THE SITTING HEIGHT

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INTRODUCTION

The sitting height is important in the measurement of the living and it is easy to obtain. It represents the distance between the vertex of the cranium and the line connecting the tuberosities of the ischium, parts covered with a minimum of tissue even in the fat and muscular, and it is therefore exact. It also gives the length of both the torso and the legs.

The trochanter height and the pubic height, which have also been used considerably in anthropometry, are difficult to obtain with accuracy. Thick muscles and fascia and sometimes fat cover the trochanter, so that its upper border cannot be determined exactly, and the error in measuring from the ground especially when it is rough is apt to be great. The measurement of the pubic height is still more difficult to obtain because of the trouble to find the upper border of the pubis, or even the pubic spine, and because of the nature and sensitiveness of this region. The pubis may be high in some people and low in others depending upon the tilting of the pelvis backward or forward, the shape or posture of the vertebral column, the length or strength of the abdominal muscles, or from other causes. The position of the ischial

tuberosities is not affected by the tilting of the pelvis to the same extent as the pubis because the latter may be raised or lowered whereas the ischium would remain in almost the same horizontal plane. The posture may be controlled better when sitting than when standing, and this gives the advantage to the sitting height. The length and strength of the abdominal muscles admit of greater variation in the vertical position of the pubis than of the ischium. The height of the pubis does not give a good basis for the length of the torso or of the legs. For these and possibly other reasons the sitting height should be taken whenever either the length of the torso, or of the trunk, or of the legs, is desired.

The measurements can best be made with Hrdlička's instruments, methods, and *technique*. Care is necessary to be sure that the vertebral column is pressed firmly against the upright in the dorsal and sacral regions.

Materials. The materials for the present study include the measurements of the following persons:

1445 white children of Ann Arbor, Mich.	583 Negro soldiers of Camp Lee, Va.
776 Filipino children of Manila.	610 white soldiers of Camp Lee, Va.
377 male Filipino students, 18 years or over	523 white soldiers of Camp Gordon Ga.
183 Filipino men of Taytay	444 engineers, Motor Truck Camp Univ. of Va.
38 Indian-Filipino men of Cainta.	439 engineers, Motor Truck Camp and students, Univ. of Va.
63 Filipino women of Taytay.	50 Professors and students, Univ. of Va.
688 Negro soldiers of Camp Gordon, Ga.	

These 6,219 persons were measured by the author except 50 at the University and some at Camp Gordon. The literature has been searched for the past five years and records of nearly 250,000 others were obtained.

Methods. The present report is divided into three parts: I. The sitting height in children; II. The sitting height in the adult; and III. The distribution of the sitting height.

The age given is that of the nearest birthday.

The measurements were taken in a uniform manner, after instruction by Manouvrier and Hrdlička,¹ the person standing or seated on a plat-

¹ v. Hrdlička, A. Anthropometry. Phila. (Wistar Inst.), 1921.

form against a vertical scale, with a sliding square pressed down properly upon the head. Several direct readings were made of both stature and sitting height. The sitting height will be called the torso.

I. THE SITTING HEIGHT IN CHILDREN

The materials for this part are from children measured by the author in Ann Arbor, Michigan, in 1906-7 and in Manila, P. I. in 1907-8.

The children of Ann Arbor were partly British American, whose parents were from Canada and the United States, partly German American, one or both parents being of German extraction.

The children of Manila were attending the Trade and Normal schools from all parts of the Philippines, except the young children who were from Manila and vicinity. They represent the more stable and progressive elements in the Philippines, many of whom are Chinese and Spanish Mestizos. They show a preponderance of yellow-brown blood, with traces of Negrito.

A word about the Filipinos may not here be amiss. The Filipino is essentially a Malay, and the Malay is largely a mixture of the southern Asiatic with the Negrito. The southern Asiatic is in turn a mixture of the White (Mediterranean and Indo-European), Yellow-Brown (Mongolian) and Black (Negrito), three fundamental world stocks. The Malay was formed by a continually recurrent fusion of the southern Asiatic with the Negrito who inhabited southern Asia and the adjacent islands. Wave after wave of these people passed out into the Pacific and each was of a slightly different composition. Thus each locality in the Philippines and the islands adjacent thereto is slightly different from the other in the characteristics of the people. There still remain pure Negritos in the Mariveles Mountains and along the east coast of Luzon. Recent Mohammedan (Arabian) movements spread over the Philippines during the 200 years before the Spanish came, and there has been considerable fusion of the Spanish and other European nationalities with the Filipinos during the past 300 years. East Indians have come into the Philippines directly from time to time, and there has been an infiltration of the Chinese for possibly a thousand years. The small trade of the islands is largely in the hands of the Chinese and their Mestizo descendants, who are among the best families in the littoral region of the archipelago.

The majority of the students of the Trade and Normal Schools in the Philippines are from the littoral population of the archipelago, although some come from the inland tribes, some are mixed Negritos

and a few are pure Europeans. It would have been futile to attempt to segregate the component elements among the students because color and other characteristics obscure conditions; therefore all the records are included. Notes however were made at the time the records were taken as to whether European, Mongolian or Negro characteristics predominated in each individual, and these will be utilized. The following table gives the number of persons at each age measured by the author.

TABLE I. THE NUMBER OF PERSONS AT EACH AGE.

Age	Boys			Girls		
	British American	German American	Filipino	British American	German American	Filipino
5	5					
6	20	22		21	16	
7	44	30	27	33	28	5
8	32	33		46	28	
9	31	36		42	31	
10	44	44		43	36	
11	49	45	34	36	43	14
12	57	33		49	43	
13	31	33	18	44	33	6
14	37	31	20	49	11	12
15	33	12	43	27	13	15
16	22	3	65	17	8	19
17	8		105			27
18			124			
19			78			29
20			54			
20+			63			18

THE GROWTH OF THE TORSO

The principal results of the study as to the growth of the torso will best be seen in the accompanying chart. Some of the important facts to be noted are that the torso is longer at each age in the British Americans than in the Filipinos, while the German Americans are in between, in both boys and girls; the torso of the girls is longer than that of the boys up to the age of 16 years, except for a short period between 7 and 10 when the torso of the boys is longer; the torso of the Filipino girls is longer than that of the boys up to 11 years, after which there is some irregularity up to the age of 15 when the torso of the boys becomes decidedly longer than that of the girls and so remains; the most rapid growth of the torso is usually from 10 to 12 years in girls and from 11 to

15 in boys, but in the Filipinos this is from 13 to 15 in girls and from 13 to 17 in boys; this increase in the rate of growth is delayed in German

The actual growth of the torso (Personal measurements).

CHART I. The solid lines represent males, the broken lines females. B. Am. is British American, G. Am. is German American, Fil. is Filipino. From measurements made by the author.

American children as compared to English American; in the Filipinos it is delayed more than in either and occurs two years later than in British American children; and in general the rate of growth in stature increases in girls to about the age of 11 years and in boys to about the age of 16, after which it decreases.

It may be of some interest to note that at the period of least variability in stature and torso the death rate in children in general is least. What relation there is between the two phenomena, if any, remains to be determined.

In other racial groups the growth of the torso appears as follows:

The actual growth of the torso. (Other groups).

CHART II. The solid lines represent males, the broken lines females. Af. (Suk) are records of the Bantu Zulus of south Africa kindly furnished by Dr. Suk of Bohemia. As. are records of Chinese by Bobbitt and Pyle and Filipinos by Bobbitt and Bean. Eu. are records of Germans by Ranke, and American whites by Hrdlička, Hastings Smedley and Bean.

Am. I. are records of American Indians at approximate ages by Hrdlička.

R. J. are records of Russian Jews by Weissenberg.

The average yearly increment in growth of the torso from 5 to 22 years, for males, is 1.82 cm. in Asiatics, 1.54 in Europeans, 1.35 in Africans; and for females it is 1.45 for Asiatics, 1.34 for Europeans, and 1.23 for Africans. The growth of the torso is greater in the Chinese and

Filipinos than in the other groups, and is the least in the Negroes, with the Europeans between. The exception to this is that the growth in the American Negro girls (mostly of mixed blood, negro-white) is equal to that of the other girls. The Russian Jews appear to be the most precocious in the growth of the torso among the European groups, the Germans seem the most retarded, and the English Americans are in between. The causes of these differences need determination.

