0	96.14
160.0	147.5	12.5	92.18
155.0	139.5	15.5	90.00
149.5	141.5	8.0	94.64
149.0	136.5	12.5	91.61
149.5	135.0	14.5	90.30
155.5	144.5	11.0	92.92
154.0	138.5	15.5	89.93
147.0	138.0	9.0	93.87
150.5	137.0	12.5	91.03
147.0	150.0	+3.0	102.04
152.5	141.5	11.0	92.78
154.0	135.5	18.5	87.98
148.5	137.0	11.5	92.25
158.0	142.5	15.5	90.19
155.0	139.5	15.5	90.00
152.5	135.5	17.0	88.85
153.0	134.0	19.0	87.58
151.5	139.5	13.0	92.07
150.0	137.0	13.0	91.33
150.0	133.0	17.0	88.60
158.5	139.5	19.0	88.01
158.0	148.5	9.5	93.98

TABLE IX—*Continued*  
100 FRENCH MEN

Head breadth	Face breadth	Differential	Face-breadth head-breadth index
millimeters	millimeters	millimeters	per cent
156.0	141.5	14.5	90.70
154.0	137.5	16.5	89.28
164.0	149.5	14.5	91.15
154.5	138.5	16.0	89.64
157.5	147.5	10.0	93.65
160.0	143.5	16.5	89.68
161.5	140.0	21.5	86.68
145.0	140.5	4.5	96.89
158.5	140.5	18.5	88.64
152.5	138.0	14.5	90.49
158.0	137.0	21.0	86.70
151.5	142.0	9.5	93.72
155.5	145.0	10.5	93.24
151.5	134.0	17.5	88.44
160.0	151.0	9.0	94.37
148.0	142.0	6.0	95.94
150.0	139.5	10.5	93.00
150.0	136.5	18.5	91.00
157.0	149.5	17.5	95.22
145.0	136.0	9.0	93.79
150.5	141.0	8.5	93.68
162.0	150.5	11.5	92.90
156.5	145.0	11.5	92.65
159.0	141.5	17.5	88.99
149.0	136.5	12.5	91.61
149.5	137.0	12.5	91.63
161.5	136.0	25.5	84.21
151.5	135.0	16.5	91.18
143.0	131.5	11.5	87.12
148.0	131.0	19.0	88.51
141.5	129.0	12.5	91.09
163.5	140.0	23.5	85.62
156.5	139.5	17.0	89.13
161.0	135.0	26.0	83.85
147.5	129.5	18.0	87.75
149.5	132.0	17.5	88.29
157.5	142.0	15.5	90.16
151.0	140.5	10.5	93.04
153.5	135.5	18.0	88.27
149.0	130.5	18.5	87.58
145.5	125.5	20.0	86.25
150.0	132.5	17.5	88.33
155.0	137.5	17.5	88.70
154.0	133.5	20.5	86.62
157.0	144.5	13.5	92.04
150.5	138.5	12.0	92.02
152.5	138.0	14.5	91.14
150.0	137.0	13.0	91.33
165.0	143.0	22.0	86.66
161.0	140.0	21.0	86.95
151.0	143.0	8.0	94.70
147.0	138.5	8.5	94.21
146.0	138.5	7.5	94.86
150.5	145.0	5.5	96.34

TABLE IX—Continued  
100 FRENCH MEN

Head breadth	Face breadth	Differential	Face-breadth head-breadth index
millimeters	millimeters	millimeters	per cent
156.0	141.5	14.5	90.76
152.0	137.5	14.5	90.46
150.0	142.0	8.0	94.66
160.0	143.0	17.0	89.37
157.5	144.5	13.0	91.74
140.5	129.0	11.5	91.91
145.5	134.0	11.5	92.09
163.0	142.0	21.0	90.93
147.0	128.5	19.5	87.41
150.5	139.5	19.0	92.69
162.5	135.5	27.0	83.38
153.0	133.5	19.5	87.25
Av. . . . 153.4	139.2	14.4	90.85
M. Var. 5.62	4.22		2.41

Av.=Average; M. Var.=Mean variation.

FACE-BREADTH HEAD-BREADTH INDEX OF  
MINNESOTA SCOTCH MEN

In table x the measurements of fifty Scotch men are recorded. Three-fourths of those men were born in Scotland. They were measured in Minneapolis as members of fraternal clan organizations.

