The racial anatomy of the Philippine Islanders : introducing new methods of anthropology and showing their application to the Filipinos with a classification of human ears and a scheme for the heredity of anatomical characters in man / by Robert Bennett Bean ... with nineteen illustrations reproduced from original photographs, seven figures.

643

Muskie

61

The RACIAL ANATOMY of the PHILIPPINE ISLANDERS

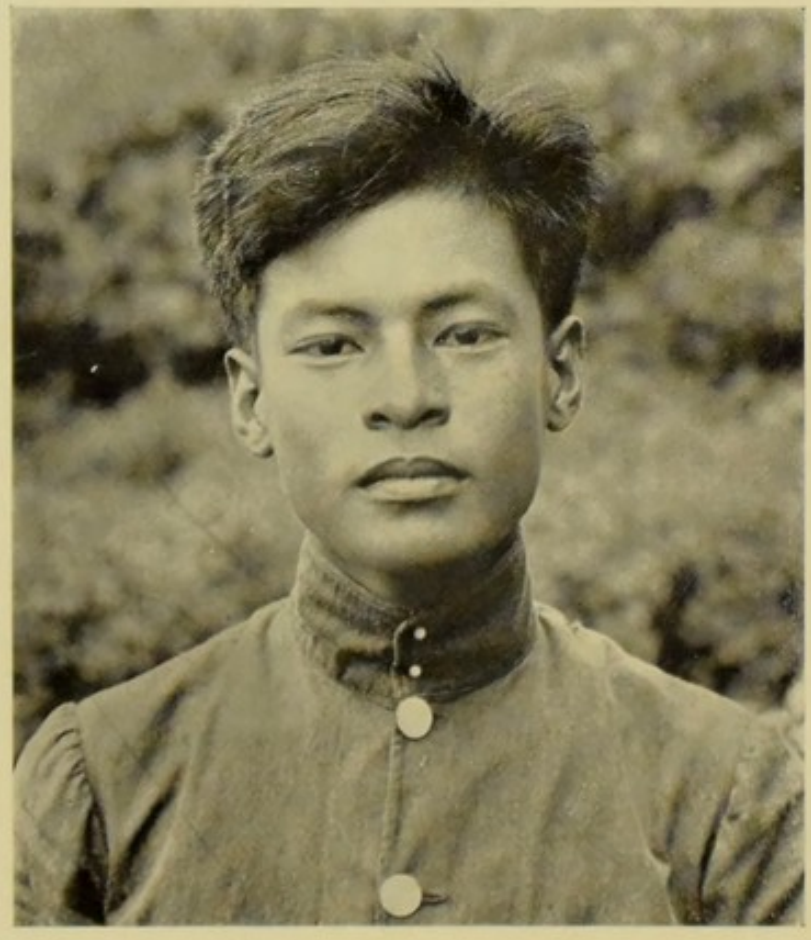

FIG. 1.—The Iberian Filipino. Iberian ears. A school-teacher from the Batanes Islands, north of the Island of Luzon.

FIG. 2.—The Modified Primitive Filipino. Modified Primitive ears. A *muchacho* from the Visayan Islands, south of the Island of Luzon.

THE RACIAL ANATOMY OF THE PHILIPPINE ISLANDERS

INTRODUCING

NEW METHODS OF ANTHROPOLOGY

AND SHOWING THEIR APPLICATION TO THE FILIPINOS WITH A CLASSIFICATION OF HUMAN EARS AND A SCHEME FOR THE HEREDITY OF ANATOMICAL CHARACTERS IN MAN

BY

ROBERT BENNETT BEAN, B.S., M.D.

ASSOCIATE PROFESSOR OF ANATOMY, THE TULANE UNIVERSITY OF LOUISIANA, NEW ORLEANS, LA.; FORMERLY ASSOCIATE PROFESSOR OF ANATOMY, PHILIPPINE MEDICAL SCHOOL, MANILA, P.I.

WITH NINETEEN ILLUSTRATIONS REPRODUCED FROM ORIGINAL PHOTOGRAPHS

SEVEN FIGURES

PHILADELPHIA & LONDON

J. B. LIPPINCOTT COMPANY

1910

Published November, 1910.

Printed by J. B. Lippincott Company
The Washington Square Press, Philadelphia, U. S. A.

To My Wife

ADELAIDE LEIPER BEAN

TO WHOSE CONSTANT ENCOURAGEMENT, INSPIRATION, AND ADVICE THIS WORK IS LARGELY DUE

PREFACE

THIS book represents studies of the human form rather than the skeleton, and embodies the results of three years' investigation of the Filipinos. A method of segregating types is introduced and affords a ready means of comparing different groups of men. The omphalic index is established as a differential factor in racial anatomy, the ear form becomes an index of type, and other means of analyzing random samples of mankind are presented for the first time.

The book, therefore, represents a new departure in anthropology, and the term racial anatomy of the living is not inappropriate as a title. Approved methods of the Old World have been utilized, and it is to be hoped that this contribution from the New World will be received with due consideration as a striving after truth.

I owe a great deal to Professor J. Playfair McMurrick and to Dr. A. Hrdlicka for their advice and inspiration during the inception of the studies. Grateful acknowledgment is ex-

tended to the Honorable Dean C. Worcester for access to his valuable collection of photographs, many of which cannot be duplicated elsewhere. To Dr. Paul C. Freer I am indebted for constant encouragement, literary criticism and liberality, and to Dr. R. P. Strong for procuring materials for publication. A large share of credit belongs to my wife, who assisted me in measuring the students, in the computations, in the arrangement of materials, in the literary product, and who by her liberality alone made possible the publication of the work.

I wish here to sound a warning to the general reader that the Introduction to this book need not be read, because it is unnecessary for the understanding of the remainder of the book and is technical, although it is to an extent explanatory.

No attempt has been made to give references to the literature, because references have been given already in the *Philippine Journal of Science,* where the original monographs of the author covering a part of the subject matter of this book have appeared from time to time during the past few years.

The object of this book is to establish definite

types of man that may be recognized by ear form, cephalic index, nasal index and other factors, that such types may be studied in families through several generations to establish their hereditary characteristics, and this is the author's reason for the present publication.

CONTENTS

ILLUSTRATIONS

INTRODUCTION

A Method of Grouping Individuals by the Use of Three Morphologic Factors

MATERIALS for the present work began to accumulate in 1905, when the author measured a few negroes in Baltimore at the Anatomical Laboratory of the Johns Hopkins University. To these were added the measurements of about 100 negroes in the Free Dispensary of the Johns Hopkins Hospital in 1906, the measurements of more than 1,000 students at the University of Michigan, and the measurements of 1,500 school children of Ann Arbor, Michigan, in 1905–7. After my arrival in the Philippines, in June, 1907, I measured about 800 students of the Trade and Normal Schools of Manila, more than 100 Igorots, 500 individuals of Taytay and Cainta, and about 200 subjects of Malecon Morgue. In addition I examined the ears of several thousand Filipinos from every part of the Archipelago. The original copies of all the above records are on file at the Wistar Institute of Anatomy, Philadelphia, Pa.

INTRODUCTION

After having measured the students at the University of Michigan it seemed essential to devise a method of classifying the individuals, because a system of means or averages is a very inadequate way to determine the composition of a body of people, and because the usual method of classifying indices does not always represent natural groups. At the time I believed that Deniker's classification of the people of Europe into six primary and four secondary races fitted the classes of students to some extent, although the types of students found in the University of Michigan were somewhat different from those of Deniker's European races. The accumulation of materials necessitated the selection of a method of treatment that would facilitate a rapid comparison of the groups with each other and with other groups of individuals, therefore three cardinal anthropomorphic characters were selected and treated as if they mingled in the usual Mendelian proportions with the formation of types much as if they were the results of interbreeding trihybrids (see pages 18 and 40).

The three factors used in the segregation of the types of students are the cephalic index, stature, and eye color, the latter as represented

by Martin's *Augenfarbentafel,* a box with artificial eyes numbered by decreasing intensity of pigment from 1 to 16. Each of the three factors is divided into three grades, and all the individuals who have any one factor in the middle grade are classed as intermediates or blends.

The Cephalic Index (of the head, not the skull index) is:

Dolichocephalic or long headed....less than 77.5.
Mesocephalic.....from 77.5 to 80 inclusive.
Brachycephalic or broad headed..more than 80.

The Stature is:

Tall.....above 170 centimeters.
Medium.....from 160 to 170 centimeters inclusive.
Small.....below 160 centimeters.

The Eye Color is:

Fair.....above number 10.
Medium.....from numbers 6 to 10 inclusive.
Dark.....below number 6.

To illustrate the method adopted in classifying the types, four groups are utilized. The first group is that of 127 instructors and advanced students measured at the University of Michigan in the early part of 1907, published here for the first time; the second group is that of 90 negroes measured at the Johns

Hopkins Dispensary in 1906, also published here for the first time; the third group is that of the 104 Igorots measured at Baguio in 1908; and the fourth group is that of the 183 men of Taytay measured in 1909. Not all the groups can be treated with the same factors, because of the absence of fair eyes in the last three groups. The ear form is substituted for the eye color of the negroes, and the nasal index is used instead of the eye color for the Igorots and the men of Taytay.

ADVANCED STUDENTS AND INSTRUCTORS AT THE UNIVERSITY OF MICHIGAN

Stature..... Head..... Eyes.....	Tall Dolicho Fair	Tall Brachy Fair	Tall Dolicho Dark	Tall Brachy Dark	....
Number of individuals....	23	17	16	4	
Stature..... Head..... Eyes.....	Small Brachy Fair	Small Dolicho Fair	Small Brachy Dark	Small Dolicho Dark	.... Blend
Number of individuals....	3	3	3	1	62

When the number of individuals of each type is compared with the theoretical results of crossing trihybrids that obey Mendel's laws, a striking similarity is noted. The calculated percentage proportion is as follows:

	1	2	3	4	5	6	7	8
	P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
Mendelian trihybrid.....	42	14	14	14	5	5	5	1
Michigan students.....	33	25	23	5	4	4	4	2

INTRODUCTION

The conformity of the types at the University of Michigan to Mendelian trihybrids is well marked for a random sample, such as the students represent, although the conformity may be only incidental, and the preponderance of some types over others due to chance rather than to the dominant or recessive characters. This is made more emphatic because Davenport and Davenport have recently demonstrated that dark eyes are dominant to fair, whereas among the students the fair-eyed individuals have the dominant position. It is, however, a singular coincidence that the type with recessive color factors is in the dominant position and the type with dominant color factors is in the recessive position, numerically.

That the negroes conform to the Mendelian trihybrids almost as well as the students is shown in the following table:

Stature..... Head..... Ears.....	Tall Dolicho Not negro	Tall Dolicho Negro	Tall Brachy Not negro	Tall Brachy Negro	....
Number.....	16	7	1	5	
Stature..... Head..... Ears.....	Small Dolicho Not negro	Small Dolicho Negro	Small Brachy Not negro	Small Brachy Negro	.... Blend
Number.....	2	4	0	0	55

The tall dolichocephalic negro with ears not negroid is in the dominant position, although

the groups with negroid ears appear to be dominant otherwise. This may be only the reflection of the impregnation of the black by the white, not a real negro ratio, and each alternate group may represent the mulatto.

So far the classification has worked well, but the men of Taytay and other groups of Filipinos necessitate other standards because their stature is not so great as that of the negroes and students and their cephalic index is different. The same standard is used, however, to demonstrate differences that appear by the nonconformity of the Filipinos to the standard set for the students and also used for the negroes.

THE IGOROTS AND MEN OF TAYTAY

Stature..... Head..... Nose.....	Tall Dolicho Narrow	Tall Dolicho Wide	Tall Brachy Narrow	Tall Brachy Wide	....
No. of individuals, Taytay.	1	0	0	0	
No. of individuals, Igorot.	0	0	0	0	
Stature..... Head..... Nose.....	Small Dolicho Narrow	Small Dolicho Wide	Small Brachy Narrow	Small Brachy Wide	.... Blend
No. of individuals, Taytay.	4	5	28	18	127
No. of individuals, Igorot.	5	34	3	12	50

The types of Filipinos are all small except for one man that conforms to a European type, but another method of classification as

given on the next page groups the Filipino into eight types that are similar to the types of students, except in cephalic index. The difference between the Igorots and men of Taytay is that the small, long-headed, wide-nosed men predominate among the former and the small, broad-headed, narrow-nosed men among the latter.

The four groups, American students, American negroes, Igorots, and men of Taytay may be contrasted with ease by a casual examination of the tables, and this contrast may be extended indefinitely by the use of factors other than stature, cephalic index and nasal index, eye color or ear form. Any three factors may be utilized in the way these have been used. For instance, hair form, facial index, and brachial index may be combined and would easily differentiate the negro from the white, in the same way that the stature, cephalic index and nasal index differentiate the Filipino from the European, and in addition the types that would be segregated might prove of interest in solving the composition of each body of people under consideration.

The following scheme is presented for the segregation of Filipino types; it is used with slight modifications throughout this book as

a working basis, and the types segregated by its use prove to be true morphologic forms of men:

The cephalic index of the head (not the skull index) is made the basis of the classification, the nasal index is secondary and the stature is subsidiary. Those individuals with a nasal index above 83 are called wide-nosed, those with an index below, narrow-nosed, and a stature of 165 centimeters is taken as the dividing line between the tall and the small. Those individuals are called Blends that have a cephalic index from 80 to 87 inclusive, when the nasal index is less than 12 above or below the cephalic index, regardless of stature.

The individuals with a cephalic index greater than 87 may be divided into four groups: The tall, wide-nosed, wide-headed people are called Adriatic because of their similarity to the people of that name designated by Deniker on the northern shores of the Adriatic sea; the small, wide-nosed, wide-headed are called Primitive because their physical characteristics are infantile, they resemble the Primitive types of other countries, and they are called Primitive by Hagen and others; the tall, narrow-nosed and wide-headed are designated B. B. B. (the big-

cerebellumed, box-headed Bavarian of Ranke, so-called by Beddoe) because they resemble a European type with similar characteristics; the small, narrow-nosed and wide-headed are called Alpine because they resemble the inhabitants of southern Germany, Switzerland, and central France, who are known as the Alpine or Middle European race. The Alpine and the B. B. B. are closely related types, and so are the Primitive and Adriatic, stature being the only differential factor. The four types are not greatly unlike but they form a group that is quite different from the four types with a cephalic index less than 80. The latter are segregated in a manner similar to that used for the other four types.

The individuals with small stature, narrow heads, and narrow noses are called Iberian because they resemble a type of Spaniard in the Philippines, which is the same as the Mediterranean race or Eurafrican of Sergi. The tall, narrow-headed, narrow-nosed people would be the northern European (Nordic), but very few are found in the Philippines, and as those found resemble the Mediterranean race they are included as Iberians. The tall, wide-nosed, narrow-headed individuals are called Cro-Mag-

non because they have some of the characteristics of that prehistoric people of Europe. Finally, the small, wide-nosed, narrow-headed individuals are called Australoid because of their characteristics that resemble the Australian. The Cro-Magnon and the Australoid, the Nordic and the Iberian, bear the same relation to each other that is found between the B. B. B. and the Alpine, the Adriatic and the Primitive, in which the only difference is stature. The Cro-Magnon and the B. B. B. resemble the Iberian, the Alpine and the Australoid resemble the Primitive.

This scheme is utilized in the segregation of Filipino types, and although an artificial division of the people is effected thereby, the groups segregated not only prove to be true types, but may even be designated as species of man.

The students of the Colonial Schools located in Manila will be treated first by this method, and it will become evident that other characters besides those used to segregate the types are found to be differential factors. This is an indication that the types are true and have other differences besides those used in their segregation—stature, cephalic index and nasal index.

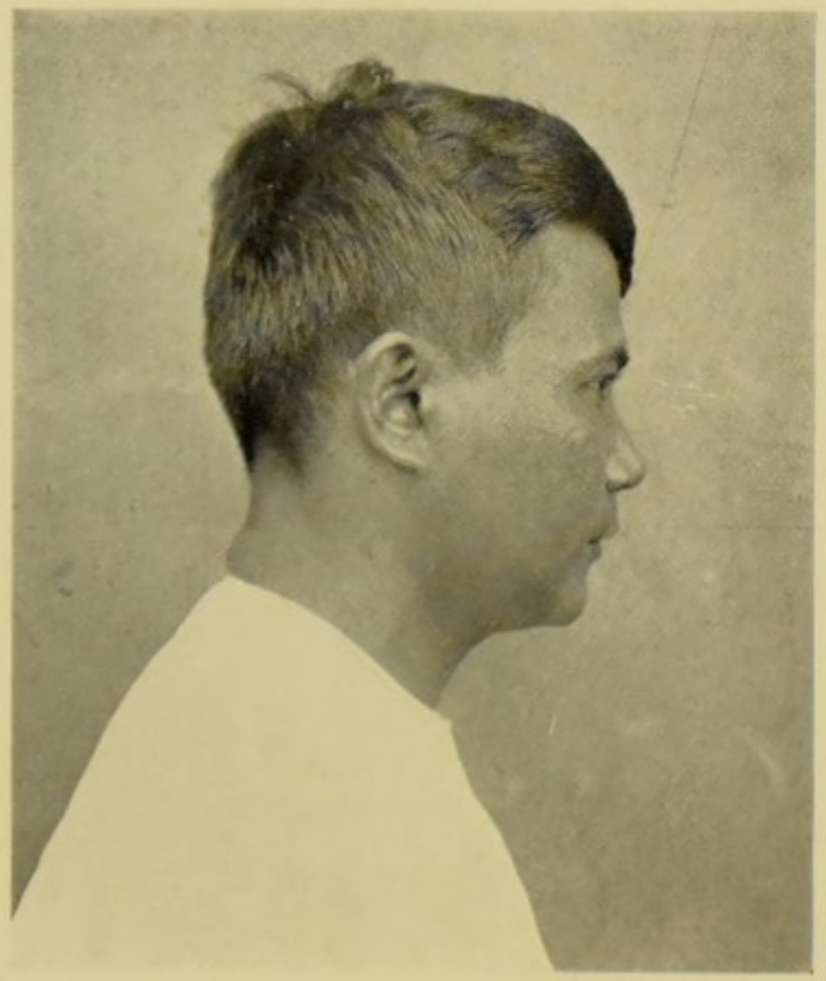

FIG. 3.—The Alpine Filipino. Modified Alpine ears. A *muchacho* from the Ilocano tribe of Luzon.

FIG. 4.—The same as Fig. 3.

THE RACIAL ANATOMY

OF THE

PHILIPPINE ISLANDERS

CHAPTER I

Types of Filipino Students

THE students utilized were measured at random, taking every individual available at the Philippine Normal School and the School of Arts and Trades, both located at Manila, but receiving students from all parts of the Philippine Islands, chiefly, however, from the littoral, or coastland population.

The average stature of the 377 students measured is 163.3 centimeters, the cephalic index is 82.1 and the nasal index is 82.55. The stature, and the cephalic index are about the same as that of the Middle European or Alpine stock, as represented by the people of central France, but the nasal index is greater, the nose of the students being broad and short.

Montano and others classify the Filipinos by

physical characters and locality into Negrito, Indonesian and Malay: the Negrito occupying the mountain wilds of the islands, the Indonesian the fertile interior, especially of Luzon and Mindanao, and the Malay occupying the coastlands. It is to be supposed that the littoral population is at present largely Malay, to which have been added Chinese and European elements, and in which still remains a remnant of Negrito and Indonesian.

In this work the students are classified as types by the method given in the Introduction, and in addition to the distinctive differences denoted by the three cardinal anthropomorphic characters, stature, cephalic index and nasal index, the types are characterized by differences in the teeth, in the circumference of the forehead, parietal, occipital and frontal regions of the head, in the dimensions of the face and other factors.

The first type for consideration is the Iberian, the Filipino mestizo which resembles closely the Eurafrican or Mediterranean race of Sergi and Ripley, and is one of the most distinct types. There are 25 students of this type, of which 16 are evidently mestizos, and the students come from the islands of Luzon

and Mindoro, many of them being from the city of Manila.

The Iberian is of medium height, or tall, with long, narrow head, face, and nose. The individuals are thin, and the head and face are small. A notable distinction is the large occipital and the small parietal circumference of the head. Only one individual has hair that is not straight; all have black hair, except one that has fine brown hair; the average age is less than that of the other types; and the teeth are badly decayed.

The next type to be considered is the Primitive, and it is presented immediately after the Iberian, because of the number of contrasts between the two. The Primitive is one of the fundamental types of the Orient, a fact that has been established by the author, and its presence in other parts of the world, as asserted by Hagen, cannot be denied. Only nine students of this type occur in 377, a comparatively small number, but the type is justified by its distinctive character, and it is more homogeneous than if more latitude were allowed in its segregation. The head is broad and short, the nose and face are broad and short, and the stature is small. Two of the nine have wavy hair,

which may be an indication of Negrito elements; 40 per cent. have no decayed teeth, and the average number of decayed teeth is 3 less than the Iberian; there are no mestizos among them; they come largely from Luzon, and a few are from the island of Leyte. The cephalic index of this type is about 10 higher than that of the Iberian, the nasal index is 12.6 higher, and the stature is 13.5 centimeters lower. The face is 10 millimeters wider than that of the Iberian, the parietal region of the head is large, and the occipital region small in relation to that of the Iberian. The teeth are notably free from cavities or any irregularities, and they are the best teeth among the 377 students. The age is a little more than that of the Iberian; therefore the differences are not due to less maturity, unless the Iberian matures early and the Primitive late in life. The type is believed to be a primary precursor of the Filipino, and it is related morphologically to the Negrito.

Closely related to the Primitive is the Modified Primitive, which would be included with the Primitive except for the fact that the average stature of the modified Primitive is 10 centimeters greater than that of the Primitive

and there is no overlapping of the extremes between them. The type is below the average stature, however, very broad headed and broad nosed, and has a short, wide face. The frontal and parietal regions of the head are relatively large, and the occipital region is relatively small. The teeth are sound, the individuals are further advanced in age, and the weight is a little greater in proportion to stature than the average. Forty-six individuals of this type appear, of whom none are mestizos and seven have wavy or curly hair. They come from the islands of Luzon, Negros, Panay, Masbate, and Romblon, which suggests that the Primitive type is generally distributed throughout the Philippine archipelago.

The Australoid type may be considered at this juncture because it is supposed to represent a mosaic of Iberian and Primitive. The stature is below medium, the head is narrow, the nose and face are broad. Thirty students of this type appear, of whom only one has wavy hair; the individuals are as young as the Iberian and equally thin. They were born in the islands of Luzon, Samar, Leyte, and Albay.

The characteristics of this type may be em-

phasized by contrast with the Iberian, which it resembles in head shape and stature, although it is not so tall and long headed. The nasal index of the Australoid is almost 20 higher than that of the Iberian, the face index is 5.3 higher, the number of decayed teeth is 20 per cent. less, and there are twice the number of individuals who have no decayed teeth, thus resembling the Primitive in all these attributes. I believe that this type represents a re-combination of the characters of the Iberian and Primitive types after crossing, and that it is one of the primary elements of the Filipino people. It resembles the Senoi or Sakai of the Malay Peninsula, and similar types are found in many of the islands adjacent to southeastern Asia. Similar types are also found among the Negritos of the Philippines and other places.

The Alpine is apparently another mosaic of the Iberian and Primitive types in which the broad head of the Primitive and the long nose of the Iberian are retained. The type is below the average in stature, very broad headed, narrow nosed, and the face is intermediate in breadth between that of the Iberian and the Primitive. The head shape is like that of the Iberian, except that the occipital circumference

is 13 centimeters less, in which this type resembles the Primitive. There are 30 students of this type, of whom eight are mestizos. They were born in the islands of Luzon, Leyte, Negros, Mindanao, Marinduque, Lubong, and the father of one is from Spain. Chinese elements are also noted, and the type represents a mixture of Spaniards, Chinamen, and Filipinos.

The students of the B. B. B. type also have indications of both Spanish and Chinese characteristics. Five are mestizos, 10 resemble Chinese, and one has wavy hair. They come entirely from the island of Luzon. The chief characteristics of this type are stature above the average, very wide head, but comparatively narrow face and nose. The number of decayed teeth is large and the age is above the average. The circumferences of the head are almost identical with those of the Primitive type, but the stature is 8.7 centimeters more, and the nasal index is 20.9 less. This appears to be another of the mosaics of the Iberian and Primitive types, in which the stature and nose form are Iberian and the head form is Primitive.

The Adriatic type is the last to be considered except the Blends. There are 24 individ-

uals of the Adriatic type, of whom 6 show evidence of European characters, one is a Chinese mestizo, and three others resemble the Chinese. The individuals come from the islands of Luzon, Bohol, Panay, and Negros. The notable characteristics of this type are the stature, which is 2 centimeters less than the average stature of the white people of Europe and America, the short, broad head and face, the broad nose and the large frontal region of the head. The average number of decayed teeth is large, although a great many individuals have no decayed teeth. The Adriatic type is an enlarged Primitive with the addition of European and Chinese characteristics.

The group of Blends is yet to be considered. This group is analyzed by correlating the cephalic index, nasal index and stature. At one extreme is found a tall element of 35 students with mesocephalic heads and relatively narrow noses who resemble the Cro-Magnon of prehistoric Europe. This race was noted for great height; long, high, narrow head; prominent occipital region; and large, square face. This tall element has a sitting height 10 millimeters more than the total for the group of Blends, the head length is 5 millimeters more, the total face

height is 5 millimeters more, the bizygomatic breadth is 2 millimeters more, and the circumference of each region of the head is 4 millimeters more; all of which brings this group nearer to the dimensions of the prehistoric Cro-Magnon than is any other group of students.

At the other extreme of the blending type an element is found with small stature, brachycephalic heads and relatively narrow noses, thus resembling the Alpine type. There is also an element with small stature, mesocephalic heads and broad noses, that is intermediate between the Primitive and Australoid types; and another element with tall stature, moderately brachycephalic heads, and relatively narrow noses that simulates both the B. B. B. and Adriatic types. Finally there is an element which predominates in numbers that has intermediate stature, moderately brachycephalic heads, and relatively narrow noses, which appears to be the ultimate Blend of all the types, and represents the Filipino of the future.

Negrito elements enter into the group of Blends, as indicated by the curly-haired students of this group, of whom 2 per cent. are found in the group with the cephalic index about 80, 10 per cent. in the group with ceph-

alic index about 83, and 9 per cent. in the group with cephalic index about 86. The increased percentage of curly hair with increase of cephalic index points to Negrito rather than European influence, although the latter cannot be excluded in accounting for the curly hair or the broad head.

The group of Blends, taken as a whole, is below the average stature, the head is brachycephalic, and the nose is moderately broad; the face is wide and short. The type is apparently molded more in body weight and stature by the European types, and more in head, face and nose form by the Primitive and Australoid types. This may be due to both natural selection and sexual selection. The most robust, yet those with Oriental characteristics, have survived, and these are the most likely ones to be selected as mates in marriage.