According to the data the torso seems to have two periods of rapid growth, the first from 5 to 7 years in boys and girls alike, the second from 11 to 13 years in girls and 14 to 16 in boys. In the Filipinos and Chinese there seems to be a third period after the age of 20 years, but this needs confirmation. The torso of Asiatic boys and girls grows however more in the second period than that of any of the other groups. In American Negroes the most rapid growth period comes later than in other groups, and the growth of the torso is less. The first period of rapid growth in American Negro and also American Indian boys comes from 8 to 10 years instead of from 5 to 7 as usual.

The torso of the girls grows 5 per cent more than that of the boys between the ages of 5 and 16 years, but the torso of the boys grows more after this.

THE SITTING HEIGHT INDEX

The sitting height index is the sitting height or torso in terms of the stature taken as 100. It serves well as an indicator of growth relationships, because when it reaches its lowest mark it represents the time at which the rapid growth of the lower extremities decreases and the rapid growth of the torso increases.

The lower extremities are seen to grow more rapidly than the torso up to the following ages: British American girls 11 years; German American girls 13 years; Filipino girls 13 years; British American boys 15 years; German American boys 16 years; Filipino boys 14 years.

After the ages given above the torso grows more rapidly than the lower extremities. The age at which this change takes place is earlier in girls than in boys; it is earlier in the Filipinos than in the British Americans, and earlier in the latter than in the German Americans.

We have already seen that the most rapid growth of the torso occurs later in the Filipinos than in the American whites. We now see that the growth of the torso is relatively greater than the lower extremities at an earlier age in the Filipinos than in the American whites. This means that the growth of the lower extremities slows down earlier in the

Filipinos than in the American whites. We recorded in a previous paper on stature and the teeth (*Am. J. Anat.*, 1914), that the Filipinos are precocious in the periods of acceleration in stature compared to American whites, and we see from chart I that their definitive stature is

The Sitting Height Index (Personal Measurements).

CHART III. The solid lines represent males, the broken lines females. B. Am. are records of British American children, Fil. of Filipino children, and G. Am. of German American children, measured by the author.

reached at an earlier age than is that of American whites. We also note from charts II and III that the Filipinos and other Asiatics have a more rapid growth of the torso during the periods of its rapid growth than is found in other groups. We may infer from the above that the Asiatics are precocious in the growth of the lower extremities which produces a precocity in stature, because after birth the stature follows the length of the lower extremities more than it does that of the torso as the result of the greater growth of the former than of the latter. There is an apparent precocity of the torso growth as represented by the sitting height index in Asiatics, because of the lag in the growth of the lower extremities at an early period. The early cessation in growth of the lower extremities and the more rapid growth of the torso during the periods of rapid growth produce the condition of long torso and short extremities found so frequently in the Filipinos and other Asiatics. The torso not only grows faster at the periods of most rapid growth but the rapid growth periods extend to a later age in Asiatics than in Europeans.

The Filipino girls have a relatively longer torso before the age of 12 years than the Filipino boys, and their stature is also greater, which is not true of American children, except at the ages of 11 and 12 in the British Americans. After this age the condition is reversed, the Filipino boys have a relatively longer torso than the Filipino girls, whereas the American girls have a longer torso than the boys, although after the age of 14 years the stature of the boys is greater than that of the girls. This indicates a precocity on the part of the Filipino girls that exceeds that of other groups.

Filipino boys have a greater stature and torso length at 13 years than is found in American boys, and the sitting height index reaches its low point and begins to rise earlier in the Filipino than in the British American boys. This is evidence of precocity in the Filipinos. Metamorphosis is earlier as proved by the early cessation of rapid growth in the lower extremities, and the early rapid growth of the torso, as well as the early definitive stature. The Filipino has a later rapid growth of the torso than the American white, and in the Filipino the sitting height index increases more than in the American white after 16 years of age, hence metamorphosis continues later in the Filipino than in the American white. The adult sitting height index of the Filipino is the same as that of the European or American white as we shall see later. This may be the result of the mixture of the Mongolian and Negrito as well as the European in the Filipino: the Negrito with a low sitting height

index, long duration of the growth of the extremities and short duration of the growth of the torso, the Mongolian with the reverse, and the white in between. The Filipino is nevertheless more like the Mongolian than like the Negrito.

The Sitting Height Index in other Groups.

CHART IV. The solid lines are males, the broken lines females.

Af. (Suk) are records of the Bantu-Zulus of south Africa kindly furnished by Dr. Suk of Bohemia.

Am. I are records of American Indians by Hrdlička.

As. are records of Chinese by Bobbitt and Pyle and Filipinos by Bobbitt and Bean.

Eu. are records of American whites by Hrdlička, Hastings, and Smedley.

Ge. are records of Germans by Ranke.

From Chart IV it may be seen that the time at which the rapidity of growth of the lower extremities begins to decrease and the rapidity of growth of the torso begins to increase varies with different ethnic groups. The list below will illustrate this:

		GIRLS	Boys
Chinese	(Pyle)	12	14
Chinese	(Bobbitt)	14	14
Filipinos	(Bobbitt)	12	14
Filipinos	(Bean)	13	14
Asylum whites, New York	(Hrdlička)	13	14
School whites	(Smedley, Hastings)	13	15
British Americans	(Bean)	11?	15
Russian Jews	(Weissenberg)	13	15
German Americans	(Bean)	13	16
Germans	(Ranke)	14	14
Asylum Negroes, New York	(Hrdlička)	14	15
School Negroes, Washington, D. C.	(MacDonald)	14	16
Bantus	(Suk)	13	15
Sioux	(Sullivan)	11	16

The girls are more precocious than the boys and the difference is about two years, with the respective ages about 13 and 15 years. In general the Asiatic is in this respect precocious, the African retarded, the European in between.

The average yearly growth of the torso is 2.11 cm. for the female African between 11 and 13 years, 2.57 for the European, and 2.75 for the Asiatic; it is 2.23 cm. for the African male between 14 and 16 years of age, 2.81 for the European, and 3.27 for the Asiatic.

The Negro children in Washington, D. C., have shown an average growth of the torso of more than 2 cm. per year for but six years whereas the white children have the same amount of growth for nine years. The Negro children of Natal and Zululand (Suk's data) have less average yearly growth of the torso than the largely mixed Negro children of Washington.

The torso of the Asiatic begins to grow more rapidly than the lower extremities about a year earlier than in the European, it continues to grow for a longer period of time, grows more after 20 years, grows more rapidly, and is relatively longer in the adult than that of the European except where the Mediterranean or Negrito element predominates, as in India. In a paper written by the author in 1909 ("Filipino Types") the following suggestion was made: "The Filipinos may have an early

rapid development which is from the European standpoint premature, and a late maturity which is incomplete, at least it looks as if the growth is continued up to a later age in the Filipinos than in the Europeans, but the extent of development is less." The present study seems to confirm that suggestion.

The torso of the American Negro begins to grow more rapidly than the lower extremities at a later date than for the European, and the time of rapid growth is less for the Negro. This is also true of the African Negro. This, in connection with the short torso and long lower extremities in the adult Negro, suggests that the Negro has a long youth and a short adolescence, as suggested by Bardeen.

Bardeen (1920) believes that the Asiatic has a short youth and a long adolescence and the African a long youth and a short adolescence, whereas the European is in between. The result is that the extremities of the Asiatic are predominately relatively short and the torso long, the extremities of the African are long and the torso short, and the European is between. The sitting height index as herein ascertained corroborates this, although the results here may not be conclusive. There is evidence from this study that in general the Chinese and Filipinos conform to the suggested Asiatic type, the American Negro conforms to the suggested African type, and the American white conforms to the suggested European type.

More data are needed at all ages for the Asiatic and the African, and for the late period of growth after the age of 16 years in the European. There are many groups among the peoples of different countries, and variations in growth will no doubt be characteristic of the groups. Even among the Negritos of the Philippines there is more than one anatomical type and this is also true of the Pigmies of Africa. There are nevertheless fundamental tendencies for each of the three continental peoples, the Asiatic, European and African. Derivatives from these three stocks would have the same tendencies. When the three are combined as in the Filipinos all three tendencies may be manifest.