TABLE X  
50 SCOTCH MEN

Head breadth	Face breadth	Differential	Face-breadth head-breadth index
millimeters	millimeters	millimeters	per cent
149.5	135.0	14.5	90.30
152.5	139.0	13.5	91.14
156.0	141.5	14.5	90.70
153.5	131.5	22.0	85.66
148.5	139.0	9.5	93.60
152.5	136.0	16.5	89.18
152.0	138.0	14.0	90.78
146.5	131.0	15.5	89.42
147.0	138.5	8.5	94.21
150.0	136.0	14.0	90.66
149.0	139.5	9.5	93.62
146.0	134.5	11.5	92.12
146.5	134.5	12.0	91.80
156.5	142.5	14.0	91.05
146.0	141.5	4.5	96.91
151.0	142.5	8.5	94.37



TABLE X—*Continued*  
50 SCOTCH MEN

Head breadth	Face breadth	Differential	Face-breadth head-breadth index
millimeters	millimeters	millimeters	per cent
150.5	135.5	15.0	90.03
149.5	131.5	18.0	87.96
150.0	136.0	14.0	90.66
148.5	129.0	19.5	86.86
156.5	135.5	21.0	86.58
156.5	139.5	17.0	89.13
144.5	121.5	23.0	84.08
152.0	140.5	11.5	92.43
147.5	132.5	15.5	89.83
148.5	135.0	13.5	90.90
141.5	128.5	13.0	90.81
151.5	138.5	13.0	91.41
152.5	135.0	17.5	88.52
143.5	133.0	10.5	92.68
150.5	137.5	13.0	91.36
149.5	141.5	8.0	94.65
143.0	132.5	10.5	92.66
162.5	146.5	16.0	90.15
154.0	135.5	18.5	87.33
147.5	134.0	13.5	90.84
158.0	136.0	22.0	86.07
160.0	145.0	15.0	90.62
160.0	134.5	15.5	84.06
148.5	129.5	19.0	87.20
154.5	151.0	3.5	97.73
148.0	131.5	16.5	88.17
154.5	142.5	12.0	92.23
147.0	125.5	21.5	85.37
160.5	145.0	15.5	90.34
145.5	130.0	15.5	89.34
154.5	142.0	12.5	91.90
160.0	138.5	21.5	86.56
155.0	143.5	11.5	92.58
162.5	147.5	15.0	90.76
Av . . . . 151.4	136.8	14.6	90.34
M. Var.. 4.20	4.55		2.20

Av.==Average; M. Var.==Mean variation.

The different tales told by the face-breadth head-breadth index of the so-called pure-blood Ojibwa man and that of the French man and the Scotch man are so striking that it seems it may be possible to use this index as a valuable contributing factor in the solution of the problem of who is a pure-blood Indian and who is a mixed-blood Indian. As the fore-going tables show, the so-called pure-blood Indian has a face-breadth head-breadth index of 94.00 per cent or above, while the typical French man and Scotch man (the two peoples which have contributed most to the Ojibwa amalgamation) average below 91.00 per cent.

## FACE-BREADTH HEAD-BREADTH INDEX OF LAKE SUPERIOR MIXED-BLOOD INDIANS

Tables XI, XII, XIII, XIV contain measurements of known mixed-bloods, whose entire measurements proclaim their white blood. Several of those in tables XI and XII show nowhere any measureable evidence of their Indian blood. Their measurements are introduced here, however, solely to show their meaning as to face-breadth head-breadth index. With the exception of the average for the 4 three-fourths white women (table XII) the breadth index, not alone in averages but in individual cases, slips in between that of the so-called pure-blood Indian, and the French and Scotch. The individuals whose measurements are recorded in the four following tables are, with few exceptions I believe, amalgamated French-Indian, Scotch-Indian, and French-Scotch-Indian.

TABLE XI  
8 MIXED-BLOOD INDIAN MEN  
Known to be three-fourths, or slightly over, white

Head breadth	Face breadth	Differential	Face-breadth head-breadth index
millimeters	millimeters	millimeters	per cent
150.0	142.0	8.0	94.66
155.0	137.5	17.5	88.70
150.0	140.5	9.5	93.66
159.5	144.5	15.5	90.59
153.5	138.5	15.0	90.22
157.5	148.5	9.0	94.28
154.5	144.5	10.0	93.52
159.0	145.5	13.5	91.50
Av. . . . 154.9	142.7	12.2	92.14
M. Var. . 2.87	3.06		1.88

Av.=Average; M. Var.=Mean variation.

TABLE XII  
4 MIXED-BLOOD INDIAN WOMEN  
Known to be three-fourths, or slightly over, white

Head breadth	Face breadth	Differential	Face-breadth head-breadth index
millimeters	millimeters	millimeters	per cent
152.0	134.0	18.0	88.15
151.5	130.0	21.5	85.80
152.0	131.0	21.0	86.18
145.0	134.0	11.0	92.42
Av. . . . 150.1	132.2	17.8	88.16
M. Var. . 2.57	1.75		2.15

Av.=Average; M. Var.=Mean variation.

TABLE XIII  
12 MIXED-BLOOD INDIAN MEN  
Known to be one-half, or slightly over, white

Head breadth	Face breadth	Differential	Face-breadth head-breadth index
millimeters	millimeters	millimeters	per cent
156.0	146.0	10.0	93.58
156.0	142.5	13.5	91.34
156.5	149.0	7.5	95.20
154.5	143.0	12.5	92.55
162.0	149.0	13.0	91.97
156.5	150.5	6.0	95.52
158.0	148.0	10.0	93.67
162.0	146.5	15.5	90.43
158.0	144.0	14.0	91.13
152.5	143.5	9.0	94.09
149.0	135.5	13.5	90.93
159.0	143.0	16.0	89.93
Av.... 156.7	145.0	11.6	92.52
M. Var.. 2.61	3.12		1.57

Av.=Average; M. Var.=Mean variation.