Comparing the Iberian, Alpine, and Adriatic types, as established by Deniker in Europe, with similar types found by me at the University of Michigan, and contrasting these with the types of the same name described above, it is determined that the stature of each type is greater in America than in Europe and greater in Europe than in the Philippines; the

cephalic index is higher in America than in Europe, and higher in the Philippines than in America, except that the Filipino Iberian is taller than the European Iberian, is more dolichocephalic than the American, and less so than the European; and, finally, the nasal index of the Filipino Iberian is notably greater than that of either the European or the American. The greater height and nasal index and the altered cephalic index of the Iberian type are no doubt due to the inclusion of tall Iberians, similar to the Northern type of Europe, many of whom are of Chinese extraction, and to the influence of the Oriental types with whom they have crossed.

It seems justifiable to believe that types similar to the European Iberian, Alpine, Adriatic, B. B. B., Northern and Cro-Magnon exist among the Filipinos, and that they have been derived from European sources in both recent (Spanish) and remote times. The recent types, the Iberian, the Alpine and the B. B. B. are more distinct than the remote types, the Northern, the Adriatic and the Cro-Magnon, which may be due to greater blending of the remote types with the Australoid and Primitive or it may be that the three remote

types have been derived from the Chinese and were already in a blended condition when they reached the Philippines. It is safe to say that the Iberian, Alpine and B. B. B. represent modified European types, the Northern, Adriatic and Cro-Magnon represent modified Chinese types previously derived from Europe, and the Primitive and Australoid represent primary Filipino types.

M. Moszkowski, who investigated the physical characteristics of the people of East Sumatra, reports two types not Malays, the Orang Akett and the Orang Sakei, who correspond in physical measurements with the Primitive and Australoid students. The Orang Akett, who are similar to the Primitive, have woolly hair and resemble the Negrito, and the Orang Sakei, who are similar to the Australoid, resemble the Veddahs of Ceylon and the Senoi or Sakai of the Malay Peninsula. I am therefore convinced that the Primitive and Australoid students are closely related to these forms, in spite of the absence of woolly hair among them. In the Malay Peninsula, in the Pacific Islands, and in parts of the Philippines, the Negrito has remained more or less predominant, whereas along the littoral of the

Philippine Islands they have become incorporated in the immigrant population that has maintained its predominance.

The word Malay has been avoided purposely so far because I have been unable to decide to my own satisfaction what is the Malay type, if there is such a type. My opinion is that the Malay is a composite of the Iberian from Europe, the Primitive from Asia, and the Australoid from its primary center, wherever that may have been. Modified European types such as the Alpine, Adriatic, B. B. B., Northern and Cro-Magnon also form a part of the Malay population of the Philippines.

If the Australoid and Primitive types represent the original elements of the Filipinos, and the other types represent modifications caused by Europeans and Chinese, recent and remote, then the individuals of the present population are larger than the original in all physical characters. Continued immigration, with consequent interbreeding of Americans and Chinese with the Filipinos, will result in further increase of size. With increase of size go increase in bodily and mental vigor. Advance on the part of the Filipinos will be coincident with and incident to the continuation of the

amalgamation of the races, although better nutrition, fewer animal parasites, and improved hygiene may assist in the advance.

The class standing of the students was obtained for the year in which they were measured, and it is treated by grouping the studies into literature, which includes history, geography, languages and such general subjects; mathematics, which includes, of course, arithmetic, algebra, geometry, etc.; and science, which includes physics, chemistry, botany, zoölogy, and practical courses necessitating handiwork. The average of each group of studies is determined first for each type, and to this is added the number of students of the type with a grade of 80 or over, and, in addition, the number of students with a grade of 90 or over; after which is subtracted the number of students of the type with a grade of 69 or less, and from this at last is subtracted the number of students with a grade of 59 or less. In this way the high and low grade students are given an additional count; and the type average may thereby be altered up or down if the type contains many good or bad students.

The most striking result of the grading is that the Australoid has the lowest grade, with

the Iberian and Blends close seconds, and all the others have about the same grade. The Iberian and Australoid have better grades in Mathematics than in other subjects, although disregarding the Blend, theirs are the lowest grades in this subject. The Alpine has the highest grade in mathematics and this is the highest grade of any type in any subject. The Blends have a lower total grade than the types, and the grade of the Blends is particularly low in mathematics. It is high in science, however, whereas the types have a high grade in mathematics and a low grade in science. The class standing of only three Primitive individuals was obtained. Disregarding the average and considering the individuals only, there is evident high class standing of at least two of these in mathematics, and one student has a high mark in all three departments. Whatever the physical condition of the Primitive type, there is no evidence of mental deficiency, at least in the three students whose grades were examined.

It is of interest to note the fact that the types of students with a large amount of Chinese admixture have the highest class standing; the types that represent a mixture of Spanish and

Filipino elements have the lowest class standing; and the types that represent the original Filipino have a low and intermediate class standing. It is also noteworthy that the types with a well developed frontal region have a high class standing.

When the relative number of extremely good and extremely bad students is considered with the mediocre, it is found that a greater number of the extremes are represented in mathematics than in either science or literature; many students are either very good or very poor in mathematics. Omitting the extremes, the students have a lower grade in mathematics, where imagination and reason are important, than in science and literature, where handiwork and memory are important.

Mendelism and Student Types

When the types of Manila students are compared with the polyhybrids resulting from the crossing of two unlike tomato plants, great similarity is found between the number of student types and the number of polyhybrids, and the relative numerical proportion of individuals to each type.

Price and Drinkard obtained eight forms of

tomato plants upon crossing the Yellow Pear which is characterized by "pyriform shape and yellow color of fruit and green foliage" with the Honor Bright, which possesses "the three opposite attributes of round or spherical fruit shape, red fruit color, and yellow foliage color." "In this cross there was noted complete dominance of green foliage color, red fruit color, and round fruit shape."

Suppose the green foliage color to represent the small stature, the red fruit color the round head, and the round fruit shape the broad nose; then the three characters combined represent the Primitive type. The three opposite characters, tall stature, long head, and narrow nose, represent the northern type of Europe, which is not found among the Filipino students. If two such types have crossed in the production of the Filipino, then all possible combinations of the three characters constituting the two types should be found according to the law of Mendel relating to polyhybrids as formulated by Price and Drinkard:

"When parents differing with respect to more than one pair of characters are crossed all possible combinations of these characters will be found in the F^2 generation and these

combinations will occur in a definite numerical proportion." The following table shows the theoretical requirements for a Mendelian trihybrid, the actual proportions secured from 40 plants of the tomato as a result of the cross of the Yellow Pear and the Honor Bright by Price and Drinkard, and the proportion of each type found among the 377 students of the Trade and Normal schools at Manila, with the proportions previously given of the types of advanced students and instructors at the University of Michigan.

MENDELISM AND STUDENT TYPES.—PERCENTAGES

Mendelian trihybrid, theoretical (per cent.)	Tomato hybrid, forty plants	Filipino types, Manila students		American types, students and instructors, University of Michigan	
42	37.5	Primitive and modified		Northern	33
..	....	Primitive	30	.....	..
14	7.5	Alpine	16	Kelt	25
14	25.0	Australoid	16	Littoral	23
14	17.5	Adriatic	13	Adriatic	5
5	2.5	Iberian	14	Saxon	4
5	2.5	B. B. B.	11	Vistulian	4
5	5.0	Cro-Magnon	?	Alpine	4
11	2.5	Northern	0.0	Iberian	2

It is to be noted that the eight European types are not the same as the eight Filipino types, although two factors, stature and cephalic index, are the same, therefore the types are similar but not necessarily identical. It is

further to be noted that the type which predominates in America, the Northern, is absent in the Philippines, and the type which predominates in the Philippines, the Primitive, is absent in America, or else these types have become modified. This may be an indication of the breeding out of extraneous elements in a population that has crossed with a foreign type. (Cf. Chapter VIII.)

It is conceivable that the union of two diverse types, the Primitive and the Northern (Iberian), may have produced all of the types in a manner similar to the production of tomato hybrids by the crossing of the Yellow Pear and the Honor Bright. The facts are suggestive, although not entirely in accord with the known composition of the groups of people examined. It is known that the European, the Chinese and the Negrito enter into the composition of the Filipino people, indications of which have been presented in this chapter. The composition of the population of Europe is diverse, although the most pronounced types are similar to the Primitive (Alpine) and Northern (Iberian).

The types of many groups may represent by the chance distribution in a random sam-

ple, similar types of which the various peoples of the group are composed. It may be that each of the peoples of the earth is composed of eight types and when the different peoples are brought together the fusion of the elements by chance distribution following Mendel's laws results in only eight types, the preponderance of one over another depending upon the relative preponderance of similar types among the peoples who unite. Suppose that the Primitive and Australoid preponderate among the Negritos, the Alpine, B. B. B., and Adriatic among the Chinese, and the Iberian, Northern and Cro-Magnon among the Europeans, then the relative proportion of these types in any part of the Filipino population would indicate the relative proportion of the three peoples in that part of the population. Among the students, therefore, the Chinese element is large and the European and Negrito elements are small.

The study of the students by the method of grouping reveals types that apparently represent *character-complexes* composed of unit characters that obey Mendel's laws in heredity. A *character-complex* is a group of characters, such as the small stature, broad head and broad

nose of the Primitive, that hangs together in heredity or breaks up when crossed with another *character-complex,* such as the tall stature, long head, and long nose of the Northern, in the formation of new *character-complexes* which are recombinations in all possible ways of the individual characters, the original *character-complexes* being also retained.

Additional differentiating factors besides those used for the students should be utilized in the analysis of groups of individuals, therefore the measurement of the body parts in addition to the head measurements and stature was undertaken in the study of the Igorots, which follows.

CHAPTER II

The Benguet, Lepanto and Bontoc Igorots

PREVIOUS to my investigations of the physical characteristics of the Igorots, no such study had been made of this people, and I was surprised to find individuals among them resembling the European, as shown in the picture on the opposite page (Fig. 5). The Igorots live in the Mountain Province of Luzon, which includes not only the old Provinces of Benguet, Lepanto and Bontoc, but other sub-provinces have been added to it, until now it contains all of the most mountainous region of Northern Luzon. The mountains of this region are called the *Cordillera Central del Norte* of the island, some of the most inaccessible portions of which lie north of Benguet in Lepanto and Bontoc.

Baguio, the capital of the Mountain Province, is somewhat less than 300 kilometers due north of Manila, about 30 kilometers east of the coast, and at an altitude of 1,500 meters above sea level. It has a temperate climate

FIG. 5.—The Iberian Filipino. Iberian ears, type A. A head-hunter from the Bontoc Igorot tribe of northern Luzon.

and is located among pine hills on an irregular plateau southwest of the center of Benguet at the terminus of one of the most remarkable highways of the world. The latter is to a large extent carved out of solid rock and suspended in midair over the deep cañon of the Bued River. The plateau on which Baguio is located rises northward along the west of the Province in the form of a group of rugged mountains intersected by small streams that cut their way through narrow gorges to Lingayan Gulf and the China Sea, passing through Pangasinan as well as Union Provinces, the latter inhabited by Ilocanos, one of the most thrifty and energetic people of the Philippines, and great colonizers. The Ilocanos form the littoral population of the western coast of northern Luzon and have penetrated the mountains to some extent. The eastern part of Benguet from its extreme northern end to its southern limit is drained by the tributaries of the Agno River, beyond which are mountains separating it from the Province of Nueva Viscaya on the east. Benguet is thus divided into mountain and valley, or highland and lowland, and except over the Benguet Road, or by rough mountain trails,

the entire Province is inaccessible. The gorges of the rivers that pass out of the mountains are filled with water during the rainy season, their beds are rough, the sides precipitous and the mountains steep and rugged, so that both mountains and rivers form very difficult ways of entry. The mountains are being riddled with trails that have a grade of less than 10 per cent., many of which can be widened and utilized as wagon roads in the future; the most audacious of these is now nearing completion and will connect Benguet with Lepanto and Bontoc.

The inhabitants of this isolated region could have arrived only by crossing high and rugged mountains, or by picking their way along the beds of the rivers during the dry season. Whether they came of their own accord or were forced from the coastlands by other peoples may never be known. I believe the Igorots pushed into the mountains as bold pioneers in much the same way that the Puritan, the Scotch-Irish and the Cavalier crossed the Appalachians and settled the western part of the United States. They probably exterminated or absorbed any previous inhabitants and have built for themselves enduring monuments

in their rock-ribbed and terraced rice paddies, and in the rock shelters for their dead. Their muscular development is phenomenal, due no doubt to their incessant mountain climbing and burden bearing, and compares favorably with that of the world's best athletes. Their laws and customs are founded on justice and equity, and measure for measure is the quality of their execution. Civilization has not yet greatly affected the Igorots and they are being protected from its evil influences as carefully as sedulous officials can protect them. They are one of the few uncivilized communities that civilization has touched but not defiled.

I made excursions to points near Baguio from time to time, and obtained a few measurements at the Benguet Sanitarium and among the camps of laborers located in the vicinity of the town. The greater number of the individuals measured were young men, and they represent the Igorot population of their section fairly well. Trips were made to Atok, Tublay and Capangan for the purpose of making the survey of the people as representative as possible.

The people of Atok, in the western part of Benguet, are a characteristic group of Igo-

rots and represent the mountain or highland people especially well. Atok is a bold point that juts out from the surrounding mountains at an altitude of 2,000 meters above the sea level, and its precipitous sides furnish a barrier almost impassable in time of attack. The inhabitants of this region were the last to come under the jurisdiction of the United States of America, and it was only by superior force of arms that they finally submitted. They live on their rocky fortress, work the paddy fields of the valley below, and return to their stronghold at night. They are a self-reliant and progressive people, with sound judgment and wise deliberation in their councils. The administration of their affairs is in their own hands under the guidance of the governor of the Province. Their chief *baknon* (old man) has already roofed his house with galvanized iron for protection from the tremendous downpours of rain which are so frequent in this region, and others are following his example.

Men and women are on practically an equal footing. The men work away from home for means to provide food, shelter, and draft animals (for working the paddy fields), and when at home the men care for the children. The

women work at home raising the small crops (*camotes,* coffee, etc.), prepare the food, and assist the men in the transportation of surplus products to distant markets over steep mountain trails, acting with them as common carriers. The women also have a voice in the councils and often exercise a controlling influence. The life of the Igorots is an existence of ideal sexual equality in many respects, and civilized nations might profit by their example.

The physical characteristics of the Igorots will be presented first by a consideration of the stature and the length of the body parts, and second by a consideration of the head form and physiognomy, with descriptions and actual measurements. Observations were made of many hundreds of Igorots, and actual measurements compassed 104 adult males, 16 years and over, 10 adult females, and 30 boys between the ages of 5 and 15 years, inclusive. The Igorots may be grouped for convenience into those from Lepanto and Bontoc, of whom there are 14 adult males, those from the mountains of western Benguet, of whom there are 46 adult males, and those from the Agno River valley, including Baguio and vicinity, of whom there are 44 adult males. The three

groups will be called Bontoc, Highland and Lowland for purposes of description, comparison and contrast.

Stature

The Igorots are a people of small stature (below 160 centimeters) although many individuals are above the average (165 centimeters) and some are tall (above 170 centimeters). The average or mean stature of 104 adult males and 10 adult females is 154.0 centimeters and 146.7 centimeters, respectively.

The stature varies directly with the altitude, but probably this variation is not due to the effects of mountain or river, but to the difference in type of the individuals making up the population. The accessible parts have been influenced by infusions of blood from outside the Province, whereas the inhabitants of the inaccessible regions are more like the original type. However, it is possible that outsiders of a bold and daring nature penetrated to the most inaccessible regions, and these may have been tall individuals who increased the average stature by their presence and by their progeny.

The individuals of the three groups, Bontoc,

Highland and Lowland, may be divided into those of small, those of intermediate, and those of tall stature. The stature of the small individuals varies around that of the Negrito (148 centimeters); that of the tall individuals around that of the European (165 centimeters); and the stature of the greatest number of individuals around that of the Malay (154 centimeters). The three groups of Atok are slightly taller and the three groups of Baguio and vicinity are slightly smaller than the figures given, but the three groups are represented there as definitely as elsewhere. The conclusion from the examination of the stature alone is that at least three groups of people make up the Igorot population, and these three groups are represented in each community, although more of the tall men are from Bontoc, more of the small men are from the Lowlands and more of the men of intermediate height are from the Highlands.

Sexual differences cannot be stated fairly, because so few women were measured, but it may be of interest to note them. The mean stature of the ten female Igorots is 146.7 centimeters, which is greater than it should be in relation to that of the men. The usual sexual

difference is seven per cent., the female less than the male, but the stature of the Igorot women is 1.8 per cent. nearer that of the men, the sexual difference of the Igorots is therefore only 5.2 per cent.

The stature of the Igorots is a racial character and not a local condition, because racial differences in stature are characteristic and persistent, although local conditions acting on the same people for many thousand years may effect a change in stature that becomes a part of the inheritance.

The stature of the boys as contrasted with that of the adult males, and the relation of growth to age deserve consideration. The ages given are not exact in every instance, because the age is determined by the number of rice harvests since the birth of the individual, but as the rice harvest is annual, this method of record is fairly accurate.

The two most significant features of the relation of stature to age are apparently the early maturity of the Igorots and their acquisition of their maximum stature at an earlier age than Europeans. The growth of the Igorot is similar to that of the European, but it is more rapid. The Igorot male is relatively

as well developed at the age of 16 years as the European at 18, and the relative growth of the Igorot boy is intermediate between that of the European girl and the European boy. The maximum height of the Igorot is reached between 20 and 30, that of the European ten years later. The stature of the different groups of Igorots varies directly with the altitude and inaccessibility of their location, but the rate of growth, the time of maturity, and the actual height are characteristics of the stock and not due to environment.

Extremities

The Igorots are essentially short-armed, although there are long-armed individuals, and the three groups show differences in the absolute length as well as the relative length.

The proportions of the body parts may be discussed by dividing them into groups; the upper extremity consists of upper arm, forearm and hand; the lower extremity consists of upper leg, lower leg and ankle; and the body consists of head, neck and trunk.

According to the absolute and relative lengths of the upper extremity as a whole, and of its three parts, the Lowland Igorots corre-

spond closely to the Senoi of the Malay Peninsula, and are similar to the Negrito, whereas the Bontoc and Highland Igorots are more like the other Malays of the Peninsula, and similar to the European, but unlike the negro.

The relative hand length of the Igorots from Bontoc is the same as that of the European, whereas the hand of the Highland, and of the Lowland as well, is unlike the European, Chinese, or negro, because it is relatively shorter.

The absolute and the relative lengths of the entire upper extremity, and of each of its parts are slightly less for the women than for any group of the men, except that the hands of the men and women of the Highland group are exactly the same in relative length.

The absolute and relative length of the lower extremity is greatest for the Bontoc, least for the Lowland, and intermediate for the Highland Igorots. The women have absolutely and relatively shorter legs than the men of the Highland group, with whom they should always be compared, because they belong to that group.

The lengths of the integral parts of the lower extremity are relatively the same as that found for the entire lower extremity, namely, the

Bontoc has the longest limb parts, absolutely and relatively, the Lowland has the shortest, and the Highland Igorot has an intermediate length.

The relative length of the upper leg follows the absolute, as does the relative length of the entire lower extremity, therefore one may say the length of the lower extremity is determined by the length of the upper leg, which in its turn determines the stature of the individual. In other words, the correlation of the stature, the length of the entire lower extremity and the upper leg length is pronounced. The same is not true of the lower leg, but rather the opposite. With absolute increase of length of the lower leg, the relative length decreases, therefore the smallest Igorots have relatively the longest lower legs. A striking similarity between the forearm and lower leg is noticed. The smallest individuals have relatively the longest forearms and lower legs, whereas the tallest individuals present the reverse.

The dimensions of the extremities of the Igorots, both absolute and relative, rank as low as any other people that have no Negrito blood, and they approach closely the Negrito and related peoples, approximating the Senoi or

Sakai of the Malay Peninsula, the Japanese, the Ainos, and the Cochin Chinese.

The Bontoc Igorots in general resemble the European in the dimensions of the limb parts, the Highland Igorots resemble the Malays, and the Lowland Igorots resemble the Negritos.

The shoulder width and the width of the hips may be compared in this connection, to determine the relationships of the Igorots and their differences from other peoples. The shoulders of the men are relatively (to the stature) wider than those of the women and the Lowland men have the widest shoulders. The hips of the women are relatively wider than those of the men. The hip breadth divided by the shoulder breadth is naturally greater among the women, but this is much less for the Igorots than for Europeans. The Bontoc and Highland Igorots approach the European more closely than do the Lowland. The difference between the Bontoc and the French men, as given by Topinard, is 5.2 per cent., and the difference between the Igorot women and the French women is 10.6 per cent. The reason for this disparity on the part of the Igorot women is not so much in poorly developed hips as in

well-developed shoulders, due to field work and burden bearing.

The Igorots are intermediate between the European and the negro in relative hip breadth.

The Body Parts and the Artistic Canon

The body length, including the head, neck and trunk, is inverse to that of the lower extremity; the Lowland has the longest, the Bontoc the shortest, and the Highland is intermediate. The body of the women is relatively longer than that of the men. The body of the Igorots is relatively longer than that of the Europeans, and slightly greater than that of the Malays of the Peninsula, according to Martin.

The neck presents unexpected differences, because presumably the neck of the long man would be longer than the neck of the short one, whereas the neck of the Highland Igorot is the shortest, even shorter than that of the women, absolutely and relatively; that of the Lowland is longer than the others, even longer than that of the Bontoc. The women have relatively as long necks as any of the men; although they are not exactly swanlike, there is

symmetry and beauty in their lines and proportions.

When a typical Igorot is compared with the normal European woman's figure as given by

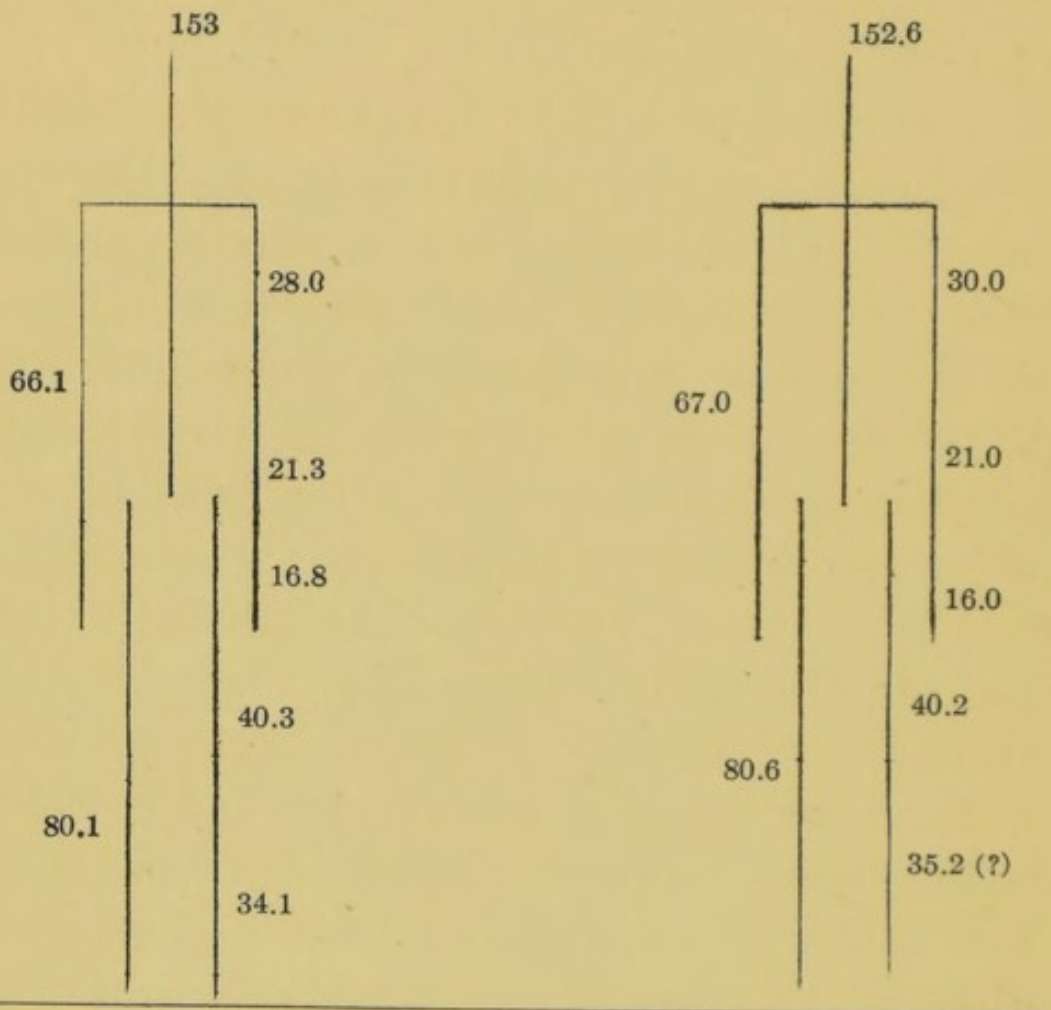

FIG. 6.—Absolute length (in centimeters) of the body parts of a Senoi man (left figure) and an Igorot man (right figure).

Merkel, according to the canon of Fritsch, it is noticed that there is no great disparity between the two in the relative proportions of the body parts. The neck and the upper part

of the head of the woman are longer than those parts of the Igorot, whereas the body and the legs of the Igorot are slightly longer than those of the woman. The abdomen (waist) of the woman is longer, the umbilicus higher than in the Igorot.

The canon of Fritsch takes as its standard the length of the vertebral column, and the other body measurements are compared with this. The length of the vertebral column is equal to the distance from the pubis to the tip of the nose or the nasal spine. With this basis photographs may be made an adjunct of anthropometry when interpreting the length relations of the body parts. The artistic modulus, which is the total head height from chin to vertex in relation to the stature, may be used in like manner. The modulus of Geyer, which is the stature equal to 8 total head heights, is said to be the artistic ideal for the European, although this may have to be modified slightly.