OLD AGE AND EMBRYO

Stature decreases with advancing age in the adult especially after the age of 60 years, and the torso decreases in length more than the extremities, which results in a lowering of the sitting height index. Whether this is due to "a loss in elasticity in the intervertebral discs," as stated by Bardeen, remains to be seen. There is a shrinkage in all the soft tissues, and this is shared by the discs, but the muscles shrink

considerably more. The shrinkage of the sacro-spinalis musculature would increase the lumbar curve, and the shrinkage of the dorsal neck muscles would increase the cervical curve of the vertebral column, which would then resemble that of the Negro. The sitting height index in the aged approaches that of the Negro. Pfitzner gives the sitting height index of 303 men from 40 to 60 years of age as 52.7, of 130 men from 60 to 70 years as 51.9, of 100 men from 70 to 80 as 52.0, and of 27 men from 80 to 90 as 51.6. The condition in the aged is probably the result of several factors, the stoop of age, the shrinkage of the muscles, the shrinkage of the intervertebral discs, and also a slight shrinkage of the long bones. The shrinkage is therefore greater in the torso than in the extremities. Persons beyond the age of 60 years should not be included as normal adults.

TABLE II. SITTING HEIGHT BY STATURE IN THE ADULT. PFITZNER.

Stature	141-150	151-160	161-170	171-180	181-190
Male	53.1	52.6	52.4	52.1	51.8
No.	34	277	748	295	9
Female	53.0	52.9	52.6		
No.	223	612	197	3	

TABLE III. SITTING HEIGHT AND STATURE BY AGE IN THE ADULT. PFITZNER.

Age	41-50	51-60	61-70	71-80	81-90
Male					
Number	133	173	130	100	27
Stature	166.2	165.3	165.4	163.6	162.2
Index	52.7	52.7	51.9	52.0	51.6
Female					
Number	92	103	97	105	33
Stature	155.5	155.1	154.2	152.6	151.1
Index	53.1	53.0	52.5	52.1	53.1

Streeter in an article entitled "Weight, sitting height, head size, foot length and menstrual age of the human embryo" (*Carneg. Inst., Pub.* 274, 1920), shows in table 1 that the sitting height grows more rapidly from the 12th to the 18th week of intrauterine life than before or after,

and there is a slight retardation in growth between the 28th and 36th week. This wavelike growth is found after birth as already pointed out, the periods of rapid growth being about the seventh and eleventh years, at times when the permanent teeth are erupting most rapidly and the long bones of the extremities are growing more slowly. This illustrates the law of alternation in development as already stated by me in a paper on the teeth. (*Am. J. Anat.*, 1914).

II. THE ADULT SITTING HEIGHT

The average sitting height index for each group measured will next be given. The term *index* will be used to mean the sitting height index, unless otherwise specified.

TABLE IV. THE AVERAGE RELATIVE SITTING HEIGHT IN THE ADULT.

Group	No.	Race	Stature	Index	Sit. ht.
Manila students	377	Mestizo-Malay	163.3	52.5	85.6
Taytay men	183	Malay	159.5	52.6	84.0
Cainta men	38	Malay-Indian	160.9	52.2	83.8
Taytay women	63	Malay	147.8	53.1	78.4
Camp Gordon	688	Negro-American	172.9	50.5	87.3
Camp Lee	583	Negro-American	169.7	51.0	86.6
Camp Lee	610	White	172.4	52.7	90.6
Camp Gordon	523	White	174.8	52.3	91.2
Motor Truck Camp	444	White	174.1	52.3	91.0
Students, soldiers and instructors	489	White	173.8	52.0	90.4

Race. The Negro records are placed between those of the Filipinos and the American whites to show readily the differences. Pfitzner has demonstrated that the leg length varies directly with stature, therefore the index varies inversely with stature; in the tall the legs are relatively long and the torso relatively short, and in the small the reverse. This is true only within the race (see tables 5 and 6). The American whites and the Filipinos have the same sitting height index although the American whites are 10 centimeters taller than the Filipinos, and the Negroes have a smaller index than the American whites although not so tall.

The small index in the Negro is the result in part at least of the short, sinuous trunk of the Negro. The Negro trunk has marked convexities forward in the lumbar and cervical regions and backward in the thoracic and sacral regions. This was observed by me for several years in the dissecting room, and at Camps Lee and Gordon many Negroes showed this condition on inspection. It is more pronounced in the

true Negro than in the frequent mixed American Negro. When the sitting height of the Negro was taken the vertebral column would not touch the wall in the cervical and lumbar regions, the back could not be straightened, the thorax and buttocks projected backward and the head and abdomen forward. The head can be brought into line with the thorax and buttocks behind only by elevating the chin. The legs of the Negro are thrown back at the hips, the pelvis is tilted forward to bring the body to the center of gravity, the spinalis musculature is contracted to pull back the trunk and thus maintain the erect posture. The lumbar curve is thereby increased. The abdominal muscles pull the upper ribs and sternum forward and downward because of their tension as a result of the tilting of the pelvis, the protrusion of the lumbar vertebrae into the abdomen, and the action of the spinalis musculature, thereby increasing the dorsal convexity. The result is a shortened torso and relatively long legs. This may also help to explain the backward protrusion of the buttocks and thorax, and the forward protrusion of the head and abdomen in the Negro, which gives them the appearance of having a rugged muscular torso. The short trunk may be caused partly by mechanical factors, though malnutrition may play a part, but the posture, relaxation, burden bearing, flat foot, and muscular pull also contribute, although the primary cause of the increased curvatures of the Negro spine is the effort to maintain the erect posture.

Stature. The stature of the American white soldiers and the Negro soldiers at Camp Gordon was higher than at Camp Lee and the index was lower, and the stature of the Manila students was greater than that of the men of Taytay and the index was lower; but on the contrary, the Cainta men of less stature than the Manila students also have a lower index, and the students of the University of Virginia have a lower stature and a lower index than the white soldiers of Camps Lee and Gordon. Differences in the proportions of the anatomical types in the different groups explain the differences in index. For instance there are more hyper-ontomorphs¹ among the men of Cainta than among the men of Taytay and there are more hyper-ontomorphs among the students than among the white soldiers. The hyper-ontomorphs have a low index and this makes the index of the Cainta men and the students low.

Sex. The women of Taytay have the lowest stature, but the index is the same as that of the Virginia University Professors who have almost

¹ For explanation of these terms see author's other publications.

the highest stature. The women have a larger proportion of the hypo-ontomorph type among them than the men, and this would account for some difference, but there is also a sexual difference: the women have in general relatively longer trunks than men. The Negrito blood of the Taytay women would give a low index, and the Chinese blood would give a high index, but the low stature, the hypo-ontomorph type and the sex would combine to make the index high.

SUMMARY

The sitting height index is shown to vary with race, type, stature and sex.

The index is the same in the American white and the Filipino, but less in the Negro. The trunk of the Negro is greatly curved thus making it both absolutely and relatively short, which with relatively long legs accounts for the low index in this race.

The index decreases with increase in stature. The American white is taller than the Filipino and therefore should have a smaller index, but the Filipino has a considerable amount of Negrito blood, and a large amount of the hypo-ontomorph type, which reduce his index to the level of that of the white American.

The index is greater in the female than in the male. The number of hypo-ontomorphs was 50 per cent greater among the females than among the males under observation, and the stature of the females was less than that of the males. The sex difference is a result of type, stature and sex.

Finally, the sitting height, and therefore the leg length, are dependent not only on growth but also on metamorphosis.

III. THE DISTRIBUTION OF THE SITTING HEIGHT

The materials for part III include the records of many authors, with measurements of more than 200,000 persons, in about 400 groups, of peoples throughout the world.

The three great masses of peoples. In any study of the peoples of the earth it may be well to bear in mind that the three great masses, African, Asiatic-American, and European, represent the fundamental stocks that carry on evolution. Other peoples about the fringes of these great masses, or in isolated regions, such as the Eskimo, Australians, Melanesians, Negritos, and others represent modified peoples through isolation and selection, or mixtures, blends, or mosaics who have undergone various changes.