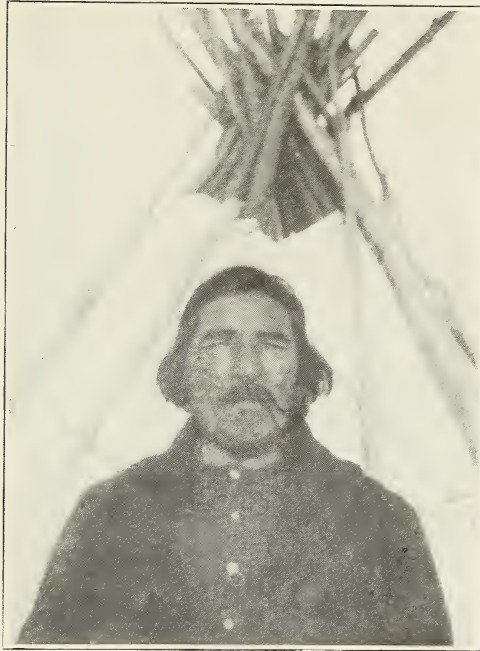
TABLE XIV  
8 MIXED-BLOOD INDIAN WOMEN  
Known to be one-half, or slightly over, white

Head breadth	Face breadth	Differential	Face-breadth head-breadth index
millimeters	millimeters	millimeters	per cent
154.5	135.5	19.0	87.72
148.0	132.0	16.0	89.19
157.0	141.0	16.0	89.87
150.0	134.0	16.0	89.33
153.0	138.0	15.0	90.19
152.5	141.0	11.5	92.45
149.5	143.5	6.0	95.98
147.0	140.0	7.0	95.23
Av.... 151.4	138.1	13.3	91.24
M. Var.. 2.81	3.25		2.48

Av.=Average; M. Var.=Mean variation.

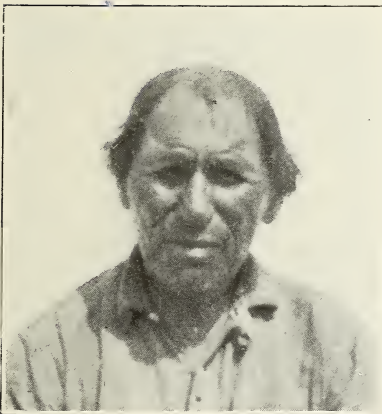
Tables xv and xvi contain, respectively, measurements of sixty men and seventy-four women who exhibit unquestioned factors of mixed ancestry besides the face-breadth head-breadth differential and index.

The individuals are believed to range completely over the field from slightly less than half white to the practical vanishing point of the influence



*Photo by Jenks*

Figure 1  
Typical French-breed  
About one thirty-second white



*Photo by Jenks*

Figure 2



*Photo by Jenks*

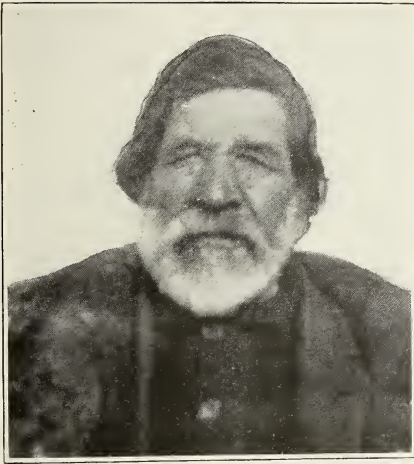
Figure 3

Typical mixed-blood  
Probably about one-sixteenth white

Head breadth	- - - - -	159.0 mm.
Face breadth	- - - - -	152.5 mm.
Face-breadth head-breadth index	-	95.91 per cent





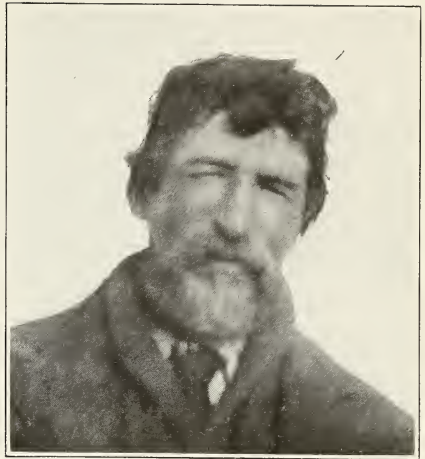


*Photo by Jenks*

Figure 1

Typical "half-breed" man, a "Pembina half-breed"

Head breadth - - - - - 152.5 mm.  
 Face breadth - - - - - 143.5 mm.  
 Face-breadth head-breadth index - 94.09 per cent