An average individual Igorot, then, resembles in form the woman of Europe, and represents a protomorph of the nature folk, according to the division of mankind by Stratz into three groups, *protomorphs* or nature folk, *archimorphs* or highly differentiated people,

and *metamorphs* or mixed races. The protomorphs are short in stature with relatively long

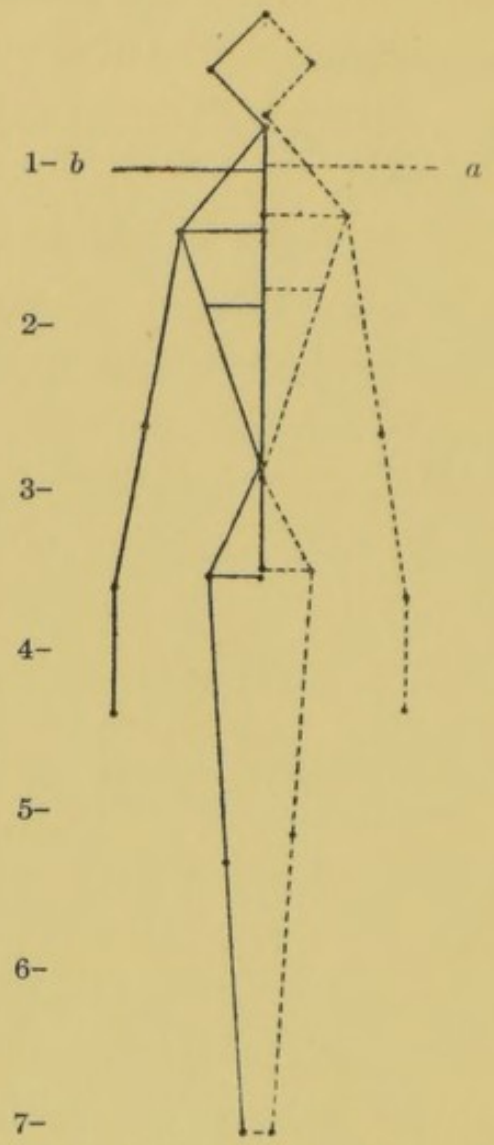

FIG. 7.—The left side of the figure (solid lines) is Merkel's standard female European according to the canon of Fritsch, and on the right side (dotted lines) is a typical Igorot (No. 52) according to the same canon. *a* and *b* point to the chin.

total head height, which is in the lower face and not in the cranium, and their arms are relatively long, in which they differ from the

European according to the canon of Fritsch and the modulus of Geyer. They include the Australian, Papuan, Hottentot, American Indian, Eskimo, Philippine Negrito, and the African pigmies. The archimorphs are the leukoderm or white, the melanoderm or black and the xanthoderm or yellow. The melanoderms are relatively short in stature, long in arm, and short in upper head height, according to the European standard by the modulus and canon given above. By the same standards the xanthoderms are relatively short in stature, in length of leg and in upper head height. The metamorphs are mixtures of the other groups, and are found along the zones between the black, white and yellow races; principally in northern Africa, eastern and southern Asia and in the islands of the Pacific. This classification is artificial or superficial rather than fundamental, based as it is on linear measurements only, and these largely through the means of photographs. However, it may serve in a general way, and by its indications the Igorots belong to the pigmies of the earth. This may be established more in detail by the examination of the head form, but before this is presented it may be well to note that the Igorots are not all protomorphs.

Igorot No. 60 on the left in figure 8 is tall and dolichocephalic, and is almost exactly like the European according to the canon of Fritsch and the modulus of Geyer, except for the

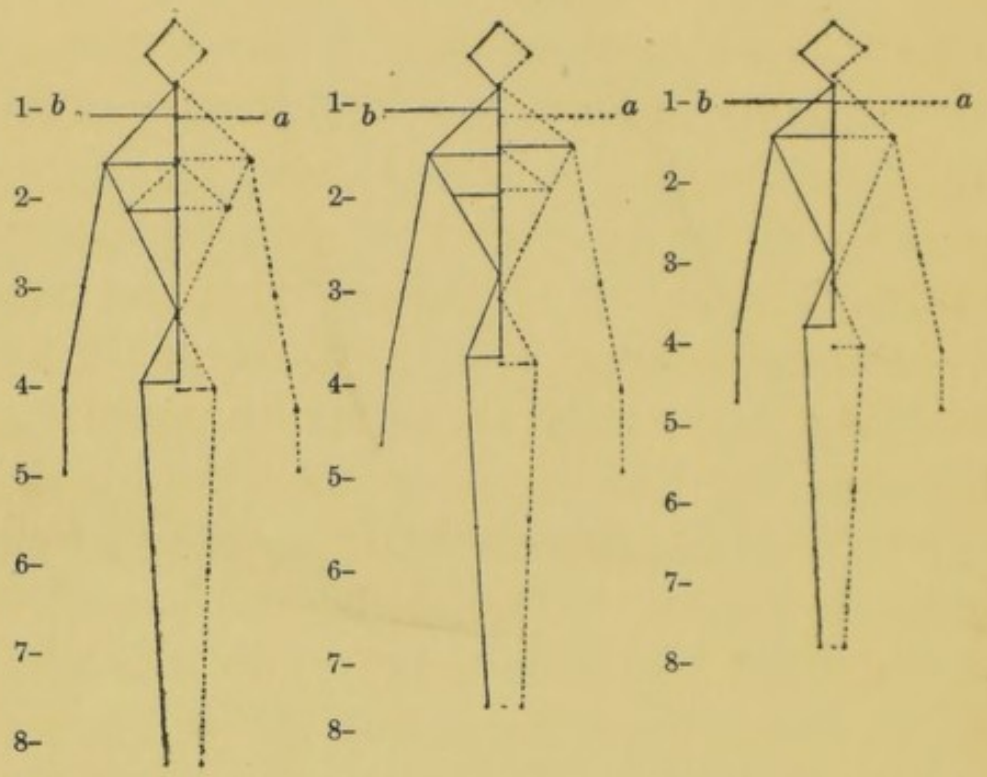

FIG. 8.—The solid lines are Europeans, the broken lines Igorots. The figure on the left represents an Igorot man (No. 60), stature 168 centimeters, from the highlands. The middle figure represents an Igorot man (No. 3), stature 155 centimeters, from Bontoc. The figure on the right represents an Igorot man (No. 83), stature 142 centimeters, from the lowlands. The left half of each figure (solid lines) is the European standard male canon of Fritsch, modified to the Igorot stature, and the right half of the figure (broken lines) is the Igorot canon of Fritsch. The horizontal lines numbered 1 to 8 indicate the number of total head heights in the Igorot's stature according to the artistic modulus of Geyer. The lines *a* and *b* point to the chin.

slightly longer arm and forearm and the short hand. The Igorot to the right of this in the same figure is intermediate in height and is mesocephalic, and resembles the European ac-

cording to the same standards, except in total head height and the length of the upper extremity, both of which are greater than the European, and resemble the protomorph. The Igorot on the right of the figure is small and brachycephalic, and resembles the European in total head height, but the stature, body length, leg length, and arm length with all its parts are different and resemble the protomorph. The characters which the three Igorots have in common, and in which they differ from the European, are long bodies, short legs, long arms, short hands, long lower head height (chin to nasion), and short upper head height (nasion to vertex). The tall Igorot from Bontoc and the Highlands is most like the white man in these characters, and the small man from the Lowlands is least like him. It is understood, therefore, that individual Igorots resemble the European, others resemble the protomorph, whereas others represent mosaics, having characters of both the European and the protomorph.

Judged by the canon of Fritsch, by the artistic modulus of Geyer, and according to the classification of Stratz, as well as the normal woman's figure of Merkel, the Igorot has char-

acters of the protomorph, the xanthoderm, and the leukoderm; does not resemble the melanoderm, but is in reality a metamorph. It may be presumed, therefore, that the Igorot has elements of the Negrito, the Mongolian and the European in his composition, judging by the linear dimensions of his body parts.

Head Form

The head form may be discussed by considering first the head outlines, afterwards the actual dimensions of the head.

The head outlines utilized represent the contour of the sagittal plane of the head from the glabella to the inion. They are treated as composites in groups, according to cephalic index and by locality and will be compared with similar outlines of students' heads taken at the University of Michigan, and of the negroes' heads made in Baltimore (see Introduction). The dolichocephalic heads are the largest, the brachycephalic are the smallest and the mesocephalic are intermediate in size. The forehead of the brachycephalic protrudes slightly and the occipital region is flattened. The head of the Igorot is tall and short, that of the student is long and low, and that of the negro is about

the same length as that of the Igorot, the same height as that of the student, and lower than either in the frontal region, except that the brachycephalic negroes have a high frontal area, and the brachycephalic students have a higher head outline than the others. It is suggested that the generous musculature of the Igorot causes an increase in the height of the head by increasing the size of the somæsthetic area of the brain, and the bearing of heavy burdens in childhood may cause a hypertrophy of the vertex of the head during the development of the individual. Other facts, such as the children sleeping on hard floors and the strapping of loads on their backs by head bands across the forehead, cannot be excluded, nor can it be said that the head height is not a racial character. The Highland Igorots have longer, higher heads than the Lowland Igorots, and the Bontoc head is longer than the head of the others, but not so high as that of the Highland. This is an additional differentiating factor between the three groups, and again the Bontoc is more like the white, whereas the Lowland is less so than the others.

The cephalic index of the head may be reduced to the cephalic index of the skull by de-

ducting 10 millimeters from each diameter of the head, and the index may then be classified with advantage by the method of von Török according to the diameters of the skull into small, medium and large, which may be represented by the letters s, m, and l, respectively. The symbols may be arranged so that those above the line represent the head width and those below represent the head length, when it is seen that the heads of the Igorots fall almost entirely in the m/m group or those of medium size. There are no heads larger than medium size, but there are 9 small ones, 7 of which are brachycephalic; the smallest head of the series, however, is dolichocephalic. There is a preponderance of dolichocephalic heads (41) over brachycephalic (18), which indicates that the Igorots are largely a dolichocephalic people, with medium sized heads, and that the brachycephalic portion of the population has small heads.

A more detailed analysis reveals the relationship of the head form in different localities. It is to be seen that the Bontoc group is fundamentally dolichocephalic, the Highland is largely dolichocephalic and mesocephalic, whereas the Lowland is for the greater part

mesocephalic and brachycephalic. The Bontoc group has not only a larger percentage of dolichocephalic heads and a smaller of mesocephalic and brachycephalic than the other groups, but there are no small heads in the Bontoc group.

The Igorots are more dolichocephalic than the eastern Asiatic people, but less so than the tribes of India. The Bontoc and Highland groups are higher headed than any of the people of the Malay Peninsula or of eastern Asia, except the southern Perak Malays, who are four per cent. higher.

As the Lowland Igorots, who are largely brachycephalic, have low heads, and the Bontoc Igorots, who are dolichocephalic, have high heads, it is to be presumed that dolichocephalic, or long heads, are high, and brachycephalic, or short heads, are low. The reverse is known to be true, however, although when I first noticed the group variation I thought the Igorots might be different in this respect from other people. A closer examination of the cephalic index reveals the fact that the dolichocephalic heads of the Lowland group are very low, which influences the average of the group so as to lower it. There are high long-heads and

low long-heads, the latter found largely in the Lowlands, the former in the Highlands.

The widest head breadth compared with the narrowest forehead breadth gives a great difference between the Bontoc and Lowland groups. The Bontoc, with the narrowest head, has the widest forehead, and the Lowland with a wider head, has the narrowest. The women have relatively wider foreheads than the men. The forehead of the Igorots is wider than that of the inhabitants of the Malay Peninsula, or of other Malays, as wide as the Northern Chinese, and a little less wide than the Aino.

The Physiognomy

The morphologic face height is the distance from the chin to the nasion; and the physiognomic face height is from the chin to the hair line. The dimensions are practically the same for the Bontoc and Highland groups, but the Lowland group is smaller in every particular. The face width of the Bontoc and Highland is greater than that of the inhabitants of the Malay Peninsula, and is nearer that of the Chinese, Japanese, and Ainos. The physiognomy of the women is less in its dimensions than that of the men.

The index of the physiognomy, which indicates the relative face width, is greatest for the mountain division and least for the Bontoc. It is greater for the Igorots than for the Japanese and Malays, but it is less than that of the Aino. The women's faces are relatively wider than the men's. The morphologic index which indicates the relative length of the face below the eyes is greatest for the Lowland and least for the Bontoc. It is less than that of any other Eastern Asiatic peoples, although the Mantra are about the same.

The Highland has the least lower face, chin to nasion, the Lowland the greatest, and the Bontoc and the women are exactly intermediate. The Highland has the greatest total head height, chin to vertex, the longest physiognomy, and the shortest lower face, therefore his frontal cranial height is the greatest of all the Igorots. This is true also of the auricular bregmatic height, and the head outlines show the same, therefore the several measurements corroborate each other. The artistic modulus of the Bontoc is nearer that of the Europeans than are the others.

The measurements of the mouth may be dismissed by stating that the lips of the Igorots

are full, but not thick and protruding like those of the negro, nor is the mouth so large. The Bontoc and the women have smaller mouths than the Highland and Lowland Igorots.

Cunningham gives the nasal index of 23 Australians (native males) which " are ranged in the immediate vicinity of 94 " with extremes of 79 and 104. This at once suggests a relationship between the Australian aboriginal and the Igorot.

The nasal index of the dolichocephalic Lowland Igorots is 99.4, that of the brachycephalic is 85, indicating that the two types differ in nasal index as well as cephalic index. The extremes of nasal index found among the Igorots are 72 and 115.

The women of the Malay Peninsula have narrower noses than the men, the Igorot women wider.

The eyes of the Bontoc are the narrowest and they are also more widely separated than those of the others. Those of the Highland group are the widest and they are also the closest together; the Lowland is between the other two in eye width and inter-eye distance. The eyes of the women are narrower than those of

the men, but the same distance apart as the group to which they belong.

The artistic conception of the European eye is that it should be equal in width to the distance between the two eyes, and the artists add that the mouth should be one and one-half times the eye in width of opening. The Igorots have a smaller mouth and greater distance between the eyes than the artistic ideal for the European.

The relative number of brown individuals increases in the Highland and reaches its limit in the Lowland. The lightest colored individuals are found in the Highlands. The one golden-brown individual of the Lowlands is a young man who for several years has been a servant in an American family, where he worked principally indoors and wore the regular European clothes of the Tropics.

The hair is invariably black, straight, and coarse. A few individuals with wavy hair were observed, but not one of those measured had a noticeable wave in the hair. This is remarkable when one considers how closely the Igorot resembles the Negrito in other characters. I can account for the predominance of the straight hair in one way only—that in the

course of centuries the kink has disappeared leaving only an occasional trace, such as the few wavy-haired individuals I observed casually, and those noticed by Jenks among the Bontoc Igorots. The wavy-haired individuals probably belong to the Senoi type of Martin.

The brows of the Igorots are never so beetling, and the brow ridges never so prominent as among the Filipinos of the coasts and other parts of the Islands. However, there is a slight difference of the size of the superciliary ridges among the Igorots which may be presented in three groups, small, medium, and large.

Skin Color

The skin of the Igorot is characteristically light brown, but the tint varies with individuals and it is different in different families. The influence of light and shade may be noticed; those who work in the sun are darker than those who serve in the house, and the women and children are lighter than the men. The whole family of one chief, including several young men and women who stay indoors a great deal, is so light brown in color as to be classed as yellow. In a few individuals a tinge of red may be seen, or the face appears

bronzed, some Igorots strikingly resembling the North American Indian. The coloring shows a trend towards lightness rather than the reverse, and this is manifested most strongly among the Bontocs.

Three Selected Types

When the 104 adult male Igorots are separated into the three groups, dolichocephalic, mesocephalic, and brachycephalic, and these groups are subdivided according to the shape of the head outlines, three types, two dolichocephalic and one brachycephalic, are separated with ease. The remainder could be subdivided with difficulty, and they are not so treated because the individuals resemble one or the other of the three types, into which they shade insensibly. The types may be summarized as follows:

Type M.—The individuals of this type are petty chiefs, councilors, etc., who reside chiefly in Bontoc and the highlands of Benguet. They may be differentiated from other Igorots by their tallness and occasional light, golden-brown skin, heavy brows, slightly aquiline nose, and large ears that have a square lobule, the lower border of which terminates abruptly

against the corners of the mandible. Other distinguishing characters are the head length and height and the forehead width, which are greater than those found in any other group of Igorots. The relatively long leg, and small brachial index are characteristics to be emphasized. The cephalic index, nasal index, and ear index are the smallest found. Otherwise stated, the head, nose, and ears are longer and narrower than any others. The eyes are also farther apart, and the upper head is relatively higher than the lower face, which is broad, but not long.

Type A.—The members of this type are laborers (farmers, police, etc.) from all parts of Benguet and from Bontoc. Their differential descriptive characters are the unusually small stature, brown or dark brown skin, large, wide, Australoid nose, rounded or oval ear without lobule, and the relatively broad shoulders. Their long, low, oval, flat-topped head with bombé forehead and narrow eyes are distinctive. The arm and forearm are relatively short, and the brachial index is low.

Type N.—This type may be recognized readily by its small stature, brown skin, delicate brow ridges, small, round head with exces-

sively developed parietal and temporal regions, narrow, retreating forehead, short nose, small round ears, and projecting jaws. The individuals of this type have relatively long arms and forearms, short hands, and a high brachial index. The cephalic index is high, the nasal index high and the ear index high. Especially to be noted are the relatively high total head height due to the large lower face, and the narrow space between the eyes. The characters in which the three types resemble each other are nasal index, hair, relative shoulder width, eye width, relative leg length and relative hand length, and it may be said that these characters are more representative of the Igorots than any other, unless it be eye color which is so uniformly brown in all Igorots, that no records are made. The differentiating characters are chiefly stature, skin color, ears, head length, brachial index, cephalic index, total head height, relative lower face height, and the distance between the eyes.

The three types are designated MAN for obvious reasons, and because they resemble types almost always associated with the Malay, the Australoid and the Negrito. They resemble the Iberian, the Australoid and the Primi-

tive of the students, although type M is more like the student B. B. B. or Cro-Magnon.

Type N is in many respects like the Negrito, and is positively identified with the protomorphs of Stratz, and the *Primitiven* of Hagen. Type A is not unlike the Negritos, and the broad nose, small stature and long head place it with similar peoples of the East that are found associated with the Negritos. Type M, however, is of different origin and clearly related to the European, although not unmixed with other types.

Besides these distinct types the remainder of the individuals belong to other types that are not so definite but harmonize with the blends. Thus a form with intermediate characteristics in stature, cephalic index and nasal index is the predominant type and may represent that from which the others are derived or it may be the product of the fusion of the other types, or such a form may be a distinct type and its identity is lost because it harmonizes with the blends of all the types.

To summarize the study of the physical characteristics of the Igorots it may be said that actual measurements were made of the limb and body parts, of the head and face, and

of the stature. These have been worked over by obtaining the averages and extremes, calculating indices and relative factors, comparing these among the Igorots by locality, and with other peoples, directly, and by means of the canon of Fritsch, the modulus of Geyer, Merkel's normal woman's figure, and the classification of the cephalic index by von Török's method. In addition to this the descriptive characters have been utilized, and by these methods and the use of correlations three distinct types have been segregated. Interesting similarities and differences between the Igorots and other peoples associated with eastern Asia, as well as the Negritos and Europeans, have been cited. It must be acknowledged, however, after all this has been done, that the true composition of the Igorots has not been determined, and it can be determined more exactly by the method of segregating types given in the Introduction.

By the method used for the segregation of the American types (p. 15) the Igorots are found to be composed of 50 Blends, 34 Australoids, 18 Primitives, 5 Iberians, and 3 Alpines. By the method as altered for the Filipinos there are 70 Australoids, 20 Blends, 6

Iberians, 5 Primitives, and 3 Cro-Magnons, which is a truer reckoning. The relatively great number of Australoid and Primitive men among the Igorots with the few Iberian, Alpine, B. B. B., and Cro-Magnon, are the chief differences between them and the Filipino Students, indicating that the students have a greater proportion of European and Chinese among them, which is known to be true. The Igorots have a greater proportion of the two types of the East that are found associated with the Negrito, called here the Primitive and Australoid, although the types of Europe and of China are not lacking entirely among the Igorots.

The facility with which the method of segregating types may be applied, the verity of its results and the ease with which different groups can be compared bespeak for the method great usefulness. In the next chapter it will be applied to the bodies measured at Malecon Morgue and to a few Japanese measured in Baguio at the same time that the Igorots were measured.

One of the characteristics of the Benguet Igorots is the prettiness of the girls and the ugliness of the men, a contrast that may be

seen without difficulty, in the photographs of the collection at the Bureau of Science of the Philippine Islands, in Manila. The types of Benguet Igorots selected by means of the photographs are largely Modified Primitive and Australoid. The Primitive Benguet Igorot has the ear of Modified Primitive form resembling the Alpine, and the nose is like that of the Australoid. The ear is long and oval, with a shelf where the lobule ought to be, the latter passing directly downward to the cheek. The concha is large and somewhat everted, and the helix rolls in to some extent, therefore both Iberian and Primitive characteristics exist, although the ear is a modified Alpine ear. The nose is heavy and straight, and the face is neither long nor broad, hence again the characteristics are intermediate between those of the Iberian and the Primitive. A typical Benguet Igorot may therefore be called a mixed Iberian-Primitive of the Australoid variety.

Modified Iberian forms may also be seen in almost every part of Benguet, such as the man Akop, who owns the house half-way between Baguio and Atok at the extreme northern end of Benguet. Akop is a genial entertainer and a friend of the Americans. Iberian characters

are present in the man, who is modified Iberian in form, and distinctly European in physiognomy. The high head and long face, the moderately high nose, not broad and flat, the nostrils opening downward, and the ears without lobule, and with everted concha and somewhat rolled out helix, stamp this man with Iberian features. Akop is of the modified Iberian type, but resembles the Filipino form of the Cro-Magnon, because of his high, narrow head, large, straight nose, and large face. The nose is also like that of the Australoid. Indications are here present that derivative forms have arisen from the Iberian type by crossing with the Primitive and probably with the Australoid; the blending of many pure types has produced various intermediate forms that resemble more than two types, Akop, for instance, having Iberian, Primitive, Cro-Magnon and Australoid characteristics.

The Benguet Igorots are more Primitive than the Bontoc Igorots, and as the Bontoc Igorots are more inaccessible one is led to believe that the Primitive element reached Benguet before coming to Bontoc, and this supposition is the more plausible because, as already determined, the Igorots of the Highlands of

Benguet are more European (Iberian) than those of the Lowlands, and the Bontoc Igorots are more like the European than the Igorots of the Benguet Highlands. The supposition is still more plausible from the fact that the Kalingas, who are on the opposite side of the Bontoc Igorots from Benguet are yet purer Iberians than the Bontoc Igorots. There has been an infiltration of the modified Primitive from the south, or there has been an infiltration of the modified Iberian from the north, or both, or at any rate there has been a mingling of the types through Benguet and Bontoc, leaving the Iberian predominant in the latter place and the Primitive predominant in the former. The earlier intrusion was probably in the north where the Hindus (Proto-Malays) entered, followed in more recent times by the neo-Malays coming from the south.

The majority of the photographs of Bontoc Igorots are Iberian in type. The ears are long, oval, often without lobule, the concha everted, the helix rolled out, the face is long and narrow, and the nose is not depressed, but rather high and straight. These types are purer Iberians than any seen in Benguet, yet not so pure as many Kalinga Iberians, which

means that the process of fusion is more recent in Bontoc than in Benguet, for were it not so there would be more blending in Bontoc. The Kalingas and Bontoc Igorots represent the Iberian type that came directly from Europe through India without mingling with the intervening peoples to any great extent, whereas the Benguet Igorots represent the product of generations of the fusing and mingling Iberians and other types.

The Primitive type is to be seen in Bontoc, as represented by the rounded form, bowl-shaped ear, and face that is not long but ovoid, with the nose short and broad. In contrast with this rounded form is the angular pattern of the Filipino B. B. B. type, found among the Bontoc Igorots, although different from the European B. B. B. in degree but not in kind. The face, head, ear and nose are all rectangular, and the individual is built on the square. This is in contrast with the pure Iberian, where the face is a long oval, the nose is straight and slender, and the ear is long, delicately molded, often with square lobule, everted concha and rolled-out helix, as found among the Ifugaos from northeast of Bontoc, which again indicates that the purest Iberians are to be found

in northern central Luzon. The startled, open-eyed expression is characteristic of the Ifugao people and of the Kalingas, and is probably derived from the East Indians, who have the open-eyed countenance that gives the peculiarly pleasing expression so often seen among the women of India.

CHAPTER III

The Submerged Tenth of Manila

THE bodies of the unclaimed dead in the city of Manila are brought to the Malecon Morgue of the Philippine Medical School, where they are retained for forty-eight hours before final disposal. About 100 of these bodies were measured by me during the school year 1907-'08 and the measurements of 48 male and 22 female adults will be utilized in this chapter.

The Filipinos whose bodies reach the Malecon Morgue usually belong to the *submerged tenth*, and should be so considered in any discussion or conclusions. However, they form an integral part of the population of the Philippine Islands, and belong to the series of investigations included in this book, of the Filipinos in different culture levels.

Ten Japanese who were measured at Baguio in 1908 when I measured the Igorots are included in this chapter. The Japanese are probably from the lower middle class, because they are all day laborers,—carpenters, etc.,—who

FIG. 9.—The Australoid Filipino—secondary variety. Modified Australoid ears. A laborer from the town of Taytay, Province of Rizal, Island of Luzon.

FIG. 10.—The same as Fig. 9.

came to the Philippines after being dismissed from the Japanese army following the war with Russia.

The Japanese and the Morgue subjects will be compared with the Igorots and the Students, after which the types of each group will be segregated by the method given in the Introduction.

The characters that differentiate the Japanese from the other groups are: dolichocephalic head index, which is the same in the Igorots, but different in the others; long, high head and wide forehead; narrow nose, relative to the other groups; face both long and wide, but relatively longer than that of the other groups; relatively long ears; wide mouth; wide eyes; high sternum; relatively short forearm and lower leg, and relatively long upper arm and upper leg; and absolutely and relatively wide shoulders and hips. With a stature about the same as that of the Iberian and other characters simulating the European, the Japanese resemble the European more than do the other groups.

The characters that differentiate the Igorots are: small stature, long, narrow head; exceedingly wide nose; narrow mouth; short

hand, and wide shoulder. These all indicate the predominating influence or presence in great numbers of the Australoid.

The differential characteristics of the Morgue subjects are: broad head; cephalic index about the same as the Student, large nose, broader and longer than that of any other group; narrow eyes; high *trochanter* (long lower extremities); high umbilicus; relatively long lower legs, forearms, ankles and hands; and narrow shoulders. The discordant composite may be due to the large number of Iberian, Primitive and Australoid of comparatively pure type, although nurture can not be excluded as a factor.

The Students are characterized by tall stature; large, broad head; and other features that are more or less intermediate between the other groups. They probably represent a greater fusion of the European and Eastern types than the other groups, with a predominance of relatively tall broad heads. Nurture may have produced some effect in molding this group. The broad head may be due to studious habit, and the greater stature to better nourishment; but I am inclined to believe that both are due to the Chinese and European types as exhib-

ited in the Alpine, B. B. B., and Adriatic, as well as in the majority of the Blends.

The percentage proportion of the types found in Malecon Morgue is: Primitive, 16.6; Australoid, 10.4; Iberian, 10.4; Cro-Magnon, 6.3; B. B. B., 6.3; Alpine, Adriatic and Modified Primitive, 2.0 each, and the Blend, 43.8. This is in contrast with the Students, among whom the Modified Primitive, Alpine and Australoid predominate, with the Iberian, Adriatic and B. B. B. not so numerous and the Primitive only a few. It is in contrast also with the Igorots, where the Australoid is predominant, and the Japanese, where the Iberian predominates.