The average stature, sitting height and sitting height index for the great continental masses of peoples are given in table 5.

TABLE V. THE AVERAGE STATURE AND SITTING HEIGHT INDEX FOR THE FOUR GREAT MASSES OF MEN.

Mass	Stature	Sitting height	Sitting height Index	Number
Male				
Asia	165.0	88.0	53.5	1,267
America (Indian)	168.0	88.0	52.3	1,050
Africa	172.0	85.0	49.5	3,500
Europe	165.0	87.0	52.5	165,000
Female				
America (Indian)	157.0	82.0	52.6	500
Africa	162.0	80.0	49.4	100
Europe	155.0	83.0	53.5	1,500

An effort is made to leave out the peoples along the fringes and to take only records from centrally located groups. This is easy to do for a large part of Asia and means more than for the other continents, because the Chinese are centrally located and have been fairly stable in their territory. America is somewhat like Asia, although movements have been common and the American Indians are comparatively recent entrants. They have however become isolated and are therefore best given apart. Africa, in the north, is a continent of recurring movements of peoples largely from Europe and Asia. The heart of the continent has not been explored nor have the natives of the interior been measured, to a sufficient extent, therefore most of the available records will be those of Negroes mixed more or less with whites. Europe has had interminable intermingling of peoples, but they have been mostly of the same or similar stocks.

From table 5 it will be seen that Asia and Europe have on the whole the same stature, while that of America is higher, and that of Africa still higher. The Negroes measured were chiefly impure stocks such as the Nilotic, Nigerian, Bantu and American. America and Asia have the same sitting height, that of Europe is less and that of Africa is still less. Asia has the highest sitting height index, that of Europe is next, that of the American Indian is close to that of Europe, but that of the Negro is far lower than the others.

Outlying groups of peoples. When we examine the sitting height index for outlying groups as illustrated in table 6, we find the lowest index among the Australians and the highest among the Eskimo. Closely related to the Australians are the Negroes, Negritos, and Melanesians, while closely related to the Eskimo are the Siberians, Chinese, and Aino. A low index relates to the Negroes and a high index relates to peoples of low stature who live under adverse conditions.

TABLE VI. THE SITTING HEIGHT INDEX OF SELECTED GROUPS.

GROUP	MALE		FEMALE	
	No.	Index	No.	Index
Africa	3,884	49.9	185	50.3
Europe	8,499	52.4	1,346	53.1
Asia (Chinese)	1,429	53.6	25	53.0
Other Asiatics	158	52.4	46	52.4
South America (Indian) ..	2,812	52.4	756	53.2
North America (Indian) ..	1,398	52.0	494	52.1
Eskimo	94	53.7	74	54.6
Siberians	1,417	53.5	72	53.5
Aino	90	52.8	71	53.6
Malay	1,417	52.1	125	52.0
India	598	51.6	...	
African Pigmies	49	53.7	16	52.9
Negritos	378	50.9	10	49.8
Melanesians	200	50.0	10	51.3
Central Africans	226	47.4	...	
Australians	40	45.5	10	47.9

When we combine the groups in table 6 with those in table 8 it will be noted that the sitting height index of the Negroes of central Africa is 47.4 and that of the Australians is 45.5. This index changes gradually through the Melanesians, 50.0, and Negritos, 50.9, to the East Indians, 51.6, and Malays, 52.1. In each group the Negro influence is distinct and in diminishing amount. The index of the Eskimo is 53.7, and the index drops gradually through the Siberians, (male 53.5, female 53.5), to the Chinese, (male 53.6, female 53.0). The African Pigmies, (male 53.7, female 52.9), and the Aino, (male 52.8, female 53.6), are similar to the Eskimo in the index, and represent isolated fragments of the Negro and mixed stocks in the same way that the Eskimo represent isolated fragment of the Asiatic stocks.

The tropical forest people, especially the Pigmies of Africa and the Indians of the Amazon basin, have not only the handicaps of luxuriant

vegetation which prevents agriculture, few domestic animals, tough grass, insect pests, rusts, blights, and bacterial infections, but to these must be added the natural aversion to labor and lack of energy on account of the disadvantages of the tropical climate. The frozen desert people of the north such as the Eskimo, Northern Siberians and Lapps, labor under disadvantages of slight rainfall, scanty vegetation, practically no agriculture, few animals and a sparse population. The result in either case is a stunted body growth, which through heredity has become more or less fixed. Dr. Donaldson suggests that the large torso and short extremities allow a relatively larger set of vital organs that make the people more vigorous, hardy, and resistant to adverse conditions. The extreme forms of this type are found in tropical forest and cold desert, but other peoples adjacent to them are similar in type and among all peoples sporadic cases occur, and variants that approach that type. On the other hand are people who are the direct reverse, and between the two may be found endless intergrades.

A few notes about the Pigmies may not be out of place here. Poutrin describes two or more types of Pigmies in Africa. The Ba-Binga, or true Pigmy, is small, 150 centimeters in stature, muscular, with long torso, high large pelvis, short legs, long arms, low cranium, large nose (straight and wide), feeble prognathism, and projecting chin. The Ba-Tua is a Negro model reduced, with all the Negro characteristics except size: small, 150 centimeters and over in stature, thin, with short torso, long legs, small, low pelvis, high cranium, low, broad, depressed nose, considerable prognathism and reduced chin. The sitting height index of the males and females of the two classes are given in table 7.

TABLE VII. THE STATURE AND SITTING HEIGHT INDEX OF AFRICAN PIGMIES, BA-BINGA, POUTRIN.

Group	No.	MALE		No.	FEMALE	
		Stature	Index		Stature	Index
Labaye	9	148.6	54.3	7	143.5	53.1
N'Gali	8	148.0	55.5	5	144.3	53.3
Ouessou	4	151.2	53.3			
N'Gongo	4	154.0	52.0			
M'Bio	12	155.1	53.2	4	154.7	51.5
Gondicola	12	158.4	52.8			

As the sitting height index decreases and the stature increases, the form becomes more like the true Negro. The pure Ba-Tua are in this respect intermediate between the Ba-Binga and the Negroes. This

refers to the "type sousdolichocéphalique" of Poutrin. The "type brachycéphalique" has a stature of approximately 143 centimeters for the male and 137 for the female. This is then a third type, probably more infantile than the Ba-Binga, certainly smaller. The "type sousdolichocéphalique" and the Semang have the same stature and the same sitting height index; they are identical in this respect with the Kubus of Sumatra, and not materially different from the Aino. This seems to mean that under adverse environment various peoples may become altered in the same way, becoming more infantile or hypo-ontomorph in type. The Aino represent probably a mixed group, the Pigmy represents the Negro, the Eskimo represents the northernmost Asiatics, and the Malay represents the much more southern Asiatic, all of the hypo-ontomorph type.

Dr. Hrdlička kindly furnished me with records of the stature and sitting height of 231 adult male and 120 adult female Negritos of the Philippines measured under his direction by Dr. Philip Newton. The stature of the males is 146.8 cm. and the index is 50.6, and the stature of the females is 138.8 cm. and the index is 51.2. They are distinctly of the African *Negro* type. This verifies my own observations of certain Negritos in the Philippines. Other types of Negritos there are of the African *Pigmy* type. The Senoi or Sakai seem to be mixtures of the Semang and the Malay because the index is the same as the European, identical with the mixed Filipino, and the explanation is that the low index of the Negrito and the high index of the Mongolian neutralize each other and leave the index in between, like that of the European. People who resemble the Senoi or Sakai may be found in all the large islands of the Philippines, especially toward the interior where the Negritos formerly existed.

The sitting height index is shown by Martin to vary in all countries and he gives the lowest index of the male Europeans as 51.4 for the Ukrainian Jews, the highest as 53.7 for Esthonians; of the females 53.2 for the Great Russians and 53.7 for the Russian Jews; the lowest index of the male Asiatic as 50.8 for the Malai, the highest as 54.8 for the Aino; of the females as 51.7 for Cambodia and 54.6 for the Aino; the lowest index of the male African as 48.9 for the Masai, the highest as 54.0 for the Pigmy; of the females as 50.5 for the Bushmen and 53.2 for the Pigmy; the lowest index of the male American natives as 50.6 for the Trumai Indians, the highest as 53.5 for the Eskimo; of the females as 51.1 for the Trumai and 53.7 for the Eskimo. These records of Martin, like those from Giuffrida-Ruggeri, are given without stature and therefore were not used in the tables and charts.