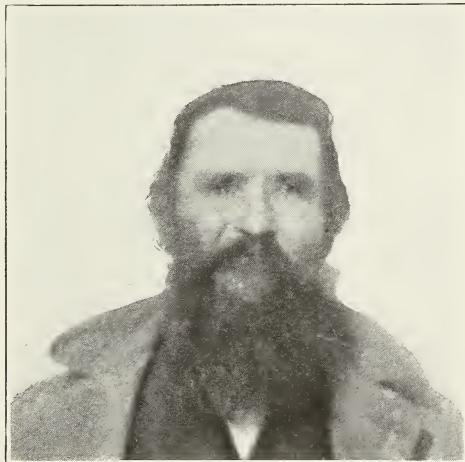


*Photo by Jenks*

Figure 2

Typical "half-breed" man, a "Pembina half-breed"

Head breadth - - - - - 149.0 mm.  
 Face breadth - - - - - 135.5 mm.  
 Face-breadth head-breadth index 90.93 per cent



*Photo by Jenks*

Figure 3

Typical "half-breed" man, at least three-fourths white

Head breadth - - - - - 154.5 mm.  
 Face breadth - - - - - 144.5 mm.  
 Face-breadth head-breadth index - 93.52 per cent



of white blood. There is a wide range of differential and index. For the men the differential ranges from +2.5 (where the face is 2.5 millimeters wider than the head) to 17.5 (where the face is 17.5 millimeters narrower than the head). The range in index is therefore great, or from 101.62 (which is ultra-Indian) to 88.44 per cent (which is sub-typical for French and Scotch men). There is also a wide range among the women, as from a differential of 2.5 to 22.5; the index range is from 98.34 per cent to 85.14 per cent. Among the women, whether Indian, white,<sup>10</sup> or mixed-blood, there is a lower face-breadth head-breadth index than among the men of the same group.

TABLE XV

## 60 MIXED-BLOOD INDIAN MEN

Known as such by unquestioned factors besides differential and face-breadth head-breadth index; they are less than half white

Head breadth	Face breadth	Differential	Face-breadth head-breadth index
millimeters	millimeters	millimeters	per cent
159.0	156.0	3.0	98.11
156.0	154.5	1.5	99.03
161.5	155.5	6.0	96.28
153.5	156.0	+2.5	101.62
161.5	159.5	2.0	98.76
156.0	142.5	13.5	91.34
154.5	148.5	6.0	96.11
161.5	158.5	3.0	98.14
159.0	152.5	6.5	95.91
156.5	151.5	5.5	96.48
145.0	145.0	0.0	100.00
156.0	146.0	10.0	93.58
162.5	156.5	6.0	96.30
158.5	153.0	5.5	96.53
156.0	152.5	3.5	97.75
151.0	143.5	7.5	95.03
148.0	135.0	13.0	91.21
167.5	155.5	12.0	92.83
162.0	156.0	6.0	96.29
157.5	143.5	14.5	90.97
158.0	145.0	13.0	91.77
156.5	149.0	7.5	95.20
153.5	150.0	3.5	97.78
166.0	152.0	14.0	91.56
165.0	156.0	9.0	94.54
156.0	149.5	6.5	95.84
156.0	145.0	11.0	92.94
156.0	146.0	10.0	93.58
162.0	150.0	12.0	92.59
157.0	144.0	13.0	92.16
159.0	145.5	14.5	91.50

<sup>10</sup> Measurements of white women (French and Scotch) have been made, but are not included in this preliminary paper.

TABLE XV—*Continued*  
60 MIXED-BLOOD INDIAN MEN

Head breadth	Face breadth	Differential	Face-breadth head-breadth index
millimeters	millimeters	millimeters	per cent
160.0	155.0	5.0	96.87
156.5	140.0	16.5	89.45
148.5	136.0	12.5	91.58
152.5	142.0	10.5	92.78
156.5	151.0	5.5	96.48
154.5	149.5	5.0	96.76
161.0	151.0	10.0	93.84
160.0	148.0	12.0	92.50
155.5	142.0	13.5	91.31
160.0	152.5	7.5	95.31
161.0	155.5	5.5	96.58
157.0	144.5	12.5	92.03
167.5	161.5	6.0	96.42
158.5	154.0	4.5	97.16
158.5	150.0	8.5	94.00
156.5	150.5	6.0	96.16
147.0	141.0	6.0	95.91
166.0	149.0	17.0	89.75
153.5	148.5	5.0	96.74
147.0	137.5	9.5	93.53
156.0	149.0	7.0	95.51
159.5	145.0	14.5	90.90
149.5	148.5	1.0	99.33
153.5	143.5	10.0	93.48
151.5	134.0	17.5	88.44
152.5	143.5	9.0	94.09
154.5	138.5	16.0	89.64
152.5	151.5	1.0	99.34
151.5	141.0	10.5	93.06
Av. . . . . 156.8	148.4	8.3	94.68
M. Var. . 3.72	5.12		2.50

Av.==Average; M. Var.,=Mean variation.