The Iberian

The stature of the Iberian type varies around 160 centimeters in the four groups, although that of the Igorot Iberian is only 155.6 centimeters and that of the Students is 164.3 centimeters, which is less than the stature of the Mediterranean race in Europe (165 centimeters). The Japanese and Igorot Iberians are not so tall as the others, although the average stature of the 10 Japanese is greater than that of the 48 Morgue subjects. From this

we may infer that the Filipino Iberian is taller than the Japanese and Igorot Iberian, and to account for it, the recent infusion of Spanish in the Filipino during the past few hundred years may be suggested, as also the inclusion of Indian Iberians who came to the islands in the Malay migrations, and more recently during the Spanish occupation of the archipelago. The Japanese Iberian probably came to Japan at a much earlier date than the Spanish arrived in the Philippines, and the Iberian is more completely amalgamated with the other Japanese types than is the Filipino Iberian with the other Filipino types, which is also true of the Igorot Iberian, because in the Filipino the Iberian is more recent and is also found unmixed in type, as among the Castilian Spanish. The Iberian predominates among the Japanese, but it does not among the Filipinos. The smaller stature of the Igorot Iberian is to be explained by the influence of the Australoid type, which the Igorot Iberian resembles in other respects, especially in the nasal index. The difference between the Students and the Morgue subjects may be due to nurture, the former being well nourished and the latter poorly nourished. All the differences could

be explained by modifications due to environment, but it is better to find the true explanation than to ascribe the differences to unknown causes. The type is justified also if the group differences can be explained.

The stature of the Iberian women is less (7.2 per cent.) than that of the Iberian men, but it is about the usual percentage less, not greater than it should be as the stature of the women is among the Igorots.

The heads of this type are moderately narrow, the cephalic index on the living about 75, except the heads of the women, which are slightly wider. The Morgue Iberians have wider heads than the Iberians of the other groups, and the Iberian women have the widest heads. The Japanese Iberians have longer, narrower heads than any other group, which indicates a condition nearly like the original dolichocephalic Mediterranean race of Europe.

The nasal index of the Iberians in the four groups varies around 75, although the Morgue Iberians have an index of only 68.14 and that of the Igorot Iberians is 80, the latter due no doubt to the Australoid type. The index of the Japanese and Student Iberians is practically the same as that of the Morgue Iberians.

The nasal index is a more reliable differential factor in the racial anatomy of a people than the cephalic index, because the nose is not so liable to distortion as the head, and being subject to sexual selection it would become differentiated and established as a permanent non-variable character while the cephalic index would not.

The stature, the cephalic index and the nasal index establish the Iberian type as a homogeneous entity which is found among Filipinos of extremely different culture levels and among the Japanese. There are also other characters that are homogeneous and that differentiate the Iberian from the other types, some of which will now be given.

The morphologic face index of the Iberian in the four groups is about 80, although that of the Japanese Iberian is only 78.32 and that of the Student is 86.4. This index expresses the face height relatively; therefore, it may be said that the face height of the Student Iberian is the greatest and that of the Japanese the least. There is no great disharmony among the Iberians of the four groups in face height, and the face, although not so long and narrow as the original Iberian of Europe, is longer

and narrower than that of the other types to be considered.

The brachial index of the Iberian is about 75, although the Japanese Iberians have an index of only 65.5 and that of the Morgue Iberians is 77.6. The Japanese have short forearms and long upper arms, which is characteristic of the Iberian in contrast with the other types. Other differential characters might be cited, but enough have been given to demonstrate that the Iberian is an entity.

The Primitive

The Primitive type has features in direct contrast with the Iberian. The latter has medium stature, long head, long face, long nose, long hands, and short forearms and lower legs; the former has small stature, broad head, face and nose, short hands and long forearms and lower legs.

The cephalic index of the Primitive ranges from 84.3 in the Igorots to 89.6 in the Morgue women, with the others in between.

The stature of the Primitive is about 150 centimeters, although the women of this type have a stature of 146.3 centimeters. Stature is one of the most distinct characteristics of the

Primitive because it is so much less than that of any other type. The stature of the Primitive Students and Igorots is relatively less than that of the Iberian in these two groups, and that of the Primitive Morgue subjects is relatively greater; and the stature of the Primitive women, relative to that of the Primitive men, is 3.1 per cent. greater than that of the Iberian women in relation to the Iberian men.

The nasal index of the Primitive is about 90, although the Morgue women have an index of 101.1 and the Students an index of only 86.5. The relation of the Morgue to the School is the reverse for the Primitives, as compared with the Iberians. The latter among the Students have wider noses, whereas, relatively speaking, the former have narrower noses. This may be an indication of the Galton-Pearson law of regression toward the mean, or it may indicate greater blending of nose type among the Students, who are largely of Spanish-Filipino extraction.

The morphologic face index of the Primitive is about 75, which is almost 10 less than that of the Iberian, and the same relative difference exists between the Morgue subjects and the Students for this type as for the Iberian, which

is that the Student's face is longer than is that of the Morgue subjects. The index of the female Primitive is 3 less than that of the male, whereas that of the female Iberian is about 2 greater than the male; but with so few individuals a slight difference may not be significant, although it may mean that the women are truer to type than the men, the Primitive woman having a wider face than the Primitive man, and the Iberian woman having a longer face than the Iberian man.

The brachial index of the Primitive is about 80, which indicates that the Primitive has a longer forearm and a shorter upper arm than the Iberian. The difference is 4-5 per cent. in the Morgue subjects, both male and female; and the difference is 14.5 per cent. between the Primitive Igorots and the Japanese Iberians.

The Australoid

The characteristics of the Australoid, in contrast with the Iberian and the Primitive, represent an intermediate condition, or a condition similar to one or the other of the two types.

The stature of the Australoid is about 160 centimeters for the men, and only 148 centime-

ters for the women, and is practically uniform in all the groups except the Igorots, where the stature is less than that of the Morgue females. Only one Student has a stature as low as that of the average Australoid Igorot, which indicates that the Student Australoid is different in stature from the Igorot Australoid. The difference is probably due to the recent Iberian in the Students. The Igorot Australoid represents a remote cross of the Primitive and Iberian, whereas the Student Australoid represents a recent cross, although a few of the remote persist among the Students. The stature of the Australoid is only a little less than that of the Iberian, although the Japanese Australoid is 2.5 centimeters taller than the Japanese Iberian. Judged by the stature alone, the Australoid men are more like the Iberian, whereas the Australoid women are more like the Primitive.

The cephalic index of the Australoid is about 77, with that of the Igorot Australoid 75.1, that of the Student Australoid 76.8, and that of the Morgue woman 78.95. The index is slightly greater than that of the Iberian, but it is practically the same. The index of the women similar to that of the Iberian is greater than that

of the men. The small index of the Igorot Australoid may indicate greater purity of type. The head of the Japanese Australoid is the largest, that of the Morgue is the smallest, and the Student is between the two in head size. This is true also of the Iberian.

The nasal index of the Australoid is about 95, and it is greater for the Igorot and Morgue Australoids than for the other Australoids, who are all alike. The Igorot and Morgue Australoids are purer than the others, as already indicated by the stature and cephalic index, particularly of the Igorots; the inference, therefore, is that the broad nose is characteristic of the Australoid type, and the most distinctive character. The nasal index of the Australoid women is less than that of the men, indicating Primitive affinities for the women, otherwise the nasal index of the Australoid is greater than the Primitive.

The morphologic face index of the Australoid is about 77, which is intermediate between that of the Iberian and the Primitive. This is practically identical for the Students and Japanese Australoids, but it is less for the Morgue Australoids, and in this way the index resembles that of the Iberian.

It is evident that the Australoid is related to the Primitive and the Iberian, if similarity implies relationship, and the Igorot Australoid represents an earlier impregnation of the Primitive by the Iberian than is represented by the Student Australoid. The earlier, or primary Australoid, may have been derived from the Indo-European migrations, whereas the later, or secondary Australoid, has been largely molded by the more recent Spanish Iberian.

The three types already described seem to be the fundamental types of the East, and each has altered the other in a different direction or amount in the different groups, due to the relative proportions of each in any group, the length of time that amalgamation has been going on, the different environment of each group and other factors. The Japanese have a predominance of the Iberian and have been molded largely by that type, the Igorots have a predominance of the primary Australoid which may mean Negrito influence, but probably is an expression of the Hindu influence on the early Primitive, with nearly complete amalgamation of the types that make the Australoid; the Students and the Morgue sub-

jects have more Primitive and recent Iberian than the other groups, and these types have not amalgamated to such an extent as in the other groups, and the Iberian influence has been greater among the Students and the Primitive among the Morgue subjects.

A few of the differential factors of the three types may be summarized in a table which includes the Igorot, Japanese, Student and Morgue males measured by me, the numbers given being the averages for all the individuals of the four groups. The Primitive type is not found among the ten Japanese, but it would no doubt be found if a larger number were measured.

DIFFERENTIAL FACTORS OF THE IBERIAN, PRIMITIVE AND AUSTRALOID TYPES—ADULT MALES

Characters.	Iberian.	Primitive.	Australoid.
Stature	163.8	151.1	158.1
Cephalic index	75.3	86.4	76.5
Nasal index	73.5	88.7	93.9
Morphologic face index	84.3	77.7	80.2
Brachial index	71.6	80.7	75.1
Crural index	98.6	107.1	102.5
Hip-shoulder index[1]	83.4	79.3	82.6
Intermembral index	73.7	72.0	70.3

[1] Morgue subjects only.

The Filipino Iberian is not exactly the same as the Mediterranean Race of Sergi, but is really a Spanish-Filipino mestizo. Two dis-

tinct color markings are noted: one is a dark-skinned, almost black individual, much darker than the average Filipino; the other is almost white and looks more like a European than a Filipino. The former may be the Indian-Filipino mestizo, and the latter the Spanish-Filipino mestizo; or, if this be not true, then the pigments of Iberian and Filipino re-act according to Mendel's laws, being intensified in the one and decreased in the other. The Iberian is a remarkably pure type, and, in spite of crossing with the Filipino, remains almost pure, especially in the characters given above.

The Primitive type is also pure and probably remains so, but the evidence of crossing can not be known positively, as it may be for the Iberian. The two types are extremely different and more distinct than any other types, as evinced by the differences. The origin of the Primitive can not be located with certainty, although accumulated evidence points to the Negrito as at least a closely related type. However, either one or both may be only primitive forms due to retarded development. The stature of the Primitive is small, the head is small and round, the nose and face are broad, short and flat. These infantile characters, and

possibly others, may mean only stunted growth, but, whatever the cause, the type is none the less a true type. Its distribution among Igorots, Students and Morgue subjects indicates that it forms a part of all the Filipino population. As it is the same as the Negrito by physical measurements, with straight instead of kinky hair, it is present in many of the Pacific islands as well.

The Australoid is nearly the same as the Iberian in stature, cephalic index, brachial index and shoulder index; it is nearly the same as the Primitive in nasal index and morphologic face index, and it is intermediate between the two in crural index. The nasal index is the only character that is not between the Iberian and Primitive, and this is the most characteristic trait of the Australoid. The evidence so far accumulated points directly to the Australoid as a cross between the Iberian and Primitive. The stature of the Igorot Australoid is, however, less than that of the other Australoids, and the nasal index is greater. This is probably the ultimate end result of the blending process. The others are more recent blends and, in time, would be like the Igorots under the same conditions. There may be two

types fused in the Australoid, one of which is a blend or mosaic of the Primitive and the Iberian, and the other is the fundamental Australoid, the two types being so much alike that they cannot be separated by measurable characters.

Remaining Types

There are so few individuals to represent the remaining types that they are all discussed together. The Cro-Magnon, B. B. B., Alpine, and Adriatic are placed in the table which follows, and the Iberian and Blend alongside, in order that each may be compared with the other. A glance along the columns of this table will reveal very slight differences between the types of the Students and of the Morgue subjects, a fact that argues for the verity of the types.

Character.	Iberian.		Alpine.		B. B. B.	
	Morgue.	Student.	Japanese.	Student.	Morgue.	Student.
Stature	163.4	164.3	160.0	160.2	166.3	168.8
Cephalic index	76.6	75.2	84.6	86.9	82.4	86.2
Nasal index	68.1	73.9	65.4	72.9	65.7	72.0
Morphologic face index	79.9	86.4	83.3	83.0	84.0	82.9
Brachial index	71.6	.....	76.6	.....	74.7	.....
Crural index	98.6	.....	85.0	.....	90.0	.....
Intermembral index	73.2	.....	69.8	.....	68.1	.....
Ear index	58.3	.....	63.3	.....	61.3	.....

Character.	Adriatic.		Cro-Magnon.		Blend.	
	Morgue.	Student.	Morgue.	Student.	Morgue.	Student.
Stature	165.0	168.6	173.0	170.0	159.8	163.8
Cephalic index	85.0	88.0	74.6	80.5	82.5	82.4
Nasal index	100.0	92.9	92.1	80.6	83.2	84.8
Morphologic face index	82.1	78.4	86.4	82.6	80.0	82.4
Brachial index	79.7	.....	78.6	.....	77.2?	.....
Crural index	104.0	.....	99.2	.....	95.2	.....
Intermembral index	70.3	.....	70.6	.....	71.3	.....
Ear index	54.6	.....	58.9	.....	59.6	.....

The Alpine and B. B. B. Types

The characteristics of the Alpine type are stature below the average, broad head, narrow nose, short lower legs, relatively wide ears and short upper extremities. It is more like the Blend than any other type, and is almost identical with the B. B. B. except in stature, which was arbitrarily chosen. Both have the highest ear index of all types, the lowest intermembral index of all types, the lowest brachial index except that of the Iberian, and the lowest nasal index of all types. It must be remembered, too, that there is only one Japanese Alpine, and only three B. B. B. Morgue subjects; therefore, the close approximation of these to the 30 Alpine students and 21 B. B. B. students is remarkable and emphasizes

the types as real entities. The differences between the Alpine and B. B. B. are not so great in the characters measured as in the characters observed, such as the square head of the B. B. B. and the round head of the Alpine, the square ear of the B. B. B. and the round ear of the Alpine, and the general stocky build of the B. B. B. and the rotundity of the Alpine, although the head of the student B. B. B. is 5 millimeters longer and 3 millimeters wider than that of the Alpine, and the head circumferences of the B. B. B. are all larger. The face of the Student B. B. B. is 4 millimeters longer and 3 millimeters wider than the face of the Alpine, and the nose is 2 millimeters longer and 1 millimeter wider. The cephalic index is less for the B. B. B. than for the Alpine. The two types would be classed as one if it were not for the differences mentioned, all of which are slight, however, and the separation may prove to be an arbitrary one.

The Cro-Magnon Type

This type is the tallest thus far encountered in the Philippines, and the cephalic index is the least of all the types from the Morgue. The nasal index is high, the morphologic face index

is also high, as well as the brachial, crural, and intermembral indices. In other words, the head is long and narrow, the nose is short and wide, the face is long and relatively narrow and the forearms and lower legs are relatively longer than those of the other types. The Cro-Magnon students are largely blended with the other types and partake only to a slight extent of the Cro-Magnon characteristics.

The Cro-Magnon resembles the Australoid in cephalic index, nasal index and other characteristics, but is distinctly different in stature, the Australoid being the smallest of all types, and the Cro-Magnon the tallest. A relation between the two, similar to that which exists between the B. B. B. and Alpine, may be true, but the relationship is not so intimate.

The Adriatic Type

This type is tall and has broad head, face, and nose. The other characters are not distinctive, although the forearm and lower leg are rather long. The Adriatic is an enlarged reproduction of the Primitive type, but it is as far removed from the latter as the Cro-Magnon is from the Australoid. The Chinese

element of the Adriatic may account in part for the difference.

Inferences

The Sarasin brothers and Martin have found in Ceylon, in the Celebes and in the Malay Peninsula, and others have also found elsewhere in the Pacific islands a type closely simulating the Australoid, and they look upon this type as one of the primary types of men from which have sprung many races. The work that I have done adds its mite toward that hypothesis, and illustrates in a more definite way some of the types that may have resulted from this primitive precursor. I believe, however, that my work also demonstrates another type which I call Primitive, that is antecedent to the Australoid, and has helped to produce the Australoid by its blending in a disharmonious manner with the Iberian, the latter having probably disappeared in other parts of the East as it has almost disappeared from among the Igorots. The objection to the types selected may be that too few individuals were observed, and if 1,000 individuals had been measured, at least some of the types would fuse by closing of gaps between them with intermediate forms

that are necessarily absent when so few are considered. For instance, I have demonstrated the similarity of the Primitive, Modified Primitive and Adriatic, of the Alpine and B. B. B., and of the Australoid and the Cro-Magnon. There are gaps between the types among the Students as well as among the Morgue subjects, but if a larger number were measured these gaps might be bridged over. If this be true, then the types selected represent cross sections of variable species, and this is additional proof that the types are elementary species, and probably represent the separation and segregation by variation and modification of new elementary species of man.

CHAPTER IV

Types of Men at Taytay

THE town of Taytay, which is situated near the Lake of the Bay (Laguna de Bay) about ten miles inland from Manila, contains a more mixed population than the average Filipino town for the following reasons: It is near enough to Manila to receive some of the overflow population from that city; its próximity to the hills and mountains attracts the hill people, and the fisher folk enter the town on the lake side. Taytay is near Pasig, the capital of Rizal Province, where a mixed population of Filipinos, Spaniards, Chinamen and Americans reside. The annual pilgrimage of the Filipino people to the statue and springs of the Virgin at Antipolo, situated on the hills, passes through Taytay during the month of May each year, and the transportation of the pilgrims by cart and hammock is one of the industries of the place. Finally, the town of Cainta, which is populated chiefly by descendants of East Indians, is but a stone's throw from Taytay, and the Indian element has drifted into the place to some extent.

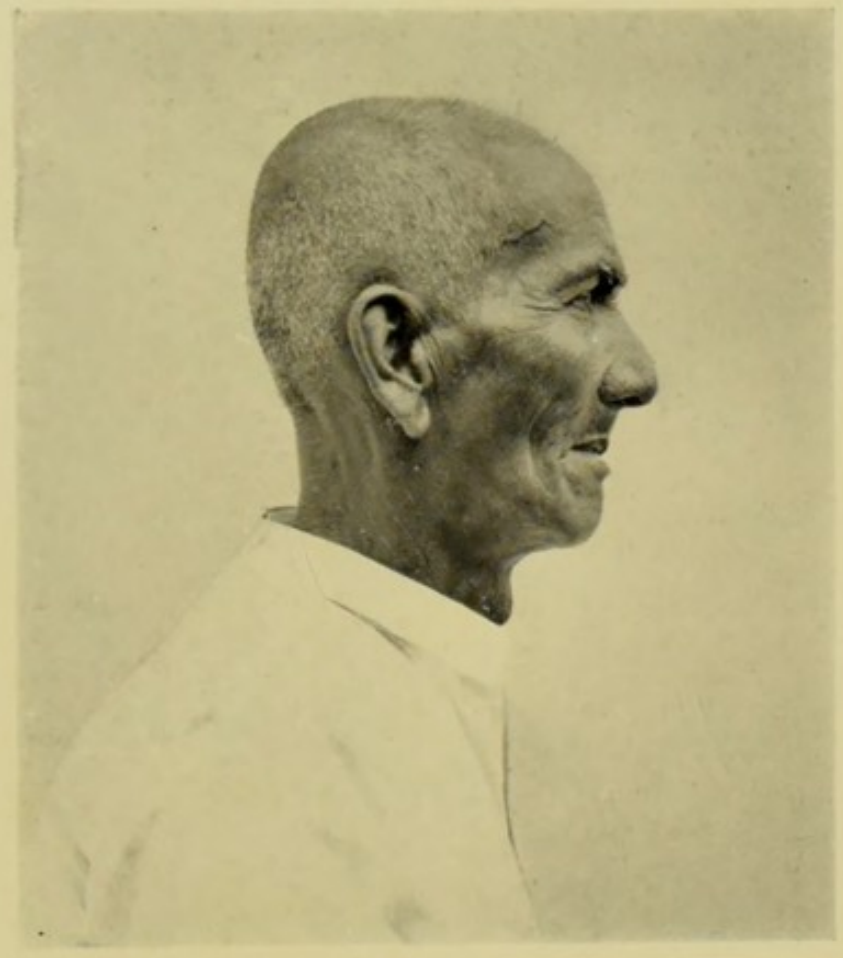

FIG. 11.—The Cro-Magnon Filipino. Iberian ears, type D (Cro-Magnon). A Filipino official from Taytay.

FIG. 12.—The same as Fig. 11.

The individuals measured were those who came to the free dispensary to be treated, or came as friends of the sick, therefore some of them should be considered as part of a hospital population, although the majority had no other affliction than infestation with intestinal parasites. The random sample represented in this chapter is more nearly the normal average of the population than recruits or students would be, because practically the entire population of the town came to the dispensary and there was no conscious selection of the individuals who were measured. Therefore, it may be assumed that the men and women measured at Taytay are typical of the littoral population of the Philippines, although a large percentage belongs to the hospital population, and the Indian element may be greater than usual.

Stature

The Taytayans are between the *small* races and the races *below the medium height,* the 183 men measured having an average stature of 159.47 centimeters, with a minimum of 145.7 centimeters and a maximum of 171.0 centimeters. The stature in age groups indicates that the fastigium is reached about the age of 40,

although there is a stature at 15 that is as great as that between 20 and 30. This may be due to the chance that more individuals of a certain type were measured at one age than another, although there may be an early maturity that is premature, and a late ripening that is real maturity. There is no such regularity in the increase of stature as found among the Igorots, which I take to indicate that the Taytayans are not so homogeneous a body of people as the Igorots. The selection of types later will prove the truth of this statement.

Body Parts

A summary of the length of the body parts is presented here in relation to the lengths of the same parts among other peoples. The stature of the Taytayan is similar to that of the other eastern Asiatic and Pacific peoples; the sitting height is the same as that of the North American Indian; the body length is the same as the European's; the total head height resembles that of the negro; the length of the lower extremity is the same as that of the European; the tibio-femoral index is intermediate between that of the Asiatic-European and the Negro-Negrito; and the total length of the

upper extremity is like both Negro and European. The upper arm length resembles that of the European and the Sikh, and the forearm length is exactly that of the European, but different from either the Japanese on the one hand or the negro on the other; and lastly, the Taytayan is more like the European than the negro or Negrito in the brachial index and the hand length. The inference from the linear dimensions of the body parts is that the Taytayans are derived from mixtures of Filipinos, Negritos, Chinamen, Spaniards and East Indians.

The Taytayan, the European, and the Nilotic Negro

It may be of interest to compare the average linear measurements of the Taytayans, the Alpine Europeans measured by Hoffman, and the Nilotic negroes measured by the late Dr. Alexander MacTier Pirrie. The stature of the Taytayans is small, that of the Europeans is above medium, and that of the negroes ranges from above medium to tall. The limb parts of the negroes, except the upper arm length, are longer than those of the Europeans or Taytayans, and the relatively great upper

arm length of the Taytayans is a distinctive characteristic of the group, and readily distinguishes them from the negroes, with their relatively great lower arm length. Some groups of negroes have a high tibio-femoral index (long lower legs) and other groups have a low tibio-femoral index (short lower legs); which is true of the different types of Taytayans, some having long lower legs and others having short ones. One negro had a lower leg the exact length of the upper leg, and one or more Taytayans have the parts of the leg of the same length. The greatest difference, however, between the people of these groups is the long forearm of the negro and the long upper arm of the Taytayan, the European being intermediate between the other two in these dimensions.

Artistic Canon

The Canon of Fritsch is used as it was used for the Igorots, for the purpose of comparing the Taytayans with the Europeans from the standpoint of the artist. The total head height, the length of the upper and the length of the lower extremities are greater in the Taytayan than in the European. The protomorphic

characters of the Taytayan are evident from the three dimensions and in this way resemble

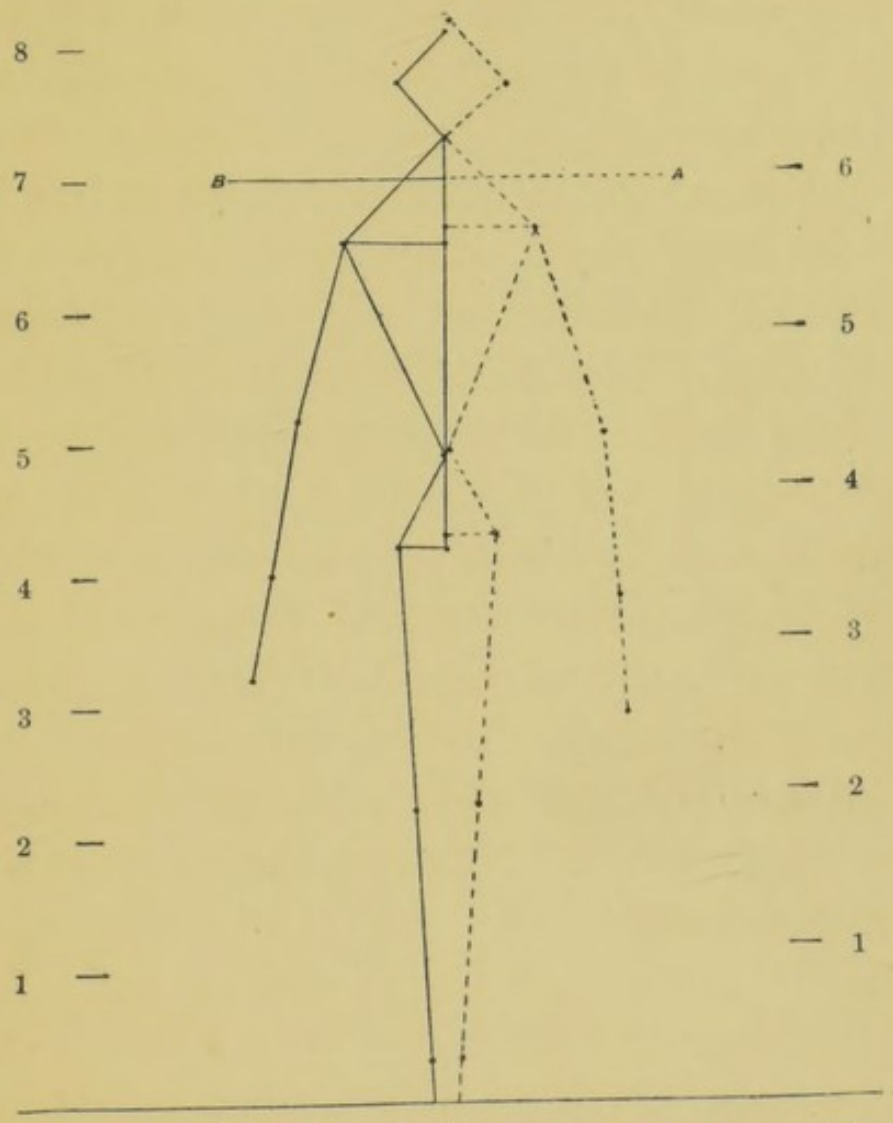

FIG. 13.—The solid lines on the left represent the average European according to the canon of Fritsch. The broken lines on the right represent the average Taytayan according to the same canon. The European stature is equal to 8 total head heights. The Taytayan stature is equal to 7 total head heights. *A* and *B* point to the chin.

the Normal Benguet Igorot and the Igorot from Bontoc. The total head height varies with the stature, according to Stratz, and a

stature of 160 centimeters corresponds to a total head height of 23 centimeters. The stature of the Taytayans is 159.47 centimeters and the total head height is 23 centimeters.