Giuffrida-Ruggeri gives 30 groups of East Indians of about 100 in each group, from Burma and Bombay which show indices varying from 49.6 to 52.5, suggesting the influence of a Negro stock. The peoples of India are derived from four chief sources, first the Negritos, second Asiatics from the north, third the Mediterraneans, and last the Aryans or Indo-Europeans from northern Europe. There seems to be more Mediterranean stock in the Deccan, and especially among the Todas and Tamils. Twenty groups from the Balkans given by Giuffrida-Ruggeri, with from 12 to 2,341 individuals in each group, give indices varying from 51.8 to 52.6. The low sitting height index goes with the Mediterranean stock and the high index with the Slav. The index of the Spanish is 52.1 and of the Swedes is 52.9, which would indicate the difference we would expect between a small and tall group except that the index is reversed. This emphasizes the difference in type. The Spanish are of the Mediterranean stock and the Swedes of the Nordic, and the inference is that the Nordic is more like the Slav than like the Mediterranean. Six groups from north Nyassa have indices from 49.8 to 51.5, Algerians have an index of 51.7 and Kabyles of 52.8. Here we have the Mediterranean race mixing with the Negro, and in the Kabyles there may be Nordic elements.

Topinard gives six groups of Western European males with indices varying from 52.2 to 52.8, and six other groups from other parts of Europe with indices varying from 51.4 to 54.9. He also gives the index of Australian males as 50.8.

Baxter and Gould give the perineum-to-sole length of 12,640 white soldiers as 47.5 per cent of the stature which would give an approximate sitting height index of 52.5. In 2,020 Negroes this was near 51.5 and in 517 Iroquois, mostly mixed bloods, it was near 53.4 per cent.

Summary of the sitting height in large groups. We may now turn to a more detailed consideration of the sitting height and then give the summary as found in the chief groups of living men. The details may be found in Table 8 arranged in groups by stature. In each stature-group the index is arranged serially, the lowest first and the highest last. More Negro or negroid groups are given in the table than European, Asiatic and all other groups, therefore the records are not fairly representative. The negroid peoples have a low sitting height index, therefore their records will fall near the first of each stature group, and the Asiatic, American Indian and European will be found in the second half. The Pigmies, Siberians, Aino and other peoples of stunted growth have the highest indices in the low stature groups, and the Europeans and American Indians have the highest indices in the high stature groups.

The records from table 8 (see end of article) are utilized for the great continental masses of peoples, each of which below will be presented separately, beginning with Europe.

EUROPE (AND AMERICA)

The median index of the male is 52.3, the lowest is 51.4 in Little Russians and Livonians, and the highest 53.7 in Esthonians. The majority of the groups of the European males are found between 160 and 180 cm. in stature, and of the females between 150 and 160 cm. The 119,571 Spaniards and the 44,929 Swedes (Giuffrida-Ruggeri) have respective indices of 52.1 and 52.9, which would indicate that the body type of the two is somewhat different.

AFRICA

The median index of the male is 50.0, the lowest is 47.4 in Central Africa, and the highest is 55.5 in the Pigmy. The extremes are much further apart than for any other great mass of peoples (unless we include the Pacific Islanders as a great mass), as a result not only of diversity of environment, but also owing to differences of type and variety of mixture. The highest index is found in the Pigmies, and the lowest in Central Africa as already noted, but the tall negroes who surround the central part of the continent of Africa, and especially the Nigerians, Soudanese, Nilotic and Bantu-Kaffir-Zulu Negroes have a low index although they show varying amounts and kinds of mixture with foreign stocks, chiefly European. These Negroes are found in the stature group 180 to 190 cm. and a part at least of their small index is the result of the tall stature. The true Negro of Central Africa is not tall, but has relatively long extremities and a short torso, and some of these characteristics are retained in the tall Negro. The Pigmy, by contrast with the tall Negro and the true Negro has a stunted growth with retention of the infantile characters, the extreme form of the hypo-ontomorph, therefore the index is high.

Had more true Negroes been included in the records and fewer of the Pigmies and tall Negroes, the stature groups would have been less extended and more intermediate. As it is the large majority lie in the same stature groups as the Europeans, between 160 and 180 cm. The stature groups of the African females are the same as those of the European females, but the index is much less.

OCEANIC NEGROIDS

The median index of the male is 50.5, the lowest is 44.2 in Australia, and the highest is 52.8 among the Sakai. The index would be considerably lower if the groups mixed with Malay or Asiatic were excluded. Lower indices are found among the Australians than among any groups in Africa and the stature is also lower. The length of the torso and the lower extremities are further apart among the Pacific Islanders than among Africans because of the lower index of the Australians and the higher index of the Mongoloid elements and Pigmy Negritos. The low index among the Australians diminishes through the Melanesians, Negritos and Sakais, to the Malay, although some of the groups among the Malays are very negroid and much like the Negrito. The majority of the stature groups of the male Pacific Negroids are found between 160 and 170 cm. The stature groups of the female Pacific Negroids are found between 140 and 160 cm. which is the same as the Malays and Asiatics, but is different from the Europeans, Africans and American Indians.

MALAYS

The median index of the male is 52.3, the lowest is 48.6 in the Singalese, and the highest is 53.4 in the Filipinos. There is not an orderly decrease in the index with increase in stature as in the other groups, and the reason for this is that the Malays are very much mixed as noted before. The mainland in India and the Malay Peninsula, as well as the large islands of the Pacific near the mainland and not far from Australia, such as Ceylon, Sumatra, Java, Borneo and several of the Philippines retain evidence of Negrito or Negro influence, and remnants of Negrito tribes may be found in most if not all of the islands. This invariably gives a low sitting height where the type is like the African Negro, but where the type is like the Pigmy or when mixed with the Asiatic the index is high. The stature is low because both the Negrito and the southeastern Asiatic have low stature. Some of the tribes of the interior of the large islands, such as the Kalingas of northern Luzon who are practically pure Europeans in type have tall statures which may be as high as 180 cm. or higher.

ASIA INCLUDING THE AINO

The index of the male and female is the same even with different statures. The median index of the male is 53.2, the lowest is 50.8 in India, and the highest is 54.1 in Samoyeds. The low index of India is the result not only of the Negrito influence but also of the Mediter-

raneean, which is profusely distributed throughout India. The high index of Siberia and southeast Asia (Annam, for example) is the result of the type of infantile form, the hypo-ontomorph. The males have a homogeneous, intermediate stature, and the index is practically the same in the two stature groups, 53.2. The stature of the females is also homogeneous, but rather small. The index is practically the same as that of the males, except that the Aino has a higher index, 53.7.

AMERICAN INDIANS AND ESKIMO

The median index of the males is 52.5, the lowest is 50.1 for the Machiganga of South America, and the highest is 54.9 for the Kwakiutl of Canada; and for females the median is 52.8, the lowest 51.1 in the Maricopas, and the highest is 55.7 among the Eskimos. The Canadians have an index in the female of 55.4 in one group. The Canadian Indians are similar to the Eskimos in this respect and not unlike the Siberians. A number of groups of Indians in South America and Central America besides the Machiganga have low indices, such as the Arowaks; but the Pimas, Papagos and Sioux also have low indices by some authors, although the stature is high, or *because* the stature is high. This may point to Negro mixture in some cases or it may be on account of local conditions and stature.

The stature of the American Indian males lies nearly all below 170 cm. which is like that of the European males. The females have a stature chiefly between 150 and 160 cm.

GENERAL SUMMARY

The sitting height depends upon age, stature, sex, race and type, as well as evolution, environment and individual development, and in any consideration of this measured part of the body all of the factors should be known.

AGE

The sitting height grows more rapidly during and after puberty than before. It remains stationary between 25 and 60 years and decreases thereafter. Girls are precocious and boys retarded in the growth of the sitting height.

THE MORPHOLOGIC INDEX

This index is devised as a factor which represents the percentage difference, of any group, person, type, index or measurable character, from a standard selected as the approximate general norm or average.