TABLE XVI

## 74 MIXED-BLOOD INDIAN WOMEN

Known as such by unquestioned factors besides differential and face-breadth head-breadth index; they are less than half white

Head breadth	Face breadth	Differential	Face-breadth head-breadth index
millimeters	millimeters	millimeters	per cent
162.0	157.0	5.0	96.91
163.0	147.0	16.0	90.18
156.5	147.0	9.5	94.56
150.0	138.0	12.0	92.00
162.5	144.0	18.5	88.61
154.5	135.5	19.0	87.77
154.0	146.0	8.0	94.80
150.0	137.5	12.5	91.66
147.0	139.0	8.0	94.55
154.5	148.0	6.5	95.85
149.0	133.0	16.0	89.26
153.0	144.5	8.5	94.44
151.0	148.0	3.0	98.01
155.0	145.0	10.0	93.54
150.0	138.0	12.0	92.00
157.0	141.0	16.0	89.80
158.0	142.0	16.0	89.87
159.0	144.0	15.0	90.56
158.5	153.0	5.5	95.30
149.0	142.0	7.0	96.48
151.5	145.0	6.5	95.70
157.5	143.5	13.5	91.40
168.5	151.0	17.5	89.61
156.0	145.0	11.0	92.94
153.5	139.0	14.5	90.74
151.5	140.0	11.5	92.49
147.5	140.0	7.5	94.23
168.0	153.0	15.0	91.07
157.0	143.5	13.5	91.40
156.0	137.0	19.0	87.82
150.0	140.0	10.0	93.33
151.5	129.0	22.5	85.14
168.0	152.5	16.5	90.77
149.0	138.0	11.0	92.61
159.0	151.0	8.0	94.71
162.0	149.0	13.0	91.97
150.0	144.0	6.0	96.00
149.5	143.0	6.5	95.65
151.5	149.0	2.5	98.34
152.0	140.0	12.0	92.10
150.5	141.5	9.0	94.01
150.0	140.0	10.0	94.44
147.5	137.5	10.0	93.21
149.0	140.0	9.0	93.95
146.0	140.0	6.0	95.88
150.0	141.0	9.0	94.00
152.5	133.5	21.0	87.47
154.0	141.5	13.5	91.23
160.0	146.5	15.5	91.56
152.0	142.5	9.5	93.75
149.5	137.5	12.0	91.97

TABLE XVI—*Continued*  
74 MIXED-BLOOD INDIAN WOMEN

Head breadth	Face breadth	Differential	Face-breadth head-breadth index
millimeters	millimeters	millimeters	per cent
159.5	143.0	16.5	89.65
157.0	142.5	14.5	90.76
157.5	145.5	12.0	92.38
147.5	137.5	10.0	93.22
141.5	138.5	3.0	97.87
151.0	139.5	11.5	92.38
147.5	137.5	10.0	93.22
149.0	145.0	4.0	97.31
152.0	144.5	7.5	98.36
146.5	133.5	13.0	91.12
144.5	135.5	9.0	93.77
149.0	136.0	13.0	91.27
154.0	141.0	13.0	91.55
154.5	142.5	12.0	92.23
148.0	137.0	11.0	92.56
144.0	138.0	6.0	95.83
148.0	134.0	14.0	90.55
147.5	132.0	15.5	89.49
153.0	142.0	11.0	92.81
152.0	139.0	13.0	91.44
158.5	142.0	16.5	89.58
157.0	142.0	15.0	90.44
161.5	143.0	18.5	86.68
Av. . . . . 153.3	141.8	11.4	92.57
M. Var. . . 4.52	4.06		2.18

Av.=Average; M. Var.=Mean variation.

## CONCLUSION

A summary of the average face-breadth head-breadth indexes for men and women in the different blood-status and ethnic groups may assist to make more clear the meaning of the typical index for each group as shown by the measurements recorded in the various preceding tables.