Head Form and Physiognomy

The cephalic index of the Taytayan's head is 81.79, resulting from an average head length of 18.3 centimeters and breadth of 14.96 centimeters. The index is 4.19 per cent. greater than that of the Igorots, and about as great as the greatest of Martin's Malays of the inland part of the Malay Peninsula. The Igorots are long headed, the Taytayans are moderately broad headed. The forehead of the Taytayan is relatively narrower in relation to the head breadth than is that of the Igorots. The nasal index of the Taytayans is 85.2, resulting from a nose breadth of 4 centimeters, and a nose length of 4.7 centimeters. The index is 7.5 per cent. less than that of the Igorots. The morphologic face index of the Taytayans is 82.1, which is 2.1 per cent. greater than that of the Igorots, indicating that the Taytayans have longer faces than the Igorots. The face of the Taytayan is long like that of

the Sikh, the Northern Chinese and the European.

Lack of time and exact appliances forbade the measurement of certain characteristics, such as skin color and minor deformities, but notes were made of such occurrences and they are utilized in the following pages for purposes of description.

Skin Color

The Taytayan has a brown skin, the shade of which depends largely upon whether the individual is an outdoor or indoor worker. As the majority of men are fishermen or farmers, the skin is usually a darker shade than the average Filipino of Manila, where so many men work indoors. The skin color is somewhat relative for this reason. However, a few individuals were so dark in color as to appear almost black, and a few more individuals were so light in color as to appear almost white. Of these there were six of the former and eighteen of the latter. The light-colored individuals invariably exhibited evidences of recent European extraction, whereas the dark colored were similar to the Indians of Cainta, from whom they were probably derived.

Hair

The color of the hair is almost uniformly black and straight, with an occasional fine brown, but no notes were made in reference to this factor. Only three individuals had wavy hair, and these gave evidence of modified European characteristics. No association with the Negrito can be established from the hair form, and there is no evidence of any recent Negrito intermixture.

Eye Color

The average eye color of 179 individuals determined with Martin's artificial eyes is that of the intermediate brown No. 3, which occurred 74 times, a greater number than any other color. It may be significant that a greater number of Australoids and Iberians have dark eyes than light eyes, signifying an intensification of pigment due probably to the Iberian. I have referred above (see also p. 100) to an intensification of skin pigment among the Filipino Iberians, and this is hereby confirmed.

The condition of *arcus senilis* is prevalent, and is not confined to old men.

Four blind individuals were noted among 183 men.

The Mongolian Eyelid

The fold at the inner canthus on the upper eyelid was well marked in 9 per cent. of the men, distinct in 37 per cent. and absent in 54 per cent. This is believed to indicate that a large proportion of the people of Taytay are of Chinese extraction, a fact that is found to be true from other considerations set forth herein, as well as from historic data. The Mongolian fold is not confined to any one type, but is found more often on the Cro-Magnon, Alpine and Modified Primitive types than on the others, which may mean that these three types are more truly Chinese than are the other types, although none of the Primitive or B. B. B. individuals were examined for lid formation.

Head Outlines

The sagittal outlines of the head were made with the cephalograph, an instrument devised by the author, and a great many heads appeared to be distorted by flattening in the dorsal region, often on one side only. The dorsal flattening was most marked in the broad headed, and a portion of the broadheadedness may be accounted for by the deformity. The heads of children and of infants are more dis-

torted than the heads of adults, and I attribute this distortion to the fact that the baby often sleeps on the hard floors with nothing intervening between the head and the floor except the *petaté,* a thin matting.

The Petaté Habit

I have called this the *petaté* habit. When the baby is placed upon the *petaté* it naturally lies flat upon its back and the head is either straight or turned slightly to one side. After a few months a flat space is formed on that part of the head resting on the *petaté,* and the child then lies on this flat piece until the head becomes misshapen and sometimes badly deformed. If the deformed condition persists during the life of the individual then a narrow-headed infant may become a broad-headed adult. The vertical occiput and the *front bombé* are probably deformities and not racial or morphologic characteristics. Because of the presence of such deformities persisting through life, I believe the cephalic index is not the best differential factor, although it may be of service and should not be discarded entirely, but relegated to a subordinate position in racial anatomy. Below may be seen

the head outlines of a boy aged 4, whose head was flattened more on the left side than on the right, thus illustrating the deformed condition.

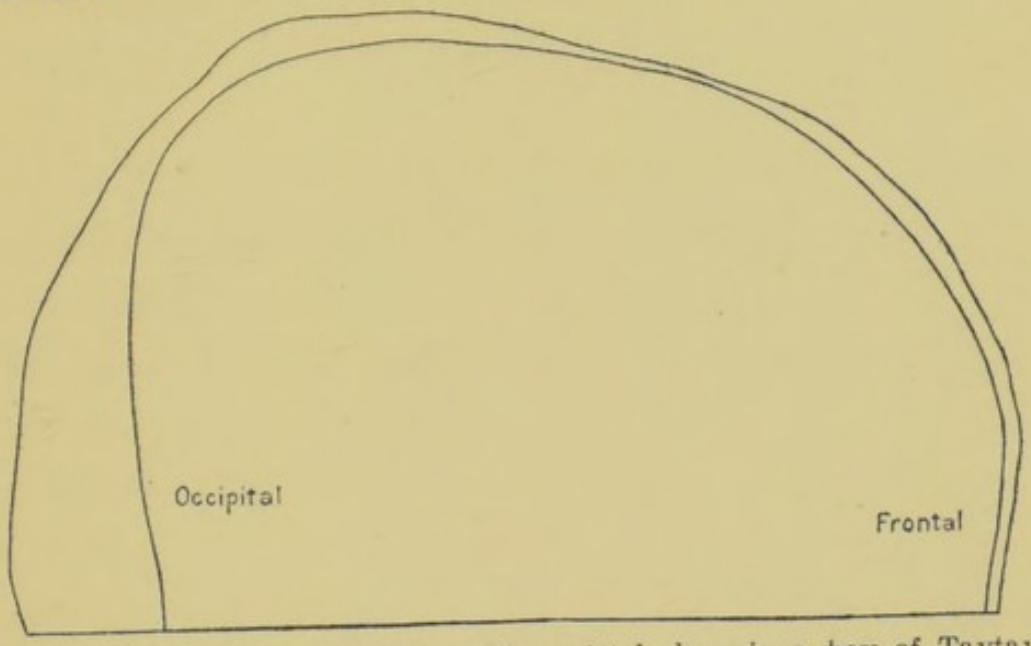

FIG. 14.—Outlines parallel to the sagittal plane in a boy of Taytay aged 4. The small outline is from the left side of the head over the middle of the eye. The large outline is from the right side of the head a little nearer the median line.

THE SEGREGATION OF TYPES

The species of men at Taytay were selected by the method presented in the Introduction, with the result that 3 were Primitive, 37 Australoid, 17 Iberian, 12 Cro-Magnon, 11 Alpine, 2 B. B. B. and 94 Blends.

THE PRIMITIVE

The Primitive individuals are small, with small round head, broad, flat, short face and

nose, lips full, but mouth small, chin small and receding, forehead narrow but *bombé,* with brow ridge small and flat, a type that is infantile and is readily associated with Hagen's "infantile Gesichts Bildung": "niederes Gesicht, stumpfe, breite, niedere, nase, breite, wenig erhebene Nasenwurzel dann Neigung zur sogenannten mongolenfaltenbildung der Augenlider, vorwölbte Stirn, die sogenannte *Front bombé.*"—" so haben wir einen ziemlich umfangreichen Komplex von Merkmalen, innerhalb dessen sich die Zusammenhangen und Gemeinschaftlichkeiten der aus den heutigen Menschenrassen herauszuschalenden Urform bewegen mussten, wenn diese wirklich auf den Namen einer 'primitiven' anspruch haben soll."

The Primitive of Taytay conforms in bodily dimensions to a type of Negrito found in the Philippines and to types found in other Asiatic island groups, as well as on the mainland in the Malay Peninsula. The Kubus of Sumatra, the Taradjas of the Celebes, the Semangs and Senoi of the Malay Peninsula, the Orang Akett of Sumatra and the Veddahs of Ceylon, have in their composition a form similar to the Primitive. This form has almost

invariably associated with it another which I call the Australoid, the chief differences being that the latter has a dolichocephalic head and a wider nose than the Primitive.

The Australoid

This type as found at Taytay differs from the Australoid among the Igorots, by resembling the Iberian largely, whereas the Igorot Australoid resembles the Primitive, and it is easy to conceive that the Iberian would influence the Australoid at Taytay more than the Australoid among the Igorots by interbreeding and partial blending, because the Iberian predominates at Taytay, whereas the type has almost disappeared from among the Igorots; at least it is present there in comparatively small numbers.

The Iberian

The Iberian at Taytay is not unlike the Iberian elsewhere in the Philippines in stature, cephalic index, nasal index and other characteristics. The head of the Iberian is unlike that of the Primitive, but resembles the Australoid head. The forehead of the Iberian is vertical and flat; the parietal region of the

Iberian is inconspicuous, that of the Primitive is large and bulging; and the forehead of the Iberian is relatively wide, whereas that of the Primitive is relatively narrow, compared with the head breadth. The Iberian and the Primitive are by contrast the most distinct and different of all the types.

The Cro-Magnon

The Cro-Magnon of Taytay is an individual above the average in stature, but not tall, with mesocephalic head and broad nose, although the nose is not flat, but straight, long and wide. The face is large in all dimensions. The limb parts are long, especially the forearm and upper leg. This is probably a modified Iberian or Mediterranean type that has impressed itself upon Europe and Africa, and Asia as well, because many Chinese are of this type, and some of the Nilotic negroes represent modified Cro-Magnon men. It may be a product of the union of the Australoid and Iberian.

The Alpine

The characteristics of the Alpine of Taytay may be emphasized by contrast with the Cro-Magnon. The Alpine is small, the Cro-Mag-

non is almost tall; the Alpine is broad headed, the Cro-Magnon narrow headed; the Alpine is narrow nosed, the Cro-Magnon is broad nosed; the Alpine is short, squat and fat, the Cro-Magnon is long, lanky and lean; the lower leg of the Alpine is relatively long, that of the Cro-Magnon is not; the forearm of the Alpine is relatively shorter than that of the Cro-Magnon; and the face of the Cro-Magnon is relatively longer than that of the Alpine.

The B. B. B.

The evident characteristics of the B. B. B. are stature above the average, relatively short lower legs and short upper arms, low omphalic index, very narrow nose, and very long face with somewhat broad head.

The Blend

The Primitive, Modified Primitive and Adriatic are so nearly like the Blend that one must constitute the latter as a definite species, embodying the others, the whole lot to be designated as the Primitive. Three characteristics of the type, the relatively long forearm, lower leg and lower extremity, are Negroid or Negritic, and the inference is that the Negrito

enters into the composition of this type, or else this type enters largely into the Negritos, or both may be true.

Inferences

The Filipinos of Taytay resemble other littoral Filipinos, but are different from the Igorots in stature, cephalic index, and the relative number of individuals of the different types, although the Australoid type predominates at Taytay as well as among the Igorots. The Igorot Australoid is, however, more like the Primitive than is the Australoid of Taytay, which resembles the Iberian more. The other types are like those found elsewhere in the Philippines. Evidences of Chinese, East Indian and European (Spanish) influence in the physical composition of the men of Taytay is not lacking.

Fig. 15.—The B. B. B. Filipino. B. B. B. ears. An Igorot woman of Bontoc in northern Luzon.

Fig. 16.—The same as Fig. 15.

CHAPTER V

Types of Women at Taytay

CASUAL observations lead to the conclusion that the women of Taytay are more Primitive than the men, which is corroborated by the present study.

Stature

The 63 women measured are below medium stature, and they are relatively smaller than the men. Several groups of Siberian women measured by Frau Dina Jochelson-Brodsky are almost identical in stature, even to the maximum and minimum, but the 63 Taytayans show greater variability, because their extremes are practically the same as 305 Siberians. The curve of stature for the women of Taytay is more irregular than that of any group of the Siberian women, indicating greater homogeneity for the latter, and a more complex composition for the Taytayans.

The stature is furthermore treated in groups by types as in former chapters. The selection of types has been accomplished by the method adopted for previous groups of Filipinos,

using the median stature of 153 centimeters for the women, instead of 165 centimeters which was used as the median for the men. It is noted that the stature of all the types except the B. B. B. and Adriatic is below medium, and that of the Primitive is small. The Iberian is below medium height, whereas the Iberian of Europe is above medium height. This indicates that the women of Taytay are Primitive in stature, even when the type is Iberian. The Blends have a great extent of variability, as indicated by the maximum and minimum, and the Primitive and Modified Primitive have the least variation of all. The Iberian, although twice as numerous, has less distance between the extremes than the Australoid. The Iberian and Primitive are therefore to be considered more homogeneous in stature than the other types, and the Blend and Australoid not so homogeneous.

Sitting Height

The sitting height of the women is less than that of the men and the variation of the two groups as indicated by the extremes is about in proportion to the number of individuals in each

group. The sitting height of the women is greater than that of the men relative to stature, and that of the Taytay women is relatively greater than that of the Siberian.

The mean sitting height of the Taytay women is nearer the maximum than the minimum, which indicates that a larger number of the women have a sitting height near the maximum than near the minimum, and as the greater sitting height is supposed to represent the Primitive type this is an indication that a greater number of the Taytay women partake of the Primitive type than of the Iberian or the other types. The mean sitting height of the Siberian women, on the other hand, is almost exactly intermediate between the extremes indicating an even distribution of sitting heights about the mean, therefore more homogeneity.

The relatively greater length of body in the women of Taytay seems to be due to the predominance of the Primitive type among the Blends. The sitting height in general is relatively less for the tall than for the small individuals; taken by type the Blend, with less stature than some other types, has relatively greater sitting height, and this difference is

greater in the females than in the males. The Primitive types, also with less stature than any other type, have a greater relative sitting height among the males than any other type except the Australoid, and among the females a greater relative sitting height than any other type except the modified Primitive, Blend and B. B. B.

This indicates that the Australoid males and the modified Primitive, Blend, and B. B. B. females are influenced in relative sitting height by the Primitive, provided we accept the conclusion of the author, that the Primitive has a relatively long body and relatively short legs. The Australoid type resembles the Primitive among the females, and the Iberian among the males, in both stature and relative sitting height, which may lead us to think that the primary inhabitants were Primitive and the secondary Iberian, provided again we accept the conclusions of the author that the Australoid is a product of the Iberian and Primitive, with mosaic characteristics, especially the disharmonic physiognomy, and provided we also accept Pearson's law that males inherit more from the father, and females more from the mother.

Lower Extremity

Turning now to the length of the lower extremity as expressed by the trochanter height, we find that the females have shorter legs than the males, both in absolute measurements and in relation to stature. The Jakuten of Siberia have less trochanter height, relatively and absolutely, than the women of Taytay. They have also less high trochanter than the other Siberian women measured by the same author, but all the Siberian women are practically the same in these dimensions. It may be of interest to note in this connection that the height of the pubis is, relatively to stature, 51.3 for the Taytayan women, 49.4 for the Siberian women, and 52 for the Russian women measured by Teumin.

When the trochanter height of the types of the men of Taytay is contrasted with that of the women, it is noted that the relative trochanter height increases with increase of stature, but the Primitive, Modified Primitive, Australoid and Blend of the women have a relative height about the same, with varying stature, and the Alpine, Iberian, B. B. B., and Adriatic also have a relative height about the

same, but different from that of the other four types. The stature varies also, but is higher in the last four than in the first four, except the Alpine, which is less than the Modified Primitive and Blend.

Pfitzner has demonstrated that the relative body length decreases with increase of stature in both male and female from a stature of 41 centimeters to that of 180, and the relative length of the extremities (arm and leg) increases with each increment of stature. This is corroborated by my findings, and it would appear that the greater relative leg length is no more than an additional increment of stature, or that stature and leg length are highly correlated. This is no doubt true, and as demonstrated by Martin and others the upper leg length and stature are more highly correlated than are other parts with the stature. The cause of the correlation is as yet, however, undefined. If it is a matter of stature, then additional stature causes additional and relatively longer limbs. If it is a matter of limb development then the long extremities cause greater height, but not so great in proportion. If it is a matter of the interplay of factors in development then the undeveloped have small stature

and relatively less limb length, and the fully developed or over developed have tall stature and relatively greater limb length. This is probably the true cause, and not only is it true in the development of the individual, but also in the development of the species. The Primitive and its related types are early species of man; the form is retained more largely in women at present, with small stature and relatively short extremities, whereas, the Iberian and its related types are more recent species of men and have the form retained more largely in men, with tall stature and relatively long extremities. This may be also an exemplification of Pearson's law that males inherit more from the father and females from the mother, the original inhabitants having been Primitive and the more recent intrusions were made by men of the Iberian type.

Upper Extremity

The length of the upper extremity as represented by the distance from the acromion process to the finger tip may be considered in this connection.

Men have relatively longer arms than women and the Taytayans have relatively

longer arms than the Siberians. The first statement is confirmed by Frau Jochelson-Brodsky, who assembles the records of measurements made by 33 different investigations of related Siberian peoples, and in only one group does the relative arm length of the women exceed that of the men, and in only five groups does the relative arm length of the women exceed 45.0, in the Lapps, the Ainos, the Jakuten, the Kirgisen and Sojotinnen, and in each group the relative length is less than that of the men of Taytay. There is so little difference, however, that no conclusions may be drawn safely. There is apparently correlation of stature and arm length as there is of stature and leg length.

Relative Upper Arm Length

In the previous study of the men of Taytay it was noted that the relative upper arm length, the brachial index and the crural index were factors that differentiated the Taytayan from other groups such as the Soudanese Negroes, the Europeans, etc.; therefore it may be well to examine these factors in the women of Taytay.

The relative upper arm length of the men of

Taytay is greater than that of any other people except the Sikh, Chinese and European, and since this factor is the same for the women of Taytay, it may be dismissed. There is also little difference between the types in this factor, so that its relations are negligible, although the Primitive and its varieties have relatively shorter upper arms than the Iberian and its varieties, following in this the relative length of the upper leg. This may be significant as a differential factor of the types, or only incidental to stature, the types with small stature having relatively short upper arms and legs, and the types with medium or tall stature having relatively long upper arms and legs. The brachial and crural indices may throw some light on these conditions.

Brachial Index

The brachial index of the women of Taytay is 70.1, a little less than that of the men. It is also less than that of the Russian women measured by Teumin, 72.4, the Siberian women measured by Jochelson-Brodsky, 75.0, the Aino women of Koganei 79.4 and the Japanese of Bälz, 80.5 to 89. The same index is 75.6 for the Igorot women. When this index is ex-

amined for the types the results are somewhat discordant, although the Primitive and related forms have a higher index than the Iberian and its related forms. The Australoid has a lower index than the Iberian, but they are practically the same, and the low index of the Australoid may be attributed to Iberian influence. However, the Primitive, Modified Primitive and Blend have higher indices than the Iberian, Cro-Magnon and Australoid, which indicates that the Primitive brachial index is higher than the Iberian.

If this applies to the Russians, Siberians and Japanese, then without doubt, the Primitive elements increase as the Orient is approached through those three peoples, certainly among the women. The Taytay women appear to have more Iberian elements and fewer Primitive than any of the three in brachial index. Hamy gives the brachial index of infants and children 88.88 for those aged 2 months, and 72.30 for those aged 5 to 13.5 years, which would indicate that the Primitive is more infantile than the Iberian, because the brachial index of the Primitive is greater than that of the Iberian.

The Crural Index

This index of the women of Taytay is 5 less than that of the men (95.1 and 90.1), but in no way can it be compared with the index of the women of Siberia because of differences in measurement and computation. Considered from the standpoint of type, however, differences are found.

The evidence is that the Primitive has a smaller index than the other types except the Iberian and Alpine women, but so few as 5 individuals do not constitute a fair number for an average. The Modified Primitive of the men has the highest index of all, but the index of the women is low. Here again, since only two individuals were measured, this may be disregarded. The crural index of the Primitive Morgue subjects was calculated to be more than 100, although only 7 men and 3 women were measured. It would be advisable to measure a greater number of the Primitive type before the crural index can be determined absolutely.

There can be no doubt, however, that the Australoid type has a high crural index, because enough individuals have been measured to indicate this, and all the measurements are

corroborative. This would make the Australoid like the Negro and Negrito. The Iberian on the other hand has a lower index, the Cro-Magnon and Alpine as well. The Blend, too, has a low index which denotes greater Primitive (?) influence than Australoid.

The crural index of the women in each type except the Primitive is less than that of the men, which means that the women have relatively shorter lower legs than the men. They are thus more Primitive, provided the Primitive is found to have a relatively low index.

To summarize the measurements of the body parts:—

The stature of the women of Taytay is small, identical with that of the Siberian women, although more variable, and relatively less than the stature of the men of Taytay. The sitting height of the women of Taytay is practically the same absolutely and in relation to stature as that of the Siberian women, although the relative sitting height is greater than that of the Siberian women or of the men of Taytay.

The leg length of the women of Taytay is absolutely and relatively greater than that of

the Siberian women and less than that of the men of Taytay.

Leg length is highly correlated with stature, and this may be due either to ontogeny or phylogeny, or to both.

The arm length is similar to the leg length in its various relationships.

The pubis of woman is probably lower than that of man.

The brachial index of the women of Taytay is a little less than that of the men, which is less than that of the Russian women.

The crural index increases in the women as follows:

Taytayan	70.1
European	72.4
Siberian	75.0
Aino	79.4
Japanese	80.5–89.0

The crural index of the women is less than that of the men.

From the standpoint of type the greatest differences appear between the Primitive and the Iberian, and in practically all the measurements the women are more Primitive than the men, and the men are more Iberian than the

women. The Australoid type is intermediate between the Iberian and Primitive, except in brachial index, in which it is almost exactly the same as the Iberian, and the crural index in which it is like neither, but resembles the Negrito.

There is some discordance in the relative length of the parts of the extremities, upper arm and leg and lower arm and leg, and the brachial and crural indices. As already noted the types with small stature have relatively shorter upper arms and legs than the types with tall stature, which should mean that the former types have higher brachial and crural indices than the latter, but this is not true. The Australoid, with small stature, has a high crural index, and a low brachial index, and the Primitive, with small stature, has a low crural index and a high brachial index. More extended observations will be necessary to decide what the true relationship of these factors may be.

The body parts having been discussed, attention may now be devoted to the head and face. No detailed comparison will be made, but only a comparison of the most important indices.

Cephalic Index

The cephalic index is greater for the women than for the men, and the Siberian women (Jakuten) have the same index as the women of Taytay, although this group of Siberian women, the Jakuten, has a higher cephalic index than the other groups of Siberians given by Frau Jochelson-Brodsky. In this as in the stature and in other measurements, the Jakuten and the women of Taytay are alike.

The cephalic index of the types is distinctive because it is used as a differential factor in conjunction with the stature and nasal index in the segregation of types; therefore it may be presented without comment.

The Cephalic Index

Type.	Men.		Women.	
	Number of Individuals.	Index.	Number of Individuals.	Index.
Primitive	3	88.5	2	86.3
Iberian	15	76.2	12	77.9
Australoid	35	78.0	7	78.3
Alpine	11	87.7	2	92.9
B. B. B.	2	82.8	1	85.5
Cro-Magnon	12	78.3	...	....
Blend	91	83.3	36	84.2

Nasal Index

The women of Taytay have wider noses than the men, and a great deal wider than those of

the Siberian women (Jakutinnen). The nasal index by type is presented without comment for the same reason that the cephalic index was so presented.

THE NASAL INDEX

Type.	Men of Taytay.		Women of Taytay.	
	Number of Individuals.	Index.	Number of Individuals.	Index.
Primitive	3	89.1	2	107.4
Iberian	15	78.5	12	77.4
Australoid	35	93.3	7	97.4
Alpine	11	70.1	2	82.0
B. B. B.	2	67.6	1	66.0
Cro-Magnon	12	93.4	..	....
Blends	91	83.8	36	85.2

The face of the women of Taytay is relatively broader than that of the men, and both are broader than the face of the Siberian women.

THE FACE INDEX

It is to be noted that in all the head and face indices there is a greater range of variation, judging from the extremes, in the women of Taytay than in the Siberian women.

In the consideration of face index and type a combined face index is utilized because this is a better differentiator than either the morphologic or physiologic face index alone. The

combined face index is obtained by dividing the morphologic face index by the physiognomic index. The following table is the result:

THE COMBINED FACE INDEX

Type.	Women of Taytay.			
	Number of Individuals.	Max.	Mean.	Min.
Primitive	2	86.3	83.3	80.3
Iberian	12	143.9	117.8	99.8
Australoid	7	127.8	113.8	95.2
Alpine	2	117.8	114.3	110.8
B. B. B.	1	.....	88.0	.....
Modified Primitive	2	96.4	91.7	87.1
Blends	34	139.1	108.8	87.8
Adriatic	1	.....	113.7	.....

A high combined face index means a relatively long and a relatively narrow face, whereas a low combined face index means a relatively short and a relatively broad face.

The Primitive and the Iberian are more distantly separated than any of the other types, and the Blends are nearer the Iberian than the Primitive. The Australoid and the Alpine also resemble the Iberian. The Modified Primitive is more like the Primitive.

To summarize the head, nose and face:—

The cephalic index, nasal index, morphologic face index, and combined face index demonstrate that the women of Taytay have rela-

tively broader heads, faces and noses than the men of Taytay, and the latter have the same characters relatively broader than the Siberian women, except that the cephalic index of the men of Taytay is slightly less than that of the others. The broad head, face and nose characterize the Primitive type, which would indicate that the women of Taytay are more Primitive than the men, or than the Siberian women.

FIG. 17.—The Modified Primitive or Adriatic Filipino. Modified Primitive ears. A man from the inland tribe of Bogabos of Mindanao.

FIG. 18.—The same as Fig. 17.