The norm should be as near the average for mankind as a whole, as it is possible to reach with our present state of knowledge.

We may use stature to illustrate. Taking the mean standard stature as 165 centimeters, then a person, type or group of people with a stature of 181.5 centimeters would have a morphologic index of +10, and a person, type or group of people with a stature of 148.5 centimeters would have a morphologic index of -10. The morphologic index is +10 because the stature is 10 per cent above the normal standard, and the index is -10 because the stature is 10 per cent below the normal standard.

From a study of all peoples it seems expedient to adopt here a normal standard for stature, sitting height and sitting height index, that may serve as a basis for computing the morphologic index. This standard will be adopted chiefly on the basis of the European records, and as far as the stature is concerned it is the same as that generally used by anthropologists as the central norm about which all the statures of the world may be most conveniently grouped. The standards adopted are: For males: Stature, 165.0 cm., Sitting height 85.0 cm., Sit. Ht. Ind. 52.5; For females: Stature, 155.0 cm., Sitting height, 80.0 cm. Sit. Ht. Ind. 53.5.

The morphologic index has been calculated for all the groups on which there are sufficient data, and the results have been combined and illustrated in charts V, VI, and VII.

In chart V the most distinctive characteristic of the morphologic index for stature is the low index for Central America and the Pacific.

In chart VI for sitting height the morphologic index is seen to be high in Europe, Asia and North America, and low for Central America.

In chart VII for the sitting height index the morphologic index is high for Asia and extremely low for Africa.

TYPE

Where short legged people live, conditions of life are difficult. The two great areas occupied by these people are tropic and arctic desert, where only with difficulty can a meager supply of food be obtained. The result has been that through selection and the survival of the fittest environment has produced a resistant type. By desert is meant jungle and ice of tropic and arctic region respectively.

In a general way we may say that each large group of people has its Hypo-ontomorph, or incompletely metamorphosed form: The Aino for the European; the Siberian, Indo Chinese and Malay for the Asiatic;

the Pigmy and Negrito for the African; and the Eskimo for the American Indian. These forms do not represent those who have failed to develop

MORPHOLOGIC INDEX OF STATURE

CHART V

through evolution but a regressive condition probably caused by the adverse environment.

At the other extreme are to be found certain groups that seem to have undergone excessive metamorphosis. Such are the Mediterranean for

the European, the Japanese for the Asiatic, and the long legged Negrito for the African. These are the extreme Hyper-ontomorph types of the stock to which they belong.

The Hypo-ontomorph may be looked upon as the type which metamorphoses so slowly that growth is completed before complete metamorphosis is reached, and the Hyper-ontomorph metamorphoses so

CHART VI

rapidly that growth is incomplete when complete metamorphosis is reached, at which time growth ceases. Growth is less in either case than with intermediate forms. Between these two extremes lies the great

body of each continental mass, which is the Meso-ontomorph of the stock. This mass carries that from which future variants may spring, under varying conditions. Intergrades may become distinct through segregation and environmental conditions. A combination of inter-

CHART VII

grades may produce many varieties through crosses that result in mixtures, blends, impure or incomplete segregates, mosaics and composites.

The Asiatic has the sitting height accelerated early and retarded late in growth, the growth of the sitting height in the African is late and short, and the European is in between.

RACE

The Asiatic has a long torso and short extremities, the African has a short torso and long extremities, and the European is in between.

Race movements have altered the stock. There are two areas of extremely low sitting height, Central Africa and Australia, and radiating from these areas the sitting height increases. There are two centers of high sitting height, tropical and arctic, where people live under adverse environment.

STATURE

The sitting height is inverse to the stature: with small stature the sitting height is relatively great and with a large stature the sitting height is relatively less, within the race. Between races this is not true. The Negro, regardless of stature, has a lower sitting height than any other people.

The sitting height index is a percentage of the stature. When the type is Hyper-ontomorph the index is low and when the type is Hypo-ontomorph the index is high. It is greater in the female than the male, even when they are of the same type and stature.

CONCLUSIONS

In any evaluation of the sitting height five factors should be known: Age, sex, race, type, and stature.

Sexual, racial and type differences appear during growth, and continue in the adult.

Racial differences that remove the Negro further from the remainder of mankind than any other group of people have been demonstrated.

Differences as the result of environment through isolation and selection appear.

Differences as the result of stature both during growth and in the adult and in races are evident.

The activities of the hormones may aid in the solution of the relations of the growth and metamorphosis of the torso and the extremities, and thus help to an understanding of problems brought out by a study of the sitting height, after we have learned more about the activities of the hormones. The thyroid gland is known to accelerate metamorphosis, therefore the Hyper-ontomorph may be looked upon as the result of high thyroid activity. The lack of thyroid activity or high thymus activity may be present in the Hypo-ontomorph, as in achondroplastic dwarfs. The gonads and the hypophysis play a rôle in determining the

ultimate size and sexual characteristics of the body. The interactions of the endocrine glands may be the key to the differences in type, in sex and in race.

TABLE VIII.
MALES. STATURE, 140.0 TO 149.9 CENTIMETERS.

Number	Group	Stature	Sitting height	Sitting height Index	Author
5	Sakai	149.1	67.4	49.7	Duckworth
231	Negrito	146.8	74.3	50.6	Newton (Hrdlička)
34	German			53.1	Pfitzner
26	Filipino	149.7	79.9	53.4	Bobbitt
9	Pigmy	148.6	80.7	54.3	Poutrin
8	Pigmy	148.0	82.2	55.5	Poutrin

MALES. STATURE, 150.0 TO 159.9 CENTIMETERS.

6	Toureg vassals	158.5	77.5	48.8	Verneau
14	Bushmen	155.3	77.0	49.5	Werner
119	Niger	159.4	81.0	50.8	Tremearne
18	Machiganga	155.9	78.1	50.1	Ferris
7	Borneo	156.0	79.5	50.9	Rose & McDougal
6	Balek Papau	153.6	78.3	51.0	Garrett
72	Bushmen	156.4	80.0	51.0	Seiner
10	Kanikar	153.6	78.7	51.2	Schmidt
16	Arawaks	155.0	79.2	51.2	Ten Kate
3					
tribes	Arawaks	159.4	81.8	51.4	Farrabee
10	Eskimo	157.7	81.1	51.4	Duckworth
11	Pulayar	157.8	81.2	51.5	Schmidt
42	Borneo	157.3	81.0	51.5	Rose & McDougal
30	Kurumbar	156.3	80.7	51.6	Schmidt
94	Borneo	155.8	80.5	51.6	Rose & McDougal
49	Borneo	158.9	82.0	51.6	Rose & McDougal
	Ba Tua	152.2	78.8	51.8	Poutrin
5	Ulladem	151.5	78.6	51.8	Schmidt
13	Borneo	153.9	79.7	51.8	Rose & McDougal
14	Irular	155.4	80.7	51.9	Schmidt
4	Pigmy	154.0	80.1	52.0	Poutrin
6	Bulangen	157.8	82.0	52.0	Garrett
37	Malay Pen.	158.4	82.4	52.0	Annandale & Robinson
37	Sundanese	159.1	83.0	52.0	Garrett
10	Quichua (mix.)	158.0	82.2	52.0	Chervin
13	Bushmen	152.5	78.0	52.1	Seiner
13	Semang	152.4	79.7	52.2	Annandale & Robinson
13	Sakai	156.3	81.5	52.2	Knocker

TABLE VIII—continued

Number	Group	Stature	Sitting height	Sitting height Index	Author
5	Malay	153.1	79.8	52.2	Schmidt
78	Jews	159.4	83.3	52.2	Weissenberg
21	Kota	159.8	83.6	52.3	Schmidt
2,276	Mex. & C. Amer.				
	Indian	157.5	82.6	52.4	Starr
33	Dyaks	157.0	82.5	52.5	Knocker
80	Quichua	158.4	83.0	52.5	Ferris
17	Javanese	157.1	82.5	52.5	Garrett
6	Bugis	154.4	81.2	52.6	Knocker
183	Filipinos	159.5	83.8	52.6	Bean
277	German			52.6	Pfitzner
25	Fuegians	157.7	83.0	52.7	Hyades & Deniker
10	India	158.1	83.3	52.7	Hagen
12	Pigmy	158.4	83.5	52.8	Poutrin
26	Sakai	152.3	80.5	52.8	Annandale & Robinson
90	Aino	156.8	83.0	52.8	Koganei
124	Quichua	158.3	83.7	52.8	Ferris
13	Spuzzum	159.7	84.5	52.8	B. A. A. S.
10	Shuswap	155.4	82.4	52.9	B. A. A. S.
75	Voguls	156.7	82.9	52.9	Rudenko
24	Quichua	158.7	84.0	53.0	Ferris
67	Quichua			53.0	Chervin
10	Harrison Lake	158.0	84.0	53.1	B. A. A. S.
12	Pigmy	155.1	82.5	53.2	Poutrin
4	Pigmy	151.2	80.6	53.3	Poutrin
127	Ostiaks	156.5	83.6	53.3	Rudenko
5	"Mallasque"	154.2	82.7	53.7	Rivet
53	Samoyeds	156.8	84.8	54.1	Rudenko
17	Aymara	156.4	85.0	54.6	Forbes
104	Aymara	159.7	87.6	54.8	Chervin

MALES. STATURE, 160.0 TO 169.9 CENTIMETERS.