TABLE XVII  
RECAPITULATION OF TYPICAL FACE-BREADTH HEAD-BREADTH INDEXES OF VARIOUS GROUPS

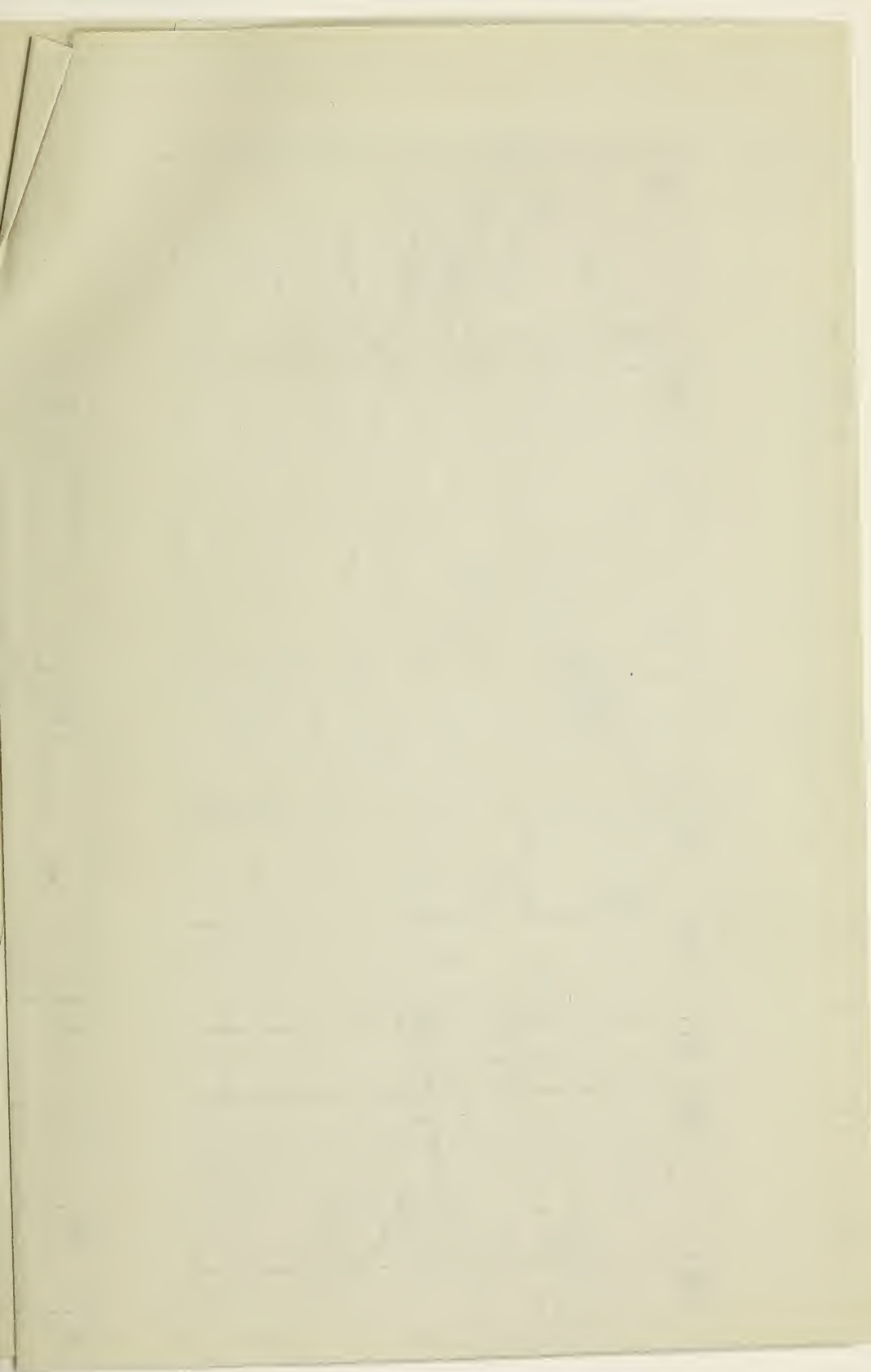
Table	Group	Men	Women	Sex not designated
III	Indian, general, derived from Morton	.....	.....	95.49
IV	Algonquin, derived from Morton....	.....	.....	96.06
V	Indians of Southern Mexico, derived from Starr.....	94.90	93.30	.....
VI	Apache, derived from Hrdlička....	94.30	90.96	.....
VI	Pima, derived from Hrdlička.....	98.63	95.83	.....
VII, VIII	Ojibwa, pure-bloods.....	97.19	96.05	.....
XV, XVI	Mixed-bloods, less than half white..	94.68	92.57	.....
XIII, XIV	Mixed-bloods, known to be half, or slightly over, white.....	92.52	91.24	.....
XI, XII	Mixed-bloods, known to be three-quarters, or slightly over, white...	92.14	88.16	.....
IX	French.....	90.85	.....	.....
X	Scotch.....	90.34	.....	.....

The following plate, F (figures 1, 2, 3,) presents graphically the head breadth, face breadth, and face-breadth head-breadth index for each of the three hundred and fifty-nine adults considered in this study. The groups of people are arranged uniformly in each of the three graphs, but not according to the order of the preceding measurement tables. The groups appear in the order of decreasing Indian blood and increasingly white blood as arranged from the bottom of each graph to the French and Scotch males at the top, i.e., in the following order:—pure-blood Indian males, pure-blood Indian females, mixed-blood (less than half white) males, mixed-blood (less than half white) females, mixed-blood (half or more white) males, mixed-blood (half or more white) females, mixed-blood (three-fourths or more white) males, mixed-blood (three-fourths or more white) females, French males, Scotch males.

In all three graphs the average is indicated by an arrow (▼) for the males, and an arrow head (♥) for the females. The heavy line represents the actual number of cases. In figures 1 and 2 the line shows the individual cases at the intervals of 0.5 millimeters exactly as the measurements were made. In figure 3 intervals of 0.5 per cent are represented. The dotted line represents an increase of the interval from 0.5 millimeters to

1.0 millimeter in figures 1 and 2, and from 0.5 per cent to 1.0 per cent in figure 3 for the purpose of showing more clearly the probable general tendency of the group. This seemed desirable because the small number of cases in most of the groups made great irregularity in the heavy-line curve.