CHAPTER VI

The Men of Cainta

THE town of Cainta, a stone's throw from Taytay near the Lake of the Bay (*Laguna de Bay*), is of considerable historic interest because of the bloody battles fought in its vicinity during the many insurrections that have characterized the region of Luzon not distant from Manila. It is of great interest to the anthropologist, because it presents a body of people different from the surrounding population.

Cainta was founded before the Spanish came to the islands, as it is stated in a history of the Philippines by Jose Montero y Vidal, volume I, page 1, that Captain Juan Salcedo, one of the first Spanish officers who came to the Philippines, in 1571, having subdued the natives of Cainta and Taytay, went to the Lake (La Laguna) pacifying many towns. There seem to be no data concerning the origin of the population of Cainta, but one of two suppositions is plausible. Either they were derived from settlers of East Indian origin

who arrived before the Spanish, or they represent the descendants of a British regiment of East Indian troops, who remained when the British evacuated the Philippines in 1763. The history of P. Murillo, written in 1752, volume VII, page 33, speaks of some of the inhabitants of the Philippines when the Spanish arrived as black people, called for politeness sake Creoles (*Criollos* or *Morenos*), who were characterized by being very active politically. Murillo believed that these people came from Malabar or Coromandel, belonging to the British, and they were probably of East Indian origin. P. Juan de Salcedo, in his history, page 264, speaking of those *Morenos* or *Criollos,* says that they have long, straight hair, long noses, and wide open eyes. He speaks further of some similar people from Malabar that he had known in Manila, who married and settled nearby in Santo Tomas, and at times came to Manila on business. He also says that if they were not brown they might be regarded as Europeans. P. Martinez makes the statement in his book "Estadismus de Filipinas," page 264, that at the beginning of the conquest of the Philippine Islands by the Spanish there came

Moors from Hindustan, trading with the natives.

From these statements one may infer that the people of Cainta were of East Indian origin and occupied the town before the arrival of the Spanish. Current opinion among prominent Filipinos differs in regard to this, and I have been informed by eminent Filipino physicians who have made a study of their country's history that tradition states their origin to have been from a company of East Indian soldiers who were stationed at Cainta during the British occupation of Manila, which was overlooked when the British embarked, and these troops settled there where their descendants at present remain. Both suppositions may be true. The town of Cainta may have been settled originally by East Indians, and a few men from among the British troops of East Indian origin may have remained when the British evacuated Manila. Whatever their origin, they are strikingly like the East Indians, who at present may be seen in considerable numbers about Manila, and they impressed me by their tall stature, almost black skin, long nose and open-eyed expression as of surprise, a characteristic

East Indian countenance. Three men I saw casually in passing were taller than myself (183 centimeters). The skin is a dark sooty brown that usually appears to be black, the face is large and particularly long, the nose is notably high, long and narrow, and the eyes have the furtive look of a hunted hare combined with the wide open lids that give the women of East India their peculiar charm of expression. Their ultimate origin from Europe cannot be doubted.

In any event they settled in Cainta and married Filipinos. Their descendants therefore resemble both Indians and Filipinos, individually and collectively, with a preponderance of the Indian in the mass and in the individual. At least such is the appearance by casual observation, and such is the actual condition as determined by measurements.

The measurements of 38 men of Cainta give average dimensions that are in almost every part slightly different from similar dimensions of the men of Taytay, and the differences are in the direction of the European. The average differences are slight, but because they are differences and because they are averages, and

because the differences all simulate the European they are significant.

It is to be reckoned that the indices and relative factors also differ between the two groups of men because the actual measurements are different, and such is the case, all the indices except one pointing to the European origin of the inhabitants of Cainta.

In only the brachial index does the Cainta Indian resemble any other people more than the European, and this index is like that of the negro—the most characteristic index of the negro's body parts.

The individuals more than the average show distinctive European markings, and a great number of them appear to be purer Iberians than were encountered elsewhere in the Philippines, one-third of the total number measured being of this type. Not only do the individual measurements indicate the pure Iberian, as in the man numbered 15, with a stature of 163.6 centimeters, a nasal index of 77.7, cephalic index 75.9 and omphalic index of 35.9, the latter 15 per cent. less than the average Filipino and 15 per cent. greater than the average European women of Russia (Jews?) as measured by Teumin; not only do the Cainta

Indians resemble this man in physical measurements, but their ear form is that of the European Iberian. Another indication of the European extraction is the absence of the Primitive and Modified Primitive types at Cainta. A few Australoid and Alpine types with the Blends constitute the Filipino element of the population.

The presence of the East Indians at Cainta is evidence that the Indians came to the Philippines and have to some extent helped to form the present Filipino population. The presence of similar people throughout the islands, even among the inland tribes, indicates that this element of the population is of no inconsiderable extent. Studies in ethnology, such as those by Doctors Saleeby, Barrows and Pardo de Tavera, prove that the culture of India is to some extent a part of the culture of the Filipino people. To what extent the East Indians have infiltrated the Philippines in times past and even at present remains as yet unfathomed, but there can be no doubt that many localities have a preponderance of the Indian in their composition. Such at least would be my supposition from casual observations of the inhabitants of several hamlets of fisherfolk about

the Bay of Manila, in such towns as Paranaque and Malabon, and about the Lake of the Bay, as well as the study of the inland tribes from photographs. The Indian element has left its impress on the Filipino by increased stature, darker skin, longer head, nose, and face, and the Iberian ear with everted concha and rolled out helix, characteristics that a close observer learns after many years to distinguish readily.

CHAPTER VII

The Relation of Morphology to Disease

IN THE first chapter I designated the types selected as new or elementary species, and suggested that some of the types might be true, systematic, or old species, from which the new elementary species had been derived. Later investigations not only confirmed this idea, but enable the two kinds of species to be differentiated. The Primitive and the Iberian are old or systematic species, whereas the Alpine, B. B. B., Modified Primitive, and Adriatic are new or elementary species which are at present in the process of formation and are therefore not so stable and definite as the other two. The Australoid and the Cro-Magnon are intermediate between the old and the new, but they are fairly stable, and may be called systematic species. The Blends represent what will be the elementary Filipino species, or the Filipino race of the future.

Great interest attaches to this classification because of the association of tuberculosis and other diseases with the Iberian type. Suf-

ficient numbers of individuals of the other species were not found to justify conclusions. Of the 70 individuals examined in Malecon Morgue the majority of deaths were caused by chronic affections. Tuberculosis heads the list with 41 per cent. of deaths, beriberi follows with 14 per cent., and then, in the order given, come senile debility, 6 per cent.; chronic enteritis, 5 per cent.; septicæmia, 5 per cent.; accident, 5 per cent.; carcinoma, 2 per cent.; pyæmia, 2 per cent.; chronic nephritis, 2 per cent.; and other diseases, 18 per cent. The other diseases include 1 case each of heart disease, uræmia, diabetes, asthma, meningitis, chronic rheumatism, hæmorrhagic purpura, typhoid fever, influenza, myocarditis, bronchitis, chronic cystitis, liver abscess, and insanity. The clinical diagnosis was confirmed by autopsy in only 23 cases.

The most significant facts are that 70 per cent. of the Iberians, 56 per cent. of the Blends, and 33 per cent. of the other types died of tuberculosis, whereas only one Primitive and not a single Australoid died of it. However, 33 per cent. of the Primitive, 30 per cent. of the Australoid, and but one Iberian died of beriberi. This would indicate that the Iberian is

more susceptible to tuberculosis than the Blends and other types, and the Primitive and Australoid are comparatively free from the disease.

Pursuing this investigation further to include the living, it was found at Taytay that the Iberian was afflicted not only with tuberculosis, but with all other diseases to a greater extent than the Primitive. Only 9 comparatively pure Iberians were examined and found diseased, and of these 5 had lung affections, 4 of which were tuberculosis. The two comparatively pure Primitives examined had an acute infection and pleurisy. The Australoid was affected in 6 cases with tuberculosis, 2 with lung or pleural trouble, 2 with heart or arterial disease, 1 with neurasthenia, and 3 had the kidneys or genito-urinary organs affected. Among the Blends were 12 cases of tuberculosis, 8 cases of other lung or pleural affections, 18 cases of alimentary disease, 5 heart and arterial diseases, 4 cases of fever, 5 of acute infections, 3 with skin diseases including 1 case of leprosy, 3 with diseases of the kidneys and genito-urinary organs, 1 case of rheumatism and 1 of splenic disease.

The Iberian and the Primitive were next

compared by taking every individual in which either type of ear occurs, be it pure or not, there being 59 in the Iberian group and 29 in the Primitive. The diseases were then found to be as follows:

	Number of individuals.	Intestinal parasites.	Lung	Tuberculosis.	Alimentary.	Circulatory.	Malaria.	Other diseases.	Beriberi.	Total diseases.
Iberian.....	59	48	18	12	10	8	4	7	0	107
Primitive...	29	19	3	1	2	1	0	3	1	29

This again corroborates previous findings, and signifies that by the ear alone the susceptibility to tuberculosis may be indicated. There are also indications that malaria is more frequent among the Iberian Filipinos, and that the heart and arteries are affected more often than in the Primitive. Indeed, all diseases are associated more frequently with the Iberian than the Primitive, except beriberi, and only one case of this disease is reported among the men measured.

No absolute conclusions would be justified from the facts exposed, but the inference is strong that the Iberian is more susceptible to all diseases but especially to tuberculosis than the Primitive. This may be indicative that the

European and Filipino offspring of the Iberian type is less resistant to disease in the tropics than is the aboriginal type on its own soil and in its natural environment.

The records of disease may be found in the statistics of the Medical Survey of the town of Taytay in the Biological Laboratory, Bureau of Science, from which the data are drawn.

Following the study of the living another investigation of the Morgue Subjects was made with particular regard to their ears, the result of which is that the association of the Iberian with tuberculosis is more firmly established. The incidence of disease and ear type is as follows:

Ear type.	Tuberculosis.	Beriberi.	Other diseases.
Iberian	17	0	13
Primitive	1	6	5
Other ear types	4	5	40

The number of diseased persons among the women of Taytay was so small that a fair comparison would be impossible, but the data corroborate previous findings, therefore they may be taken as substantiating former deductions. Fifty per cent. of the Iberian women examined were diseased, whereas only 20 per cent.

of the Primitive, and about 30 per cent. of the Blend had diseases. Fifteen per cent. of the Iberians had tuberculosis, whereas none of the Primitive were so affected, and only one Blend and one Australoid had the disease. It is obvious from the above that the Iberian women of Taytay are more diseased than the Primitive, and they seem to be especially liable to tuberculosis.

It was observed both at Taytay and in the Morgue that the Iberian ear type A, the one without lobule, is the ear more than all others associated with tuberculosis. Not only is this ear always found with tuberculosis, but the tuberculosis is always of an aggravated form, pulmonary, with cavity formation, etc.

Finally the ears of the tuberculosis patients of Bilibid Prison were examined, and 107 Iberian, 2 Primitive, and 70 mixed ear types were noted among 180 patients with pulmonary tuberculosis—1 patient was not seen. Of the Iberian ears 45 per cent. were type A, 25 per cent. type B, 20 per cent. type C, and 10 per cent. type D, indicating, as mentioned above, that individuals with the Iberian ear type A are more liable to tuberculosis than is any other form.

The lepers in San Lazaro Hospital have also a preponderance of Iberian ears, but the most prevalent form of ear with leprosy is the Iberian type D and not the Iberian type A, although many lepers have ears that are so distorted by the disease as to be unrecognizable in so far as type is concerned.

The foregoing demonstrates the incidence of the Iberian with tuberculosis, whatever may be the reason for it. The Iberian is found not only to be afflicted with tuberculosis to a larger extent than is the Primitive, but the Primitive is comparatively free from the disease, and the other types, including the Blend, have not so much tuberculosis as the Iberian. The large number of Australoids and Blends with tuberculosis may be due to the Iberian in their composition. It may be said that the reason Iberians have more tuberculosis than the other types is because they are more numerous in the population, but the relation of 107 Iberians to 2 Primitives as found in Bilibid Prison is out of all proportion to the relative number of the two types in the Filipino population. The Primitive predominates in some localities, and the Iberian in others, but the total population is without doubt more Primitive than Iberian.

It is a noteworthy fact that the Filipino of the Iberian type presents a very unfavorable picture as seen from the results of my studies, whereas Filipinos of the Alpine, B. B. B., and Adriatic types give a very favorable impression. The Iberians are small, delicate looking individuals with long, thin chests of the "habitus phthisicus;" a large per cent. die of tuberculosis; they form a greater per cent. of the Morgue subjects than of the Students; they have the worst teeth and the lowest class standing of all the types; and they have practically disappeared from among the Igorots, either by absorption or by elimination through disease or otherwise. On the other hand, the Alpine, B. B. B., and Adriatic are the most robust looking individuals; their stature is greater than that of any other types; they form a large part of the Students and practically never are found in the Morgue, probably because they are of the better classes and are cared for by friends; they have good teeth and their class standing is the best. These differences may be due to environment, but type is also a factor.

The inference to be drawn from this study is that a process of breeding out an alien stock is in progress. The Iberian is undoubtedly of

European origin and has been grafted on the East through repeated migrations, but the type does not retain its stamina when strained through a different people in a new environment, therefore it succumbs more quickly to tuberculosis and other diseases than the original inhabitants on their own soil and with their accustomed environment. What is lost by breeding out the Iberian, is gained in other ways, by adding size and vigor to the native stock, and in the formation of other types such as the Alpine and B. B. B., which are derived from the combination of the Primitive and the Iberian. The Blend is also freer from tuberculosis than the Iberian, and may be another element of value in the population of the future.

Professor D. Hansemann, in his book, " Descendenz und Pathologie," introduces the idea that variability is normal, and extreme variation favors extinction. By external influences variation is hindered, and by other external influences extinction is accomplished. Epidemics, such as unusual abundance of food, or absence of adverse circumstances, cause a rapid increase in numbers of individuals, therefore an increase of varieties and of variation, or,

on the other hand, epidemics, such as unusual abundance of disease germs or absence of protective agents on the part of the host, cause extinction.

At present in the Philippine Islands there is an epidemic of tuberculosis, and this epidemic is largely confined to the type I have designated Iberian.

We have, in conclusion, the following inferences:

The Filipinos were originally composed largely of two systematic species of men, which I have termed Primitive and Australoid. To these have been added Chinese and European elementary species, chiefly Iberian, especially in the cities and along the littoral of the islands. The elementary species represented by the Europeans and Chinese are now in greater abundance than the systematic species, and the Blends constitute about one-half of the littoral population. The Iberians apparently are more liable to tuberculosis, whereas the original Filipinos are comparatively free from the disease. The Iberian will ultimately disappear, leaving new combinations and Blends unlike the original types.

CHAPTER VIII

The Omphalic Index

THE position of the umbilicus in relation to the pubis and the suprasternal notch, although it is more variable than the two points last mentioned, is of importance in the differentiation of the species of men. Its importance embryologically cannot be denied, but whether its position is due to developmental phenomena or not, remains to be determined. I present for the first time the index of the umbilicus, and emphasize its significance.

The index is found by dividing the distance of the umbilicus from the pubic spine by its distance from the suprasternal notch. This indicates its relative position on the body. If the index is high, the umbilicus is relatively near the suprasternal notch, but if low, it is relatively near the pubic spine.

I propose the name of Omphalic Index for the index of the umbilicus. Divisions into hyper-, meso-, and hypo-omphalic would follow naturally for the high, intermediate, and low umbilicus, and these might be termed

Omphalites of a high, intermediate, or low order. It is inexpedient at this time to attempt a definition of the limits of the three classes, although I believe the Filipinos are omphalites of a high order.

When the Igorots were examined the position of the umbilicus was determined, and the omphalic index proves to be 41.1, whereas that of the women is 50. The Lowland Igorots have a higher index than either the Highland or Bontoc Igorots, and as the Lowland men are not so tall as the others it may be concluded that tall men have a low index and the small men a high index. The Igorot boys have a high index similar to that of the women, and this is especially true of the boys below the age of ten. After that age the index is about the same as that of the adult.

Afterwards the measurements of the Morgue subjects confirmed the findings in regard to the Igorots, which is that the women have a higher omphalic index than the men. The men and women of Taytay exhibit the same differences, and when their omphalic indices are compared with the indices of the women of Siberia measured by Frau Jochel-

son-Brodsky, three classes of omphalites are distinguished:

THE OMPHALIC INDEX

	No.	Max.	Mean.	Min.	Author.
Men of Taytay	180	60.26	42.25	20.36	Bean.
Women of Taytay	63	73.20	48.20	32.30	Bean.
Jakuten (women)	64	.....	42.00	.....	Jochelson-Brodsky.
Russian women and Russian Jewesses			33.00		Teumin.

The navel of the men is lower than that of the women, which has been demonstrated already for the Igorots and Morgue subjects; the navel of the women of Siberia is about the same as that of the men of Taytay.

The Jewish and Russian women have lower navels than any other group under consideration. This is of interest when the Omphalic index is considered in relation to type as follows:

THE OMPHALIC INDEX

MEN OF TAYTAY

Type.	No.	Max.	Omphalic Index.	
			Mean.	Min.
Primitive	3	56.5	44.1	37.0
Australoid	32	55.9	41.4	26.2
Iberian	15	52.8	42.9	33.5
Cro-Magnon	11	51.6	42.9	38.6
Alpine	10	52.2	42.6	36.3
Blend	88	57.6	42.2	20.4
Modified Primitive	6	46.2	43.1	35.2

WOMEN OF TAYTAY

		Max.	Mean.	Min.
Primitive	2	47.7	47.6	47.5
Australoid	7	63.6	48.4	36.8
Iberian	12	54.6	46.4	38.4
Alpine	2	45.4	39.2	33.0
Adriatic	1	....	38.8	....
B. B. B.	1	....	37.6	....
Blend	36	73.2	49.9	32.3
Mod. Primitive	2	47.8	46.2	44.6

Among the men the Primitive and Modified Primitive types have a higher omphalic index than the others and the Australoid has the lowest of all. Among the women the Australoid, the Blend and the Primitive types have the highest indices, and the Alpine, Adriatic and B. B. B. have the lowest, but only 4 individuals of the latter type were observed. The significant facts are that the Iberian and its related types have a lower index than the Primitive and its related types in both men and women, with slight exceptions. The Blend among the men has a low index (42.2) and the Blend among the women a high index (49.9), which indicates that the female Blend is largely Primitive and the male Blend largely Iberian. It is to be supposed from the above that the women of Europe, particularly the Russian

and Jewish women, are largely Iberian and the Siberian women are largely Primitive.

The Cainta Indians measured while I was working at Taytay have an index of 39.5, which is 2.75 per cent. less than that of the men of Taytay, and indicates a preponderance of the Iberian type. By actual measurements and the observation of the ear type the majority of the men of Cainta who were measured prove to be Iberians. To summarize:

By the use of the Omphalic Index the relative amount of Iberian and Primitive stock in a people composed of the two stocks may be determined with a fair degree of accuracy. Judged by this standard the Russian women (Jewesses?) measured by Teumin are 34 per cent. less Primitive than the Igorot women, 30 per cent. less Primitive than the women of Taytay, 25 per cent. less Primitive than the men of Taytay and the women of Siberia (Jakuten), and 16 per cent. less Primitive than the Cainta Indians, or the other way around they are more Iberian than the other peoples mentioned. This is not the exact percentage of difference between the groups, but I believe it represents an inexact relative difference. Other features, such as stature, ceph-

alic index, nasal index, and ear type substantiate the assertion.

The sexual differentiation by the omphalic index is great; the women have an index that is higher than that of the men. Child-bearing in women may have some influence on the position of the umbilicus. So may the protrusion of the abdomen from any cause, such as obesity, ascites, rice feeding, etc., but type seems to be the most important factor.

The index is high before the age of ten and decreases thereafter. The position of the umbilicus in the small male child is similar to that of the women.

CHAPTER IX

A Classification of Filipino Ears

THE cosmopolitan population of Manila affords abundant material for the study of ears of all kinds. Here, if anywhere in the world, all races and many types of mankind are represented; the white, the yellow, the red, the brown, and the black. I had previously observed ears in America and Europe for several years, and after my arrival in the Philippines, in 1907, I gave particular attention to the ears of the Filipinos and the other inhabitants of these islands.

The study of Filipino ears began by a close inspection and sketching of ears, on the streets leading into Manila, including the suburbs as well as the city proper, in the Assembly, and among other collections of Filipinos, such as the prisoners of Bilibid, where the criminals from all parts of the Philippines are incarcerated. Following this I made a more detailed study of the ears of the bodies received at Malecon Morgue, examined critically the ears of the people of the town of Taytay, and the

ears of the inland tribes of the Philippines, the last largely by means of photographs.

Not having any preconceived ideas of the types of Filipino ears, I was led to select the European types with which I was familiar as the basis on which to begin my observations. I was surprised to find that the ears of Filipinos resemble those of Europeans, although the types at first selected were only the most general. The first 844 Filipinos examined were assigned to the groups as follows:

EARS OF ADULT MALE FILIPINOS

Long (Northern and Cro-Magnon)	345
Oval, shelf, no lobule (Alpine or French)	86
Round, flaring	84
No lobule	122
Others	207
Total	844

Five types for a new grouping are established by notes and sketches made during my preliminary observations; two from the long-eared group and one from each of the others.

Type 1 is a long, slender ear, with a straight posterior border and square lobule, the outline a parallelogram with rounded corners, which presents itself on long, lean individuals with

long heads and faces, prominent cheek bones, and usually with dark eyes and hair. This ear is designated Cro-Magnon because the type of man resembles my conception of the cave man of Europe, although since the preliminary observations were completed this type has been classed definitely as Iberian type D.

Type 2 is long and flat, with a straight posterior border, and square lower helix without lobule. This exists on medium-sized individuals of stocky build, and as it is found frequently on the Igorots it was designated as Igorot, although later detailed study reveals Iberian characteristics. Two types are found similar to it, which are classed as Iberian type B and B. B. B.

Type 3 is large and oval, with a shelf where the lobule is attached to the cheek. Type 3 is found throughout middle Europe (southern Germany, Switzerland, central France) and in America along the Ohio River, in Canada, and on the shores of the Gulf of Mexico, or wherever the inhabitants of central Europe have settled. This ear is termed Alpine, from Ripley's designation of the middle European. It is associated with persons of adipose ten-

dencies, with dark hair and eyes, and broad heads.

Type 4 is a small, round, flaring ear, in which the lobule and superior part of the helix are symmetrical. Type 4 is called Iberian because it is found on small, dark, long-headed individuals representing the Eurafrican or Mediterranean race of southern Europe, and it is later designated as Iberian type C, because the form of the lobule is intermediate between that of the Iberian types B and D.

Type 5 is long and oval, with large helix and small lobule, and it is designated Northern because it occurs most frequently on tall blondes of the Nordic type of Northern Europe. This type is also believed to be an Iberian type that has become considerably modified. Ears that resemble any one type more than another, but are not exactly identical with it, are put into groups, six of which are differentiated. The groups are subordinate to the types and each contains only ears that resemble the type, for example: the ears of group 1 resemble those of type 1. Ears unlike any of the five types of the groups are included under the heading "Others."

EARS OF ADULT MALE FILIPINOS

Type.	Number of individuals.	Group.	Number of individuals.	Total.
1. Iberian D	6	1	101	107
2. Iberian B	25	2	282	307
3. Alpine	12	3	120	132
4. Iberian C	20	4	83	103
5. Northern	3	5	91	94
Others	148	...	...	...
Total	214	.....	677	891

Type 2 is predominant and the others are each present in about equal proportions. All ear types so far considered are European and characteristic of definite somatologic types of European men. At this time, after the second thousand observations have been completed, at least two additional types appear to be predominantly Filipino. These I have designated Malay and Negroid. The Malay Ear has since been termed the Primitive because almost invariably found on the Primitive type, and the Negroid ear has been analyzed into a composite of Primitive and Iberian, which probably represents the Australoid type. One more type is selected in addition; a large, well-rounded ear with heavy lobule and broad helix; distinctive of a European type that may be designated as the box-headed, big-cerebel-

lumed Bavarian of Ranke, which I call the B. B. B. Another Iberian ear, called Iberian type A also occurs; this has no lobule, flares upward, and has an everted concha at its outer border (anthelix), especially below.

After the above classifications were completed, the haunts of the average Filipino were again invaded and a third set of observations recorded. This time an endeavor was made to separate the masses into classes by registering pedestrians in one list and those seen in street cars and carriages (not the common street cart) in another. Only pure-type ears are recorded; no ears that show mere resemblances are tabulated; those that are not of one type or another are put under " Others."

The records of this third classification indicate four ear types as characterizing the Filipino, two of which are European, the Iberian type B (Igorot) and the B. B. B., and two of which are not, the Australoid and the Primitive. Four other types, all European, are found, therefore the inference can be drawn that the Filipinos of Manila and vicinity are more European than otherwise. The two groups, pedestrians and riders, separate the poorer classes from the well-to-do, and a

notable difference in the relative number of ears of the different types in the two groups is observed. Among the pedestrians the Australoid and Primitive are most numerous, whereas among the riders the B. B. B. and Iberian type B predominate, an indication that the European types of Filipinos are more prosperous than the others.

Individual Types

Having determined that European ear types with characteristic morphology pertaining to definite somatologic types of men are present to a large extent among Filipinos, and that other morphologic ear forms belonging intrinsically to the Filipinos are also present, material is at hand to enable us to find the type of Filipino to which each ear type appertains. This is done by confining observations to one type at a time, noting the characteristics of each individual on whom the particular ear type under consideration is found.

Individuals of all nationalities are included in the observations and the relative number of the types is somewhat altered, the European types being increased by the inclusion of

Americans, Spanish and English. Details of the individual types follow.

The Australoid Ear

The Australoid ear is irregular in shape, although frequently somewhat pentagonoid, and without lobule or with a very small one. One form of the ear closely resembles the Primitive with a somewhat bowl-shaped helix that has a square lobule, sloping gently forward. The ear is large and heavy in structure, with rough, velvety surface. It is a distinctive negro ear type. It often presents a wrinkled helix, which folds over almost to the concha; the superior border passes abruptly from the head in a horizontal direction and often joins the posterior border in the formation of a blunt point. The posterior border is often straight and appears as if it had been amputated and healed, leaving a scar that has drawn the ear while contracting. The lobule is usually absent or minute in size, the inferior border of the helix passing diagonally downward and inward to the jaw. The ear resembles in some respects the ear depicted by Hrdlička as the Negro ear. The individuals on whom this type of ear is found are almost in-

variably small, wide-nosed, with oval head, straight black hair, brown eyes, and brown skin, although three tall Filipinos and four short, stocky Filipinos are noted with Australoid ears.