19	Australia	166.4	77.5	46.8	Spencer & Gillen
16	Singalese	160.5	78.0	48.6	Deschamps
95	Kanembu	167.6	82.0	49.0	Gaillard & Poutrin
55	Oulad-Shinon	169.3	83.1	49.1	Gaillard & Poutrin
19	Papuan	165.6	81.6	49.2	Chalmers
20	Papuan	163.6	80.7	49.3	Chalmers
33	Teda	169.6	84.0	49.6	Gaillard & Poutrin
16	Papuan	167.7	84.0	49.9	Spencer & Gillen
14	Papuan	162.8	81.4	50.0	Hagen
82	Amboras	168.6	84.3	50.1	Verneau

TABLE VIII—continued

Number	Group	Stature	Sitting height	Sitting height Index	Author
44	M'Baka	167.1	84.2	50.4	Poutrin
15	Papuans	160.9	81.0	50.4	Schellong
18	Bondjio	163.0	82.5	50.6	Poutrin
25	Ba-Téké	162.1	82.5	50.7	Poutrin
77	Pima	169.6	86.0	50.7	Ten Kate
	Arawaks	161.5	81.8	50.7	Farrabee
25	Somali	165.5	84.5	50.8	Puccioni
27	Malser	162.1	82.5	50.8	Schmidt
44	Tamil	161.8	82.0	50.8	Hagen
	Batua	160.1	81.8	51.0	Poutrin
583	Amer. Negro	169.7	86.6	51.0	Bean
18	Papago	169.6	86.6	51.1	Ten Kate
57	Porto Rico	168.7	86.3	51.2	Boas
28	Badaga	163.9	83.8	51.2	Schmidt
20	Schonar	166.2	85.0	51.2	Schmidt
150	Egypt	163.4	84.1	51.3	Hrdlička
54	Kaffirs	166.2	85.3	51.4	Suk
32	Papuans	160.6	82.5	51.4	Schellong
200	Little Russian	166.9	85.2	51.4	Diebold
13	Melanesians	163.3	84.0	51.4	Hagen
9	Melanesians	161.7	82.5	51.4	Hagen
105	Javanese	160.4	82.5	51.5	Kohlbrugge
28	Pariah	162.5	83.7	51.5	Schmidt
22	Toda	169.0	87.2	51.6	Schmidt
30	Tatars	164.2	85.0	51.6	Benzengue
100	Jews	162.8	84.2	51.6	Blechman
99	Zapotec	160.5	83.0	51.6	Starr
15	Lolas	162.5	83.5	51.6	Delisle
27	Malay	160.0	83.0	51.6	Hagen
67	Berbers	164.3	85.2	51.7	Topinard
100	Paris insane	165.0	85.4	51.7	McAuliffe
304	East India	161.9	83.6	51.7	Schmidt
17	Brahman	162.6	84.4	51.8	Schmidt
23	Wellala	163.9	85.2	52.0	Schmidt
23	Sudra	165.9	86.2	52.0	Schmidt
100	Jews	165.1	86.0	52.0	Weissenberg
100	Tarascan	160.0	83.2	52.0	Starr
15	Nkamtúnemuq	165.7	86.3	52.0	B. A. A. S.
12	Lilloet	162.3	84.5	52.0	B. A. A. S.
127	Russians			52.0	Mainow
11	Melanesians	161.7	84.0	52.0	Hagen
18	Ntlakyapamuq	162.7	84.7	52.1	B. A. A. S.
780	Tsiganes	164.9	86.6	52.1	Pittard

TABLE VIII—continued

Number	Group	Stature	Sitting height	Sitting height Index	Author
38	Filipinos	160.9	84.0	52.2	Bean
50	French Lorraine	169.6	88.4	52.2	Collignon
	Jews (London)	165.1	86.3	52.2	Jacobs & Spielman
105	Shoshonean	166.1	86.7	52.2	Boas
7	Batavian	163.4	85.5	52.3	Garrett
100	Balkans	163.5	85.5	52.3	Pittard
100	French	166.0	86.8	52.3	Collignon
100	Normandy	168.1	88.0	52.3	Garnier-Moronval
38	Shuswap	165.2	86.7	52.4	B. A. A. S.
748	German			52.4	Pfitzner
377	Filipinos	163.3	85.8	52.5	Bean
100	French	165.1	86.8	52.5	
33	Chilcotin	165.1	86.8	52.5	B. A. A. S.
	Jews (English)	163.3	85.0	52.5	Jacobs & Spielman
125	Greeks	167.4	88.0	52.5	Pittard
100	French	164.0	86.1	52.5	Collignon
13	Lolos	168.4	88.5	52.6	Legendre
11	Eskimo	167.9	88.2	52.6	Boas
2,341	Tatar	163.6	86.1	52.6?	Pittard
40	Battaks	160.0	84.2	52.6	Hagen
41	Malays	161.5	84.8	52.6?	Hagen
29	Lolos	167.5	88.3	52.7	Legendre
100	Paris normal	165.1	86.8	52.7	McAuliffe
10	Sudanese	160.8	84.8	52.7	Hagen
30	French	163.6	86.3	52.7	Collignon
10	Lolos	166.7	88.1	52.8	Legendre
	Jews (London)	163.3	86.5	52.9	Jacobs & Spielman
7	Amer. Indian	166.3	88.4	52.9	Boas
12	Lilloet	164.3	87.0	52.9	B. A. A. S.
10	Sundanese	161.8	85.5	52.9	Hagen
100	Balkans	169.0	89.5	53.0	Pittard
	Jews (English)	168.8	89.3	53.0	Jacobs & Spielman
98	Tungus	163.1	86.5	53.0	Mainow
30	Thibet	164.3	85.9	53.0	Delisle
117	Chinese of Annam	164.6	83.6	53.1	Vaillant
207	Jakuts	162.4	86.2	53.1	Mainow
	English	169.8	90.0	53.1	Galton
90	Chinese South	168.5	89.7	53.2	Koganei
68	Bashkiri	165.7	88.2	53.2	Weissenberg
15	Maschtscherjaken	163.6	87.2	53.2	Weissenberg
60	Apache	169.7	90.3	53.2	Hrdlička
12	Utámk't	161.0	85.7	53.2	B. A. A. S.
	Jews (English)	160.8	85.0	53.2	Jacobs & Spielman

TABLE VIII—continued

Number	Group	Stature	Sitting height	Sitting height Index	Author
49	Chinese	161.4	86.0	53.2	Hagen
70	Java	161.4	86.0	53.2	Hagen
51	Filipinos	162.1	86.7	53.4	Bobbitt
100	Chinese	161.1	86.2	53.4	Legendre
53	Balkans	166.4	88.8	53.4	Pittard
307	Siberia	164.6	88.3	53.5	Paissel
12	Eskimo	167.5	89.7	53.5	Boas
92	Kalmucks	163.1	88.0	53.5	Karolew
125	Armenians	166.1	89.0	53.6	Pittard
942	Chinese	167.5	89.7	53.7	Koganei
181	Buriats	163.1	87.5	53.7	Schendrekowski
100	Esthonians	164.3	88.2	53.7	Gruber
20	Nass River	167.0	90.0	53.7	B. A. A. S.
69	Annam	162.3	87.6	53.8	Roux
24	Bilqula	166.0	89.6	53.8	B. A. A. S.
150	Mordvini			53.8	Mainow
105	Armenians	167.1	90.5	54.1	Tvarjanovic
61	Eskimo	162.7	88.3	54.3	Moore
18	Tinneh	163.7	89.0	54.4	B. A. A. S.
36	Kwakiutl	164.4	90.2	54.9	B. A. A. S.