The order of groups used allows one to see the value of the face-breadth head-breadth index (figure 3) as a contributing factor, among the other measurements taken, in determining the blood status of the so-called American Indians. The index of the males is greater than that of the females of the same group, but the gradual lessening of the index with the gradual increase of white blood in the individuals is shown by the movement of the averages, and of the frequency curves from right to left across the graph. Again the value of the face-breadth head-breadth index as a contributing factor in determining the blood status of "Indians" is seen, irrespective of sex, by comparing figures 2 and 3. In figure 3 the lessening is continuous (except for the two small groups of 4 three-fourths white women, and of 8 three-fourths white men). Whereas, in figure 2 (showing face breadth), the lessening is broken in all groups by the fact of sex. The face-breadth head-breadth index is thus shown to be a more reliable factor than is face breadth for determining the blood-status of Indian-white mixed-bloods.







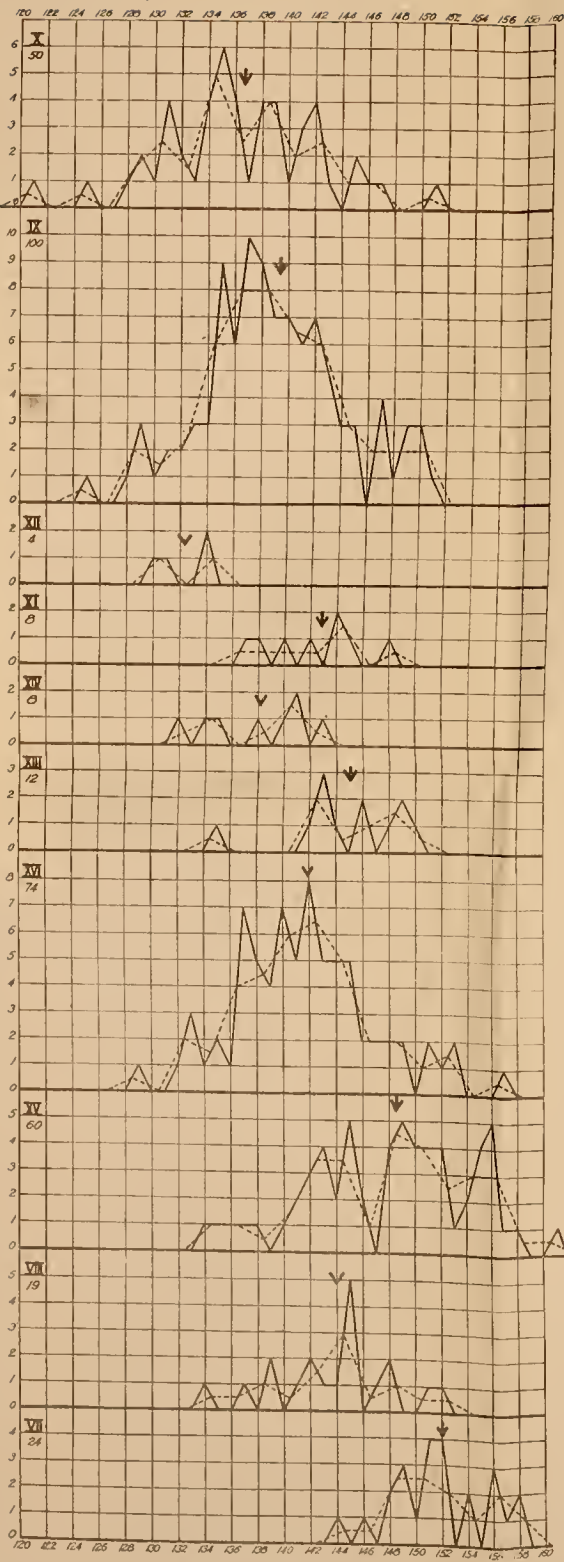


Figure 1  
Distribution of head-breadth measurements.