The Primitive Ear

The Primitive ear is small and round, with small lobule, double rolled helix, and a slight flare at the top and at the bottom. The inversion of the concha and the rolling in of the helix are the essential features of this ear. The superior part of the helix often slants downward from where it joins the head, and the lower part of it terminates in a small, flat lobule which is horizontal. The concha is large and its edge (anthelix) frequently runs parallel to the helix, which gives the appearance of a double roll. The Primitive ear appears on at least four groups of Filipinos, all of whom are similar in physical attributes. The individuals are usually small, round headed, wide nosed, and dark skinned, the hair being straight in 84 instances and curled or wavy in 26, a Mendelian proportion that indicates the kinky hair of the Negrito to be recessive to the straight hair of the Primitive; the ear resem-

bles a form of Negrito ear, which form is that of the Primitive.

The B. B. B. Ear

This type of ear, the B. B. B., is smooth, well rounded at the corners, clear cut, and even in shape. The helix is rolled above, but flat below, the lobule is flat and broad, although it may be round or pointed. The concha is open, large and oval, without rounded rim, and the area between the concha and helix is smooth and flat. The ear usually lies close to the head, without any evidence of flaring; it is often square, with rounded corners. The individuals on whom it is most frequently found are medium sized or large, square set, stocky, with a tendency to obesity. The heads are large and oblong in shape. This is one of the most characteristic Spanish types, but it is also seen among Americans, Englishmen, Chinese, Filipinos and Mestizos. It was seen on twelve blonde Americans, one of whom is redheaded, and on 23 brunette Americans, some of whom had dark hair and light eyes. All the Filipinos of this type have light brown or yellow skins, and straight, coarse, black hair, brown eyes, and large, straight, high noses.

The Alpine Ear

The Alpine ear is the ear of the *fat* man. It is large, round, or oval and without lobule. The helix is continuous around the ear to the lower margin, where it turns forward to terminate in the anthelix and cheek, and thus forms a shelf which is supported by the part of the ear that should be the lobule, but is firmly attached to the cheek. The concha is large and open.

The Alpine ear is related to the B. B. B. on the one hand and to the Primitive on the other. The three types shade insensibly into each other. The individuals also resemble each other in size, head shape, and general appearance, which may mean that blending has taken place by continual contact of the types, or that the one is *developed* from the other, the B. B. B. from the Alpine, which in turn is derived from the Primitive.

Individuals with Alpine ears are usually portly, though not above medium height. They have round heads, flat and broad behind. Their features are full, with especially well-developed parotid glands that may influence the appearance of the ear by everting the lower portion of it. They walk largely along

the easy ways of life and frequent the sunny paths.

The Alpine ear is found equally among mestizos and the dark-skinned Filipinos.

The jolly, fat, Spanish friar, the American salesman, the French good fellow, the charming Celestial, all have ears of this type. Music and oratory live in their souls and they constitute to a great extent members of orchestras, bands, and legislative bodies.

The Iberian Ear

The essential characteristics of the Iberian ear are the eversion of the concha and the rolling out of the helix, two characteristics that are ascribed by Schwalbe to the ear of the fœtus after the fourth month of intrauterine life, and that differentiate it from the Primitive ear. A feature of the Iberian ear that is especially worthy of note is the spiral effect of the helix rim when viewed from behind. The effect is like the Italic f or the Old English s, and the ear looks as if it had been twisted backward at the upper corner. The type A ear is probably the most like that of the fœtus, therefore it is given first.

This ear is somewhat long and slender, the

crest of the helix projects upward and backward; there is no lobule, the lower border of the helix passing diagonally to be joined firmly to the cheek. The eversion of the antitragus and inferior concha is one of the most characteristic features of the ear. The edge of the helix is usually small, thin, and round, and the space between the helix and anthelix is broad above and narrow below, where they come almost into contact.

The men of the Iberian type are almost invariably thin and slender, with medium stature, long head, face and nose, straight hair and dark eyes, but among Americans as well as Europeans, some are blonde and some are brunette, some are tall and some are small.

The type B ear resembles the B. B. B. except that it is not so coarse and heavy and the lobule is smaller, more slender and square, attached as it is at right angles to the cheek. This ear may be seen on Igorots, Japanese, Chinese, Spaniards, Americans, Europeans and Filipinos, including mestizos.

The type C ear is a little different from the other types, principally because it has a different shaped lobule.

This ear is round or slightly elongated and

stands out from the head. The crest of the helix (superior border) is symmetrical with the lobule; and the whole of the helix is a large, round roll.

The men of this type have Roman noses and are almost invariably small and slender; otherwise they resemble the other Iberians.

The type D ear is different from the other types, and has been called by me the Cro-Magnon ear.

This ear is the true long ear. It is symmetrical around the base and has a helix and lobule that are equal in size and shape at the two extremities. The descending part of the helix or dorsal border of the ear is straight or gently curved, and is a narrow, round roll, neither broad nor flat. The lobule is large and hangs low to a rounded point. The concha is oval, elongated, and often reaches almost to the helix. The ear stands out well from the head, often at right angles. The individuals to whom this ear is attached are tall brunettes with disharmonic physiognomy (long head and broad face). They often have a peculiar, wrinkled appearance as if they had dried up and their skin had been left in loose folds. The nose is large and heavy looking. Occasionally an in-

dividual with all the appearance of this type, except the tall stature may be seen, particularly among the Filipino women.

All types of the Iberian ear may be seen not only on Europeans, where they are pure, but also on Chinese, Japanese, Americans, East Indians, and Filipinos; as well as on Negritos and African negroes from America. The spread of the Mediterranean race has been phenomenal, judging from this distribution of the ear types.

The Northern Ear

The Northern ear is seldom seen upon a Filipino, but is often found on Chinamen, as noted later.

The Northern is a long, oval, flaring ear with slender helix and small lobule. The distance between the helix and anthelix is great above and small below. The concha is irregularly oval in shape and the antitragus is sometimes slightly everted, thus resembling the Iberian ear. Europeans with this ear are tall and blonde with long heads, and these characteristics, except the coloring, impress themselves upon the Chinese and the Filipinos who have the Northern ear.

Blends of infinite variety are continually noticed, and many ears are of such a nondescript character as to be difficult of classification. The European types of ears found upon the Filipinos resemble closely the corresponding European types, although the skin of the Filipino with European ears may be brown, and other characters of the Filipinos are not so truly European as the ears. This indicates that pure types of ears do not blend so readily as other characters, such as skin color, and the European ears grafted on the Filipino remain true to type, but slowly taking on the characteristics of the native as generations pass.

Chinese Ears

The Chinaman's ears are more largely European than those of the Filipino, and the same European ear types appear among the Chinese as among the Filipinos, although among the Chinese the European ear types are not so distinctly European as among the Filipinos. Judged by ear types the Chinese are more completely amalgamated than the Filipino, and they have a larger proportion of European elements fused into their composition. The majority of the Chinese noted are in the shops along both sides of Calle Rosario and vicinity.

Among the Chinese, as among the Filipinos, the Australoid ear predominates, which points to a common origin for a portion of the two peoples. The Northern and Sub-Northern types appear frequently among the Chinese, but are rare among the Filipinos. The Sub-Northern ear is a characteristic Chinese ear and it is called Sub-Northern because it occurs on tall, long-headed Chinamen, with long, narrow faces. It stands almost at right angles to the head in its lower half, which is oblong and similar to the lobe of the Iberian type B ear or of the B. B. B., except that these two are usually parallel to the head, or at a more acute angle than 90 degrees.

The types of Chinamen corresponding to the ear types are in all particulars (with slight differences) like the types described under Filipino ears. A greater number of Chinese than of Filipinos are tall, and not so many of the Chinese are stocky. The relative proportion of each type among the two peoples may be of interest.

The Chinese have a greater percentage of Australoid, Alpine, Iberian type A, Northern and Sub-Northern ears, and ears without lobules; the Filipinos have a greater percentage

of B. B. B., Primitive, and Iberian types C and D, and each people have an equal number of Iberian type B ears. The number of long ears is great among both people, but slightly less among the Filipinos. It is impossible to know from a random sample of the population that the types are present in the exact proportions designated, but the presence of the Primitive, B. B. B., and Iberian among the inland tribes of the Philippines leads me to believe that the three types are to be found more frequently among the Filipinos than among the Chinese.

Spanish Ears

The ears of the Spaniards in Manila are largely of two types, the Iberian and the B. B. B., although the Alpine ear is of frequent occurrence, but partakes of the characteristics of the B. B. B., with which it is blended so that the line of demarkation is slight. The Iberian type D ear must claim attention also because of its frequent occurrence.

The individual physical characteristics of the men agree with previous descriptions of the physical types; the ear type and the physical type coincide more nearly than among the Filipinos. The types of ears and of individuals

are purer among the Spanish than among the Chinese or the Filipinos because there is no confusion of Australoid and Primitive among the Spanish. There is more or less blending of the different types so that an Iberian ear may resemble the B. B. B. or Alpine, or one of the other types, but is none the less distinctly Iberian in character.

So with the other types. The Iberian types C and D are more like each other than like other ears, and the Alpine and B. B. B. are in the same category. The Northern ears are not found among the Spanish on blondes, but on brunettes.

East Indian Ears

The ears of a few Indian merchants on the Escolta were examined, also the ears of a few Sikh night watchmen. The latter are all except two (7–2 = 5) Iberian Type D ears. The two are one B. B. B. and one belonging to the class termed " others."

One important feature of the Indian ears is the remarkably pure European types among them, purer than the Chinese or the Filipino. The skin of the Indians is usually darker than that of the other two peoples, but their features are more like the European than are those of

the Chinese or Filipinos. It is to be noted that only four European types occur among the Indians, but a larger number might reveal more of other types. If one may reason from so small a number, and the purity of ear type and physical type make it justifiable, there appear to be Europeans under brown skins among the Indians, and occasionally a Primitive is found. The brown skin could be due to implantation of the European on the Negrito and persistence of the brown color by selection aided by the tropical sun; the European traits to early prehistoric migrations of white men from Europe. The mingling of the European and Negrito resulted in the retention of useful characters, the color of the Negrito and the form of the European.

The Ears of the Women of Manila

The difficulty of observing the ears of the women because of the hair renders the collection of data limited and not easy, therefore only 144 individuals are noted.

The female ear is essentially long, longer than that of the male, and the lobe is more pendent. There are 56 long ears and 25 short

ears among the women, besides the Australoid ears which are longer for the women than for the men. Absence of the Iberian type A and B ears may be significant, or it may be because so few individuals were observed. The accumulated evidence indicates that some of the precursors of the present Filipinos were long-eared and the long-eared precursors were Mongolians and Europeans. The Iberian type D, the Sub-Northern, the Iberian type B, the B. B. B. ears are long ears; the Primitive and the Iberian types A and C are short ears, also the Alpine and Australoid. If the women represent the primary stocks and the men represent the invaders, then the primary stocks had less Iberian and Alpine, more Australoid and Primitive than the invaders, and Iberian and Alpine ears are more recent grafts on the Filipino than are the Australoid and Primitive. In other words, there were more Australoid and Primitive elements among the peoples of the Philippines before the East Indian and Spanish came, and the Spanish introduced among the Filipinos a greater proportion of Alpine and Iberian than had previously existed.

The Morphology of the Filipino Ear

The morphological differences in the types of Filipino ears are of significance if our present knowledge of the developmental history of the ear is accepted to indicate that the human ear is undergoing retrograde metamorphosis.

Schwalbe demonstrates the similarity of the ear of human embryos at 4 to 6 months' intrauterine life to the ear of *Macacus rhesus* and *Cercopithecus engythita,* one of the chief points of resemblance being the absence of the inrolled rim of the helix. This author further states (p. 188): "*Vom 8 Monat an beginnt ein Reduktionsprozess der Ohrfalte, welcher sich im wesentlichen in Einrollung des Oberrandes und stärkerer Ausbildung des Anthelix Systems ausprägt.*" When the adult human ear has attained its full maturity, the rim of the helix has rolled inward and forward, and the tip of the ear forms Darwin's tubercle. The extent of inrolling of the helix marks the grade of development and evolution of the ear, hence the age in the world's time of the ear type.

The types of ears under observation may be grouped conveniently into three classes:

1. Old types which have the inrolled helix.
2. Intermediate types which have rolled helices but not so marked as in old types, and
3. New types with slightly rolled helices, resembling the ear of the embryo.

The Australoid and Primitive ears are old types, the Iberian type D, A and C ears are intermediate, the Iberian type B and B. B. B. ears are new types. The others are mixed, intermediate, and new. By this criterion the Filipinos are older than the Chinese, Indians, or Spanish because they have older ear types, at least a greater proportion of the Filipinos than of the other peoples have old ear types. Portions of the Filipino, Chinese, and Indian populations have old ears, and portions have new and intermediate forms, therefore, the three peoples were originally of the same stock, and have since received similar infusions of new stocks, although in varying proportions as regards type.

Bilibid Types

The inmates of Bilibid Prison are of two kinds—local, short-term prisoners, or those from the neighborhood of Manila who are serving terms of less than five years; and general,

long-term prisoners, or those from all parts of the Philippine Islands except a part of the Moro dominions, who are serving terms of five years or over. The latter are representative Filipinos of the lower class, and for that reason I examined a large number of their ears.

The Bilibid types should be compared by percentages with the pedestrians of a previous classification (page 171) since they both represent Filipinos of the lowly walks of life.

EARS OF BILIBID PRISONERS AND MANILA PEDESTRIANS, BY PERCENTAGES

Type.	Pedestrians.	Prisoners.
Australoid	18	11
Primitive	15	18
Iberian type B	10	3
B. B. B.	8	5
Iberian type D	5	7
Iberian type C	5	4
Alpine	4	6
Iberian type A	2	1
Others	33	45
Total	100	100

The significant feature of this comparison is that the percentages are nearly equal in the two groups, although there is a greater per cent. of Primitive and others and a smaller per cent. of Australoid, Iberian and B. B. B. among the prisoners than among the pedestrians. When the prisoners are contrasted

with the riders of a previous classification (page 171) the similarity is not so great.

EARS OF BILIBID PRISONERS AND MANILA RIDERS, BY PERCENTAGES

Type.	Riders.	Prisoners.
B. B. B.	24	5
Iberian type B	17	3
Alpine	12	6
Iberian type D	7	7
Australoid	7	11
Iberian type C	6	4
Primitive	4	18
Iberian type A	1	1
Others	22	45
Total	100	100

The difference between these two groups is that the European types of Filipino constitute 65 per cent. of the riders, whereas the Primitive, Australoid and others constitute 74 per cent. of the prisoners. The Filipino prisoners of Bilibid are less European in their composition than the riders of Manila, and more like the pedestrians, but they have even less European than the pedestrians.

SUMMARY

The Chinese, the Indian, the Manila rider, the Manila pedestrian, and the long-term Bilibid prisoners are groups of men undergoing the process of fusion of similar elements, and each group represents a different stage of

transition in the fusion process. The long-term Bilibid prisoners have less European elements than the other groups, and the European is more obscurely mixed; the Chinese have less Primitive than the other groups, and the European elements predominate, obscuring the remainder. Between the Chinese and the long-term Bilibid prisoners the other groups have variable proportions of the different elements, but the Indians; the Manila riders and pedestrians represent more recent minglings of the types than the Chinese and Bilibid prisoners. Among the first three groups the engrafting of European is more recent than in the last two, therefore the blending has not advanced so far and more definite European types are encountered, but in the last two groups it is more difficult to detect pure European types, although the majority of the Chinese resemble Europeans more than do the majority of the prisoners.

Among the prisoners there is evidence of at least three old types besides the new European types. The three are the Primitive, the Australoid, and the Iberian type D (Cro-Magnon).

The following scheme seems plausible:

First the early European types (Iberian

probably by way of India) mingled with the Primitive and Australoid, forming the Proto-Malays, and peopled the Philippines to some extent, and their representatives are the inland tribes, exclusive of the Negrito. Later another infusion of fused Europeans (Iberian, Alpine and B. B. B.) with the Australoid and Primitive forming the Neo-Malays, came into the Islands, and these mingling types produced the littoral Filipinos found here when the Spanish came. In more recent times the modern European has impressed the Filipino, especially in the large towns along the coast, and the mingling of the three fusions has produced the present littoral population.

According to my scheme for heredity in Chapter X the three groups of Filipinos, riders, pedestrians, and Bilibid prisoners, represent three successive stages in the blending of the Iberian and the Primitive and Australoid. The riders are in the stage of beginning blending, where the pure types persist; the pedestrians are in a stage farther advanced, although a few pure types still appear; and the Bilibid prisoners are in the stage of a variable blend with all shades of intervening variations between the types, but no pure types.

The Indians are in a stage close to that of the riders where the blend is progressing, but the pure types persist, whereas the Chinese are more advanced than are the Bilibid prisoners toward a complete blend, with a much larger proportion of Iberian than any of the Filipino groups, and probably more than the Indians; but the Chinese are composed of Iberian types some of which are different from those that have blended in the Indian and Filipino.

Inferences

Types of human ears are established for the first time, and each ear type is associated with a physical type of man.

The majority of Filipino ears examined in Manila and vicinity are similar to European ears, but the majority of Filipino ears examined in Bilibid Prison on long-term inmates from all parts of the Islands except the Moro Province are not so much like European ears.

The types of ears not of European origin are morphologically older than the European ears.

The Spanish population of Manila has ear types which are closely simulated by the European types among the Filipinos.

The Chinese influence on the Filipino is evident in ear form as in other characters.

Prehistoric Europeans have probably affected the Filipino ears to some extent.

Chinese and Indian ears exhibit types similar to those of the Filipino, but different from them because of the difference in time during which the amalgamation has progressed, and because some of the types entering into the composition of one people are not found in the other.

The Chinese ears are longer than the European, Filipino, or Indian, probably because the Chinese population is composed more largely of the long-eared European types (Northern, Sub-Northern, Cro-Magnon).

Ear type seems to be independent of pigmentation to some extent, because the same type of ear is found on blonde and brunette Europeans, on dark-skinned and light-skinned Filipinos, and on dark-skinned Indians and light-skinned Chinese.

Subsequent studies of the ears of the Filipinos of Taytay and the East Indians of Cainta, besides intricate studies of the ears of the morgue subjects indicate that the Iberian and the Primitive ears are very dissimilar.

The Iberian ears are marked essentially by the eversion of the concha and the consequent turning back of the helix, particularly in its lower part. The margin of the helix for this reason presents the shape of a letter *s* stretched until almost straight, and it resembles an imperfect spiral, as if the upper part of the dorsal margin of the helix had been pulled upward and backward with a twist. The lobule is absent in type A, square in type B, small and rounded in type C, or long and pendent in type D; in the first two it is attached at its lower end directly to the cheek; in all it is everted, the lobule alone being enough to distinguish the ear in the majority of individuals. The Iberian ears are usually thin in structure, with fine, clear-cut details.

The Primitive ears are almost the reverse of the Iberian in every respect. The concha is inverted and the helix is rolled in. This gives the appearance of a hollow bowl with the front of the rim removed, and the depression of the rim at the middle of the helix behind looks as if a bite had been taken out and it had healed. A shelf is thus formed by the helix both above and below, the upper shelf being formed by the dorsal border of the helix

and the lower shelf by the ventral border, this being seen well from in front or behind. The Primitive ears are small, round, and thick. The structure is coarse, and the details are smoothed by the rounded edges, and not clear-cut as in the Iberian.

Ears at Cainta

Very few ears were examined at Cainta (less than 100), but those studied were by far the purest Iberian ears yet seen in the Philippines, and the majority of the ears examined in Cainta were of the Iberian type. This substantiates the results of the physical measurements, and denotes that the people of Cainta are of European type, probably by way of India.

When the ear form and morphologic type of individual are correlated it becomes evident that the Iberian ear is frequently seen on broad headed individuals, who otherwise have Iberian characteristics. This may be due to the distortion of the long Iberian head by flattening in infancy by the *petaté* habit. The ear form is established beyond doubt as a differential factor in racial anatomy, and among the Filipinos of the littoral it should be placed

above the cephalic index in importance, because of the distortion of the head in many individuals. By the ear alone, the derivation of the majority of people may be determined, and in conjunction with the omphalic index, the nasal index, and stature assisted by the cephalic index, more definite species can be segregated than by using the last three without the ear.

Ears at Taytay

I would alter the terminology of the species of some individuals measured at Taytay where the ear type is significant. The number of individuals in the species of men as selected by the three factors, cephalic index, nasal index, and stature, becomes altered as shown in the following table by the use of the ear as a factor.

	Iberian.	Blend.	Austr.	Alp.	Cro.-Mag.	B. B. B.	Prim.	Mod.Prim.	Adr.
Original classification	17	94	37	12	12	2	3	4	1
Altered classification	50	41	39	11	13	4	14	9	1

The altered classification reduces the Blends more than one-half by placing a large number of them with the Iberian, Primitive, and Modi-

fied Primitive. The other species remain practically unaltered except the B. B. B., which is increased by two individuals, thus doubling the number.

When the species of women, also selected by physical measurements, is corrected by the ear type as a factor, and removing from among the Blends those individuals that resemble the Iberian or the Primitive, the following changes occur: Eight Blends become Iberians, six Blends become Primitive, and one Blend becomes an Australoid. It is to be noted that the extracted Iberians are more like the Primitive than are the extracted Primitives like the Iberian and as the Blends that remain are also more like the Primitive than the Iberian, this is evidence that the Blends partake more of the Primitive than of the Iberian in characteristics (see pp. 33 and 163).

CHAPTER X

Generalizations

EFFORTS to reconcile Mendel's laws with the prevailing views of blended effects in heredity need not be unavailing, if the two may be considered as phases of the same process acting at different times during the life history of an elementary species.

Heredity represents all the changes of organic life by three factors:

1. *Determinants,* which are in the germ plasm.

2. *Modifiers,* which are all influences through time and space that act on the germ plasm, and

3. *Laws of change,* which are the rules of conduct by which the determinants and the modifiers interact.

These factors are variable when looked at through all space and during all time, but for any elementary species in a given space and for a limited time they are fixed. A simple diagram inserted here may serve to explain

the relation of Mendel's laws to blended heredity (see Figure 20).

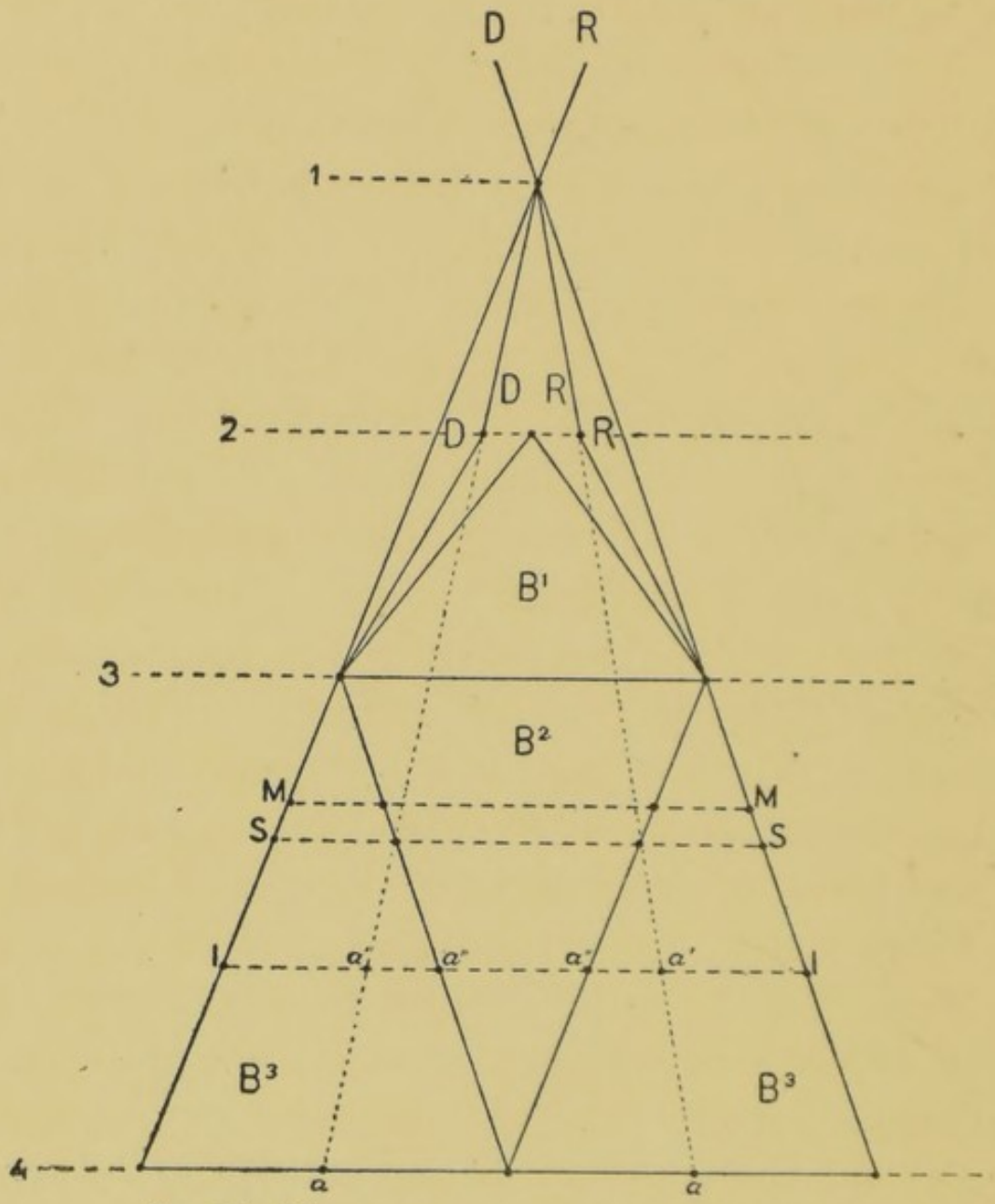

FIG. 20.—Diagram representing scheme for heredity

Let D and R represent the homozygotes of an allelomorphic pair that meet at 1 in sexual union, begin to blend at 2, present the picture

of a variable blend at 3, and fuse completely into a perfect blend at 4. The width of the diagram, exclusive of the spaces B^3 (solid lines), indicates the amount of variation at any time. D=homozygous dominants; R= homozygous recessives; DR = heterozygotes; B^1 (inside the solid lines) = a variable blend ever increasing in number with each successive generation; while D, R, and DR decrease to disappear entirely at 3. B^2 (inside the solid lines) represents the continuation of the blend without either of the originals of the allelomorphic pair, but with all shades of intervening characters blending in various ways as influenced by ancestry and by environment, until a homozygote is formed at 4. B^3 represents the increasing purity of the blend until at 4 a perfect blend or an elementary species is formed. From 1 to 2 True Mendelism exists, Spurious Mendelism is found from 2 to 3, and from 3 to 4 No Mendelism is present, but two tendencies prevail (*a*) the reversion to type, and (*b*) the tendency to blend.

Davenport and Davenport have established true Mendelian heredity for eye color in man; Bateson has designated many conditions in man which indicate spurious Mendelism; and

Boas has suggested the two heredity tendencies above mentioned, when broad-headed and long-headed, or wide-faced and long-faced individuals are united in marriage.