MALES. STATURE, 170.0 TO 179.9 CENTIMETERS.

21	Australia	172.4	76.3	44.2	Spencer & Gillen
141	Niger	177.2	84.0	47.4	Tremearne
85	Bulala	175.2	83.0	47.4	Couv
25	Mongawa	171.0	82.0	47.9	Gaillard & Poutrin
30	Kouri	173.0	83.7	48.4	Gaillard & Poutrin
739	Niger	172.1	83.5	48.5	Ruelle
19	Toureg	172.1	84.0	48.8	Verneau
37	Niger	172.1	84.5	49.2	Tremearne
105	Bondamme	173.0	85.0	49.2	Gaillard & Poutrin
116	Niger	176.0	86.5	49.2	Tremearne
36	Toureg nobles	175.1	86.2	49.2	Verneau
41	Dahomey	176.3	87.2	49.4	Verneau
16	Papuans	170.2	84.3	49.5	Chalmers
142	Niger	173.0	86.2	49.8	Tremearne
111	West Africa	170.0	85.7	50.4	Verneau
152	Niger	170.5	86.2	50.5	Tremearne
688	Amer. Negro	172.9	87.2	50.5	Bean
29	Maricopa	172.2	87.8	50.8	Ten Kate
	Polynesians	175.5	89.6	51.0	Ten Kate
14	Polynesians	172.8	88.2	51.0	Ten Kate

TABLE VIII—continued

Number	Group	Stature	Sitting height	Sitting height Index	Author
100	Livonians	173.5	89.4	51.4	Waldhauer
536	Sioux	172.9	88.9	51.4	Sullivan
24	Balkans	178.5	92.0	51.6	Pittard
77	Sioux mix.	173.5	89.3	51.6	Sullivan
15	Tatar	178.5	91.9	51.6	Pittard
63	Kurds	170.0	88.2	51.8	Pittard
60	Lithuanians	170.5	88.8	51.9	Walber
295	German			52.1	Pfitzner
364	Canada	170.9	88.2	52.4	Pittard
2,066	Amer. white	174.0	91.1	52.4	Bean
17	Amer. Indian	171.0	90.3	52.8	Boas
	Jews London	171.2	90.7	52.9	Jacobs & Spielman
35	Pima Indians	171.8	91.0	52.9	Hrdlička
	Old American	174.3	92.3	52.95	Hrdlička
	English	172.5	91.5	53.0	Galton

MALES. STATURE, 180.0 TO 189.9 CENTIMETERS.

6	Niger	187.1	88.0	47.0	Verneau
140	Niger	184.0	90.8	49.3	Tremearne

FEMALES. STATURE BELOW 140.0 CENTIMETERS.

25	C. Amer.	139.9	76.2	54.5	Starr
120	Negrito	138.8	71.1	51.2	Newton

FEMALES. STATURE 140.0 TO 149.9 CENTIMETERS.

3	Semang	140.8	65.7	46.7	Duckworth
1	Borneo	148.0	71.6	48.3	Rose & McDougal
1	Borneo	146.5	73.8	50.3	Rose & McDougal
17	Bushmen	149.7	75.5	50.5	Werner
18	Bushmen	148.2	72.2	51.0	Seiner
3	Borneo	145.0	74.6	51.4	Rose & McDougal
2					
tribes	Arawaks	147.9	76.5	51.7	Farrabee
25	Dyaks	145.4	75.5	51.8	Rose & McDougal
15	Machiganga	143.9	74.2	51.8	Ferris
6	Borneo	149.3	77.6	51.9	Rose & McDougal
13	Ba Tua	143.7	75.4	52.5	Poutrin
4	Sakai	144.3	76.5	52.8	Knocker
223	German			53.0	Pfitzner
63	Filipino	147.8	78.5	53.1	Bean
573	Mex. & C. Amer.	145.3	77.2	53.1	Starr

TABLE VIII—continued

Number	Group	Stature	Sitting height	Sitting height Index	Author
7	Pigmy	143.5	76.2	53.1	Poutrin
53	Fuegians	147.3	78.2	53.1	Hyades & Deniker
17	Eskimo	149.7	79.7	53.2	Duckworth
5	Pigmy	144.3	77.0	53.3	Poutrin
26	Filipino	149.7	80.0	53.4	Bobbitt
55	Aino	146.8	78.4	53.4	Koganei
3	Aino	142.7	77.3	54.2	Koganei
13	Aino	149.5	81.6	54.6	Koganei
7	Aymara	147.8	80.6	54.6	Chervin
68	Quichua	145.4	80.4	55.6	Ferris

FEMALES. STATURE 150.0 TO 159.9 CENTIMETERS.

17	Australians	159.1	76.0	47.6	Spencer & Gillen
10	Australians	156.8	76.0	48.4	Spencer & Gillen
24	Sioux (old)	157.7	78.8	49.9	Sullivan
10	West Africans	158.3	79.7	50.5	Verneau
54	Negro	155.7	79.0	50.8	Poutrin
10	Polynesians	159.1	81.7	51.3	Ten Kate
5	Papago	157.6	81.0	51.5	Ten Kate
51	Pima	156.3	80.7	51.6	Ten Kate
19	Lilloet	152.5	79.2	51.8	B. A. A. S.
12	Nkamtnemuq	157.7	82.1	52.1	B. A. A. S.
30	Pima	157.4	82.2	52.3	Hrdlička
35	Okanagau	156.5	82.0	52.4	B. A. A. S.
62	Jakuts	153.4	79.5	52.4	Mainow
18	Thibet	152.6	80.0	52.4	Delisle
6	Eskimo	155.6	81.5	52.4	Boas
3	Borneo	159.5	83.8	52.5	Rose & McDougal
14	Gillooet	154.2	81.1	52.6	B. A. A. S.
	Ntlalsyapamupó	153.0	80.7	52.7	B. A. A. S.
28	Shuswap	155.0	81.8	52.8	B. A. A. S.
29	Apache	157.2	83.0	52.8	Hrdlička
21	Shoshonean	152.8	80.8	52.8	Boas
430	Tsiganes	153.2	81.2	52.9	Pittard
612	Germans			52.9	Pfitzner
25	Chinese	151.5	80.4	53.0	Pyle
38	Balkans	154.7	82.7	53.5	Pittard
17	Utámk	153.2	81.5	53.6	B. A. A. S.
	English	158.3	84.8	53.6	Galton
6	Eskimo	151.5	81.2	53.7	Boas
8	Quichua	154.1	83.2	53.8	Chervin
52	Jakuts	150.0	72.5	54.2	Mainow

TABLE VIII—continued

Number	Group	Stature	Sitting height	Sitting height Index	Author
10	Tungus	150.0	81.0	54.2	Mainow
	Jews English	152.0	82.5	54.3	Jacobs & Spielman
17	Nass River Indians	154.3	84.3	54.7	B. A. A. S.
33	Kwakiutl	153.7	80.7	55.4	B. A. A. S.
46	Eskimo	151.7	84.6	55.7	Moore
FEMALES. STATURE, 160.0 TO 169.9 CENTIMETERS.					
33	Niger	163.9	78.5	47.9	Ruelle
18	Maricopa	160.1	82.0	51.1	Ten Kate
44	Kaffir	161.0	82.6	51.4	Suk
156	Sioux	160.0	82.4	51.4	Sullivan
19	Sioux (mix.)	161.2	82.8	51.4	Sullivan
197	German	165.0	87.0	52.6	Pfitzner
	English	160.8	86.1	53.5	
200	Old American	161.8	87.35	54.-	Hrdlička

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