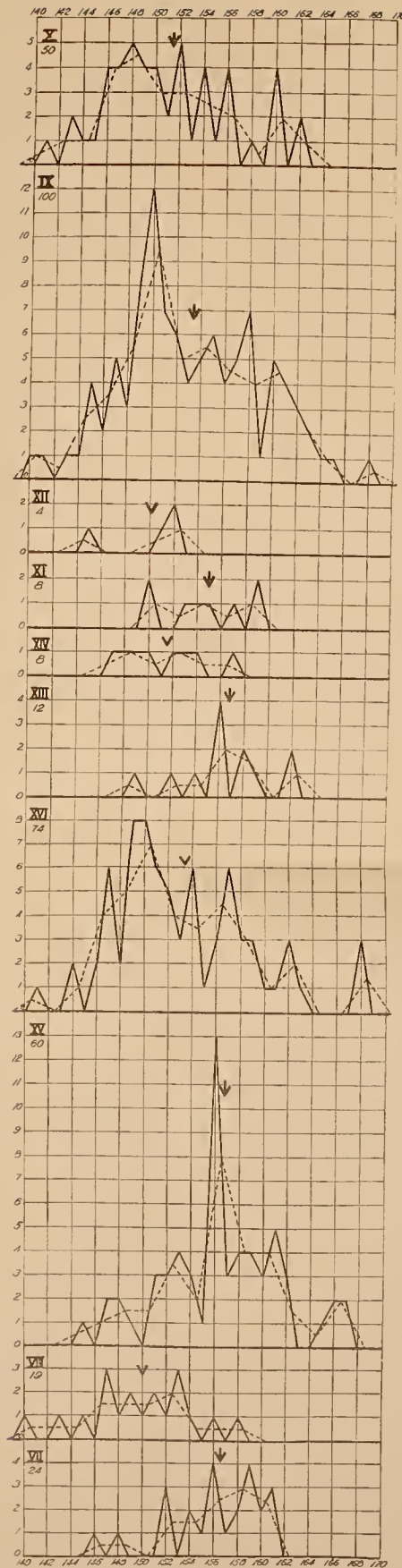


Figure 2  
Distribution of face-breadth measurements.

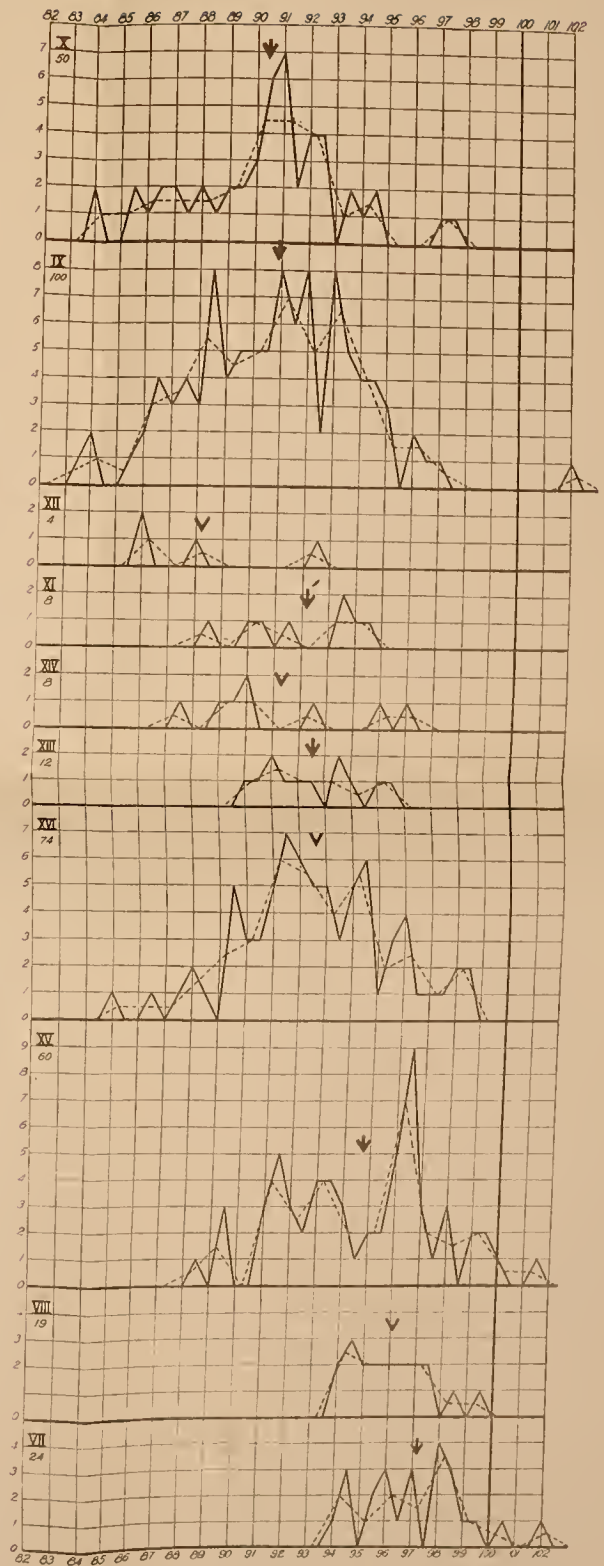


Figure 3  
Distribution of face-breadth head-breadth index.

Explanation of figures 1 and 2. Figures in horizontal line represent millimeters. Figures in vertical line represent number of cases. In the left upper corner the Roman numerals refer to the table containing the figures from which the graph is made; the Arabic numerals give the number of individuals in said table.

Figures in horizontal lines represent per cent. Figures in vertical line represent number of cases. In the left upper corner the Roman numerals refer to the table containing the figures from which the graph is made, the Arabic numerals give the number of individuals in said table.

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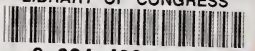


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