This scheme represents the individual characters, but it may also apply to the type composite, although characters that are nearly alike may blend at once when crossed, without intervening Mendelism, and the condition represented between 3 and 4 is reached immediately, or if the characters are somewhat more different there may be a variable result as represented by Spurious Mendelism between 2 and 3.

The ultimate result of a process where many types are blending will depend upon factors such as environment, natural and sexual selection, the relative number of each type which enters into the amalgamated product, the dominance of one type over another, the time during which amalgamation has taken place, etc.; and the elementary species formed may be unlike the original types, yet not a perfect blend, but a kind of mosaic. For example, the Australoid, as a result of crossing the Iberian and the Primitive.

The scheme presented may be applied to the

Igorots, Morgue Subjects and Students, to calculate somewhat inexactly the relative extent of amalgamation or homogeneity represented by each group of measured individuals. The calculation is somewhat inexact because more than two types have mingled in each group, the types that mingled have not been pure, *i. e.,* perfect blends, or homozygotes of Mendelian characters, and the minglings have been many. In spite of these and other disturbing factors, the degree of homogeneity or the extent of fusion may be determined approximately.

The relative number of Blends in proportion to the types is to be considered, also the number of individuals in each type present, and, finally, the condition of the types as to purity. Malecon Morgue receives a larger proportion of the Primitive, Australoid, Iberian and Cro-Magnon types than is found among the Igorots or the Students, and there are fewer Modified Primitive, Alpine, Adriatic and Blends than among the Students. The greatest number of Blends is represented among the Japanese, which would indicate that the Igorots are more completely amalgamated than the Japanese, but the number of

Japanese is too few for generalization. There are more Blends among the Students than among the Morgue Subjects, yet the number of Blends is less than among the Igorots, therefore the Morgue Subjects represent the least blended group, the Igorots the most blended. As determined by the relative proportion of the Blends without reference to the purity of the types, the Igorots are the most completely amalgamated of the three Philippine groups, and the Students are more completely amalgamated than the Morgue Subjects. The types selected from among the Igorots are not pure types, but show resemblances to the European and the Asiatic and but one type, the Australoid (type A), is distinct. This is additional evidence in favor of the nearly complete amalgamation of the types that make the Igorot. The broken line I–I represents their position. Between I and a′ are the Australoids, between a′ and a″ are the relatively pure Blends, and between a″ and a″ are the impure or variable Blends (represented by types M and A and the Iberian).

The Manila Students are composed of at least three comparatively pure types: Iberian, Primitive and Australoid, and of several other

types that are not so definite: the Alpine, B. B. B., Modified Primitive, Cro-Magnon, and Adriatic. The purest of types are the Iberian and Primitive, the Iberian the purest of all, the Australoid not so pure, because it is a mixture of the two, a mixture that has had two successive stages; one remote in time and one recent; the former well represented among the Igorots, the latter better among the Students. If the types are considered in connection with the Blends, there is an equal number of the two, and the line S–S would represent the position of the Students in the scheme for heredity.

The Morgue Subjects are in a condition of amalgamation similar to that of the Students, although the actual number of Blends, which would place them at M–M, is less.

To summarize: The Igorots are in a condition of No Mendelism and by actual calculation they are nearer 4 than 3; the Manila Students and the Morgue Subjects are less fused than are the Igorots, therefore they would be placed under No Mendelism, nearer 3 than 4, although some individuals of the Iberian or Primitive types may exhibit Pure or Spurious Mendelism and would be placed between 1 and 2 or between 2 and 3. The re-

sults of the calculations are in accord with recognized differences between the Igorots, who are isolated and have been free for a long time from outside influence to any great extent, and the littoral Filipinos, represented by the Students and Morgue Subjects, who have been in the line of many migrations.

Recent observations in the study of heredity indicate that, in some cases at least, heredity is neither exclusively alternate (Mendelian) nor exclusively blended, but may be neither or both. In any study of heredity, at least two kinds of variation must be considered: The variation due to environment, and that due to heredity or to crossing opposite extremes of the same character, such as black and white coat color in animals. When these two varieties of variation do not overlap there is no confusion, but when they do, endless confusion may result. With this in mind, we may consider the physical characteristics of the Filipinos in the light of the recent work of Spillman, who, in reviewing the work of Schull in hybridizing corn says that Schull " looks upon a cornfield as simply a heterogeneous collection of elementary species and hybrids between them," and Spillman accounts for these ele-

mentary species on the "old Darwinian idea of gradual evolution," which he represents by a scheme of letters and exponents, with A representing a Mendelian character that is variable and the differences of which are hereditary, and B and C representing similar characters. Exponents of these from 1 to 10 represent the difference between the characters, any two adjacent ones being so slightly different from each other as to appear exactly alike, but the difference between alternates, as A^3 and A^5, is sufficient to be recognized and those that are far apart, as A^1 and A^{10}, are extremely different. Some of the intermediates may have disappeared, leaving gaps not bridged over by living forms. The differences may have accumulated gradually throughout the time of the evolution of the structure, and each one of the series now existing is fixed within the limits of environmental variation. The Filipino types suggest the cornfield of Schull with its "heterogeneous collection of elementary species and hybrids between them." The selection of types is not an attempt to prove or disprove the application of this scheme to man, but is an earnest effort to find the exact composition of a mixed population. That the

types fall somewhat into Spillman's scheme goes without saying. The gametic constitution of the types of Students, for instance, is as follows, in fulfilment of Spillman's scheme, where A^1 represents a stature of 145 centimeters, and A^{10} a stature of 190 centimeters, with the other powers of A equivalent to the intervening statures at intervals of 5 centimeters for each power; B^1 represents a cephalic index of 72.5 and B^{10} one of 95.0, and C^1 represents a nasal index of 55 and C^{10} one of 100, with intervening indices accordingly, represented by intervening powers of B and C:

Iberian	A^5	B^2	C^5
Primitive	A^2	B^6	C^7
Australoid	A^4	B^3	C^9
Alpine	A^4	B^7	C^5
B. B. B.	A^6	B^6	C^4
Adriatic	A^6	B^7	C^9
Modified Primitive	A^4	B^6	C^9
Blend	A^5	B^5	C^7

Many possible forms are missing and those present are near the median or below, except in the nasal index, where the highest extreme is almost reached. Individual forms probably bridge over the majority of the gaps, and a perfect series could be constructed from them.

If plants and animals may be designated as elementary species by the aid of Spillman's scheme, on the " old Darwinian idea of gradual evolution," with equal propriety and verity that scheme may apply to man and the types selected above represent elementary species of men which have been formed by the blending of diverse types, as well as by gradual evolution.

Professor W. Johannsen, in his recent book entitled "Elemente der Exakten Erblichkeitslehre," embodies in a working hypothesis the fundamental principle that an ordinary frequency polygon, such as that represented by the stature of 100 individuals, of whom 10 are about 155 centimeters tall, 25 are about 160, 30 are about 165, 25 are about 170 and 10 are about 175, and in which there is an even distribution of stature from the smallest to the tallest, making a normal Gaussian curve; that such a polygon is usually made up of several elementary masses, each of which has a frequency polygon of its own. In any polygon that has characteristics due to modifications of environment, the selection and breeding of extremes of the same polygon results in blending; but the selection and breeding of mem-

bers of different polygons results in an isolation of elementary polygons, the constituent members of which reproduce as elementary species. Thus quantitative as well as qualitative differences may constitute elementary species. There may be *phaenotypes* or false types, which do not become isolated as elementary species, and *genotypes* or genetic types, which are true elementary species, according to Professor Johannsen. This has been my contention for years, and upon this idea I have based my classification into types of various groups of men.

The time has come when the types of men found in the Philippine Islands may be designated without doubt as elementary and systematic species. It is not within the province of anthropology to define these terms so that they will apply to all zoölogical forms, but the studies among the negroes, the students, and the school children in America, among the Igorots, the Manila students from all parts of the Philippine Islands, the morgue subjects and the people of Taytay, as well as a study of Filipino ears, justifies a classification of the types of mankind into two definite groups. One contains the types that are stable and

have been stable for many hundreds if not thousands of years, and that do not blend readily when crossed with other stable types; these are called systematic species. The other group contains the types that are unstable, that have not been in existence so great a time, and that blend readily, especially with nearly related types; these are called elementary species.

Each species may have subspecies or varieties. The elementary species are cross sections of variable species which have been formed by the union of two diverse species, whereas subspecies or varieties are cross sections of systematic species that are variable through inherent changes not due to actual crossing but to the interplay of heredity and environment. Elementary species and subspecies or varieties may sometimes be the same, and ultimately may prove to be synonymous terms. Varieties may become systematic species when they shall be sufficiently differentiated, and shall have become stable. Elementary species may become systematic species when the blending elements have reached a stage of slight variability and have become a pure blend. The difference between elementary species and variety is that the first is the beginning formation of a sys-

tematic species by the blending of two others, whereas the second is the beginning formation of a systematic species by the differentiation and disintegration of an old systematic species.

The proper use of the terms, systematic species, elementary species and variety, may be illustrated by the Filipino types of this and previous chapters.

The Iberian type became isolated many hundreds of years ago and became a systematic species of man, and, in the course of time, developed varieties which Sergi, under the title of the Eurafrican or Mediterranean Race, has differentiated and designated by their skull form, and which I have differentiated and designated by their ear form. The varieties of this type spread over the face of the earth, and as they came to the Orient they encountered an entirely different type, another systematic species, the Primitive with its varieties. The commingling of the varied forms resulted in several new types which are elementary species or variable blends of the varieties of the two original systematic species. This will probably account for every people of the East except the Negrito, and it may prove useful in

unravelling their varied forms, because the Negritos are not homogeneous, as will be evident in a forthcoming study.

The previous chapter revealed at least four types of Iberian ears, which differentiate the Iberian varieties, and to this extent the division of the Mediterranean Race by Sergi is corroborated. The Primitive may also be subdivided into at least three types; the Primitive proper, the Modified Primitive, and the Adriatic, and also the Blends, all of which have ears of similar form that have not yet been differentiated, but the varieties of men are none the less evident.

The union of the Iberian and Primitive species as constituted by their varieties, has produced in the Philippines the Australoid, Alpine, and B. B. B., if not the Cro-Magnon. Their union to form the Australoid had resulted in the type A of the Igorots,—the *primary* Australoid—at the time the Spaniards came to the Islands, after which a new infusion of modified Iberians caused an alteration of the *primary* Australoid and the formation of the *secondary* Australoid. The *primary* Australoid is an elementary species, and the

secondary Australoid is also an elementary species but different from the *primary*.

The Alpine represents the union of the Iberian and Primitive as a complementary form to the Australoid but without subdivision, although the B. B. B. probably stands in the same relation to the Alpine as the secondary Australoid to the primary.

The Cro-Magnon has Iberian qualities and also Primitive and Australoid, but not so definite as the Iberian. This form is probably the result of recent and remote Cro-Magnon elements which came with the Iberian from Europe. Its relation to the Australoid is similar to the relationship of the B. B. B. to the Alpine.

The question of race naturally suggests itself here and may be considered in relation to the varied forms that constitute the Filipino people.

The definitions of *species, variety* and *race* are given by Quatrefages as clearly as one may hope to have them:

"*Species* is a collection of individuals more or less resembling each other, which may be regarded as having descended from a single

primitive pair by an uninterrupted and natural succession of families."

Variety is "An individual or a number of individuals belonging to the same sexual generation, which is distinguished from the other representatives of the same species by one or more exceptional characters."

Race is "A number of individuals resembling each other, belonging to one species, having received and transmitting, by means of sexual generation, the characters of a primitive variety."

There is nothing in the above definitions that is incompatible with the ideas formulated and expressed in the preceding pages as to systematic species and varieties, but Quatrefages gives no definition of a type that is formed by the union of two other types, therefore room is left for the term elementary species as defined above.

The use of the word *race* may well apply as indicated by Quatrefages, except that such an entity becomes again a *species* as soon as it is established as a *race*. Derivatives of the primary races are termed secondary races, and derivatives of these tertiary races by Quatrefages, but when many of these become fused

the term race is used no longer. Would it not be better to continue the terms *species* and *variety,* or to give the name *type* to the primary, secondary, tertiary, etc., *races* of Quatrefages, and to dignify each nationality that has developed characteristics that differentiate it from other nationalities by the term *race,* as the German race, the French race, the Filipino race? Otherwise, the word race becomes lost or relegated to designate remnants of humanity such as the Esquimo and the Negrito, which are only types or varieties.

The term race *should apply to any composite body of individuals who are becoming or may have become a distinct type by natural or artificial processes.* A race may contain systematic species, varieties and elementary species in profusion. A Filipino race at present exists under this terminology but not under that of Quatrefages, nor would more than a few of the world's living peoples be races according to his definition. Race would apply also to the Cro-Magnon of early Europe, the Mediterranean of Sergi and to other forms that have become dispersed and diffused or remain as fragments such as the Basque, the Es-

quimo and the Negrito. There would be a German race and an English race, a Dutch race and a Spanish race, but not a white race or a black race or a yellow race, because elements of each color are fusing in different ways in various places, and the color markings do not constitute a definite factor of differentiation, although color may be useful as an adjunct. Color markings have been of no value in the differentiation of Filipino types. Hair form has been of little avail in the study of the Filipinos, because they all have straight black hair, with an occasional wave. The cephalic index has been found unreliable because of possible distortion of the head. In the place of this, however, the ear form has been found a better indicator, and by this alone much can be known as to the individuals' component elements. In conjunction with the other physical factors, omphalic index, nasal index, facial index, stature, brachial and crural indices, etc., the ear form is of great service.

By means of these factors the Filipinos have been separated into groups that are called species and varieties in the following classification:

Systematic species.	Varieties.	Elementary species.
Iberian	Iberian A Iberian B Iberian C Iberian D	Cro-Magnon (?) B. B. B. (?)
Australoid (?)	Primary Australoid Secondary Australoid	Australoid. Alpine.
Primitive	Primitive Modified Primitive Blend (?) Adriatic	

Two processes are supposed to have been active, a differentiation of the Iberian and Primitive into diverse forms, producing varieties, and a fusion of the varieties to make the elementary species. It can not be determined absolutely that the Primitive and Iberian did not arise by the fusion of other forms, but if so, they have so completely fused as to be true systematic species, unless the varieties represent the forms that previously fused. The Australoid furnishes an interesting example of the fusion of two forms, and at the same time the production of two different forms.

Fusion of the mass of Filipinos throughout is evident in the formation of a blend that will probably be largely Primitive, or between that and the Adriatic, because in the course of time

the Iberian elements will be eliminated to a great extent by disease, especially tuberculosis.

The Filipinos are therefore in the blending period, but at the same time some of the types may exhibit alternate heredity, some are in a condition of stability, and others are undergoing differentiation. There is, no doubt, an exemplification of Galton and Pearson's ancestral heredity and reversion to mediocrity, Mendel's laws hold true to some extent, alternate heredity as demonstrated by Boas undoubtedly prevails, yet fusion of all the elements seems to be the ultimate goal.

CHAPTER XI

Conclusions

THE Generalizations of the previous chapter are not conclusions, but tentative hypotheses upon which a theory may be based by subsequent investigations that shall involve the study of the ear form and other characteristics through at least three generations in a great many families.

No positive conclusions can be drawn from the studies in the previous chapters of this book except that the ear form has been established for the first time as a differential factor in racial anatomy. Associated with the ear form are certain types of mankind the differential characteristics of which are the usual anthropometric standards, stature, nasal index, cephalic index, etc., the three most distinct types being the Iberian, Primitive, and Australoid.

The Iberian is the Eurafrican or Mediterranean race of Sergi, the fundamental type of Europe, and is characterized particularly by delicately moulded ears with the concha everted and the helix rolled out. The individ-

uals are of the classical Greek mold, with long heads, faces and noses. The Primitive is similar to the Eurasiatic of Sergi, and is characterized by coarse ears with the concha inverted and the helix rolled in. The individuals are stockily built, with broad heads, faces and noses. The Australoid is the fundamental type of the Philippine Archipelago, and is characterized by an ear that is large, oval and slightly bowl shaped. The individuals are heavily built, neither slender nor stocky, and have long heads, ovoid faces and large, straight noses.

The three types represent the three fundamental units of mankind, the Iberian being the fundamental European type, the Primitive being the type of the Orient, and the Australoid the primary Negroid element. The other types, such as the Cro-Magnon, Alpine and B. B. B., are modifications and combinations of the three fundamental types. Other observations of many groups of individuals among European and African peoples lead me to believe that the three fundamental types are present in varying proportions among the peoples derived from the two continents, Europe and Africa. In Europe and America the

Primitive type has become modified, and the Australoid exists rarely, the Iberian is the predominant type. Among Negroes the Primitive is also modified, the Iberian exists in great numbers, but the true negro type is the Australoid. In the Orient the Iberian has been modified, the Australoid is present in great numbers, but the Primitive is the fundamental and predominant type. The proportion of any one of the types in different populations varies depending upon the relative proportion of each that has entered into the composition of the population, and upon other factors. The studies of Filipinos from all parts of the Archipelago show that a large proportion of the population, probably more than a third, is Iberian. A part of this element is due to the Spanish interbreeding of the past few hundred years, but there can be no doubt that the people of India have swarmed through the Philippines for many more hundreds of years than the Spanish. The earlier infiltrations penetrated the interior and are now well represented in such tribes as the Subanuns of Mindanao, the Mangyans of Mindoro, and the Kalingas of Northern Luzon, who have large numbers of comparatively pure Iberians with

very dark skins among them. I have studied these three tribes as well as others by means of photographs from Mr. Worcester's collection and from the collection at the Bureau of Science, at Manila, and find that many more pure Iberians exist among them than among the neighboring tribes of the interior, and the Kalingas are all comparatively pure Iberians. Other evidences of the East Indian influence may be found at Cainta, where the majority of the individuals are apparently pure Indians. The town of Paranaque on the bay shore, not far distant from Manila, is another place where the population is of the East Indian Iberian type. The evidences are conclusive that the East Indians have assisted largely in peopling certain sections of the Philippine Islands, and in no part of the population can they be positively excluded. Even among the Negritos may be seen the pure Iberian, although the kinky hair, dark skin and small stature class them as Negritos, but the everted concha, rolled out helix and spiral shaped rim of the ear, the long narrow nose, the " hatchet " face with pointed chin, and the long head are sufficient evidence that certain individuals are Iberians. The presence of the Negrito in many

parts of the islands at this time, and evidences of their former presence over a greater area may account for the presence of the Australoid type throughout the Archipelago, but the primary Australoid, Homo Philippinensis, may have originated from a stock other than the Negrito or Negro, and, wherever found, is there only by impregnation at a previous time.

The presence of the Primitive is natural because the locus of its origin is in the Orient, but a large part of this element may be due to the Chinese and Japanese who are fundamentally of the Primitive type, as inclusive of the Adriatic, Blend, Modified Primitive and Primitive types previously described.

The Filipino peoples, exclusive of the Moros, are derived principally from East Indian sources, the southern Pacific Islands, China, and Japan, and Europe. Continual intermingling has failed to eradicate, or fuse, or blend the three fundamental types, Iberian, Primitive and Australoid, which continue in comparative purity throughout the Philippine Islands.

NOTE

THE materials for this book were derived through the generosity of the Government of the Philippine Islands, and studies based on the materials have been published in the Philippine *Journal of Science*. The studies have been overhauled and re-written, with the addition of considerable new material, and with the additional knowledge gained by experience slight alterations have been made in the conclusions. This book brings my views up to date, systematizes the ideas of previous studies, and makes a homogeneous compilation that is readily accessible, instead of leaving the materials in scattered studies. This is a reason for the present publication. The figures in the text and the reproductions from photographs are here published by permission from the Philippine *Journal of Science,* in which the originals appeared.

The original records on which this book is based are on file at the Wistar Institute of Anatomy, Philadelphia, Pennsylvania, where they are accessible to any one who may be interested in the sources of information.

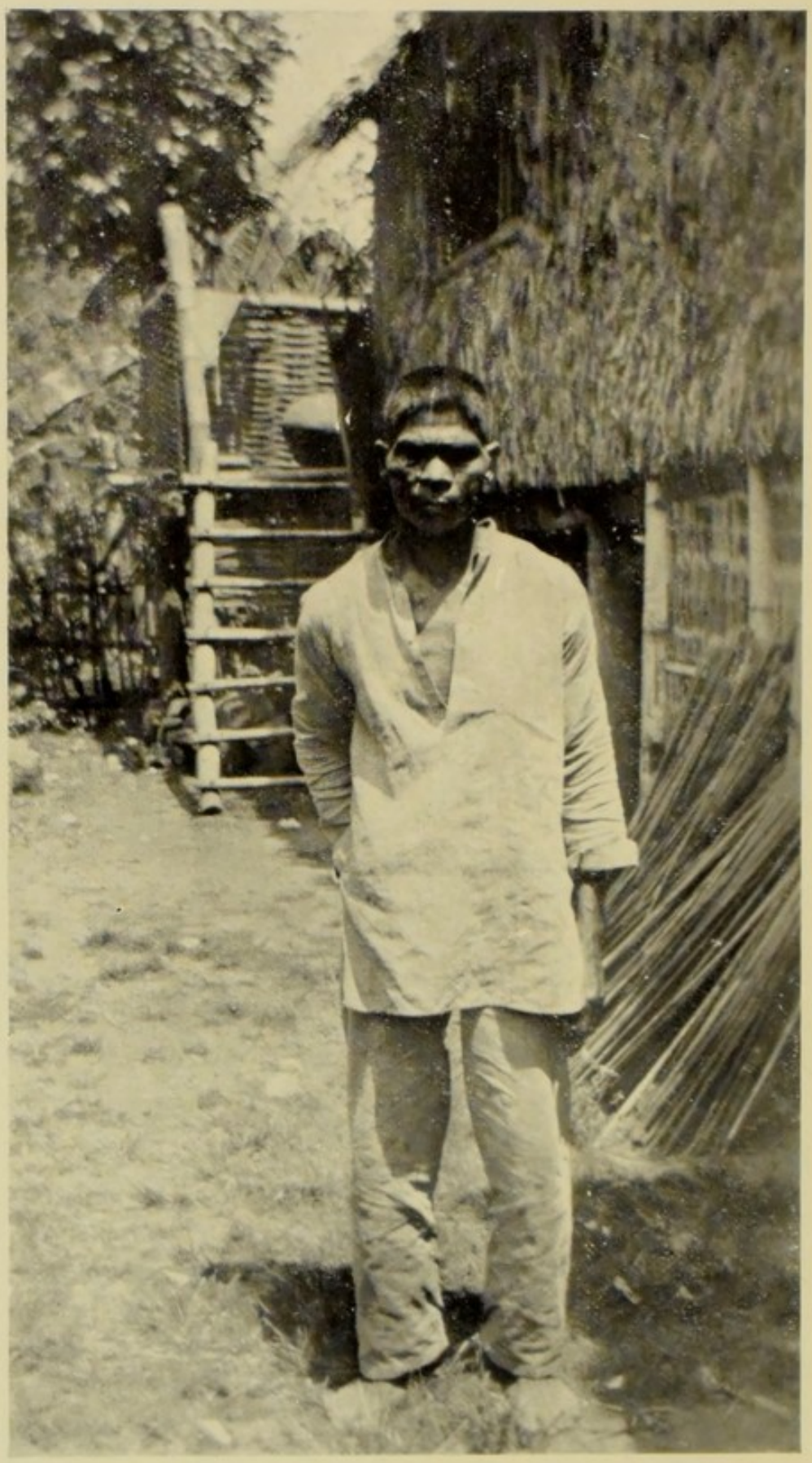

FIG. 21.— Homo Philippinensis. A hillman from near Taytay of the Australoid type.

APPENDIX

Paleolithic Man in the Philippines: Homo Philippinensis

THE discovery of a lower jaw at Mauer, near Heidelberg, by Dr. Otto Schoetensack, on October 21, 1907, marks the earliest form of man yet found in Europe. This man has been called *Homo Heidelbergensis*, and the jaw is peculiar in that it unites two seemingly contradictory qualities: massiveness of jaw, with absence of chin ("negative chin formation"—Klaatsch), and a specially square ascending ramus, qualities that are called pithecoid. *Homo Heidelbergensis* belongs to the earliest paleolithic age, or to the transition period from Diluvium to late Tertiary (Pliocene).

Another early paleolithic form was recently discovered in the lower grotto of Le Moustier (Dordogne), where a skeleton was unearthed bearing the marks of the old Diluvial race, resembling the Neanderthal type. The massive proportions of the chinless lower jaw are remarkable. The femur is extraordinarily short, the length is estimated at 19.5 centimeters, and the lower extremities were necessarily short.

Another find of great importance occurred in France near La Chapelle-aux-Saints (Correze), on August 3, 1908, in the form of a skeleton in an absolutely undisturbed stratum, by the Abbés A. and J. Bouyssonie and L. Bardon. The subject is an old man of about 160 centimeters stature. The skull is dolichocephalic, with an index of 75, the height of the skull is small, the huge round orbits and wide nasal apertures resemble the Neanderthal skulls. The face is prognathous, and the mandible is very large, with absence of chin.

The cultural and fossil findings in connection with the remains place them in three succeeding periods of time, *Homo Heidelbergensis* being older, and the other two more recent and of about the same date, but all of great antiquity.

In the Philippines to-day men of similar form may be seen, rarely, it is true, but the close observer who lives among the people of different parts of the archipelago for years can hardly fail to notice such types. It was my good fortune to make observations and measurements of such a man at Taytay, in the Province of Rizal, Island of Luzon, on April 5th, 1909, during my anthropometric survey of the town. The man came to the clinic of the Free

FIG. 22.

FIG. 23.

FIG. 24.

FIG. 25.

Homo Philippinensis. (The same as Fig. 21.)

Dispensary which was being operated during the survey of the town, and was treated for sexual neurasthenia. The man disappeared as quietly as he came, and I was unable to find him again. He did not live in the town, and some of the people there said that he came in from the hills that lie immediately back of Taytay. I endeavored to obtain a photograph, but unfortunately the Government photographer was absent that day, and the only camera available was a No. 2 A Brownie pocket kodak. This was utilized, and the resulting photographs are reproduced here for the first time. (See Figures 21 to 25).

The features of this man are large and heavy, the lower jaw is heavy, long, square, narrow, with "negative chin formation." The brow ridges protrude, the cheeks are large and prominent, the nose is massive, wide, straight, and depressed at the nasion, and the lips are full and thick. The brow ridges are noticeably prominent. The upper lip is broad from its border to the nasal spine, a distance of 2.7 centimeters, and the peculiarity of it is the rounded contour between the nasal spine and lip margin as seen in profile. The face is prognathous, the facial angle 70°—glabella, nasal spine, external auditory meatus—is not greater

nor less than that of many other Filipinos, although it is 7° to 8° less than that of the Igorots measured in the same way. Nevertheless, about 30 per cent. of the Igorots have the same index, and 4 per cent. an index less than 70°. The nasal index is 102.2, the cephalic index is 73.68, and the stature is 156.8 centi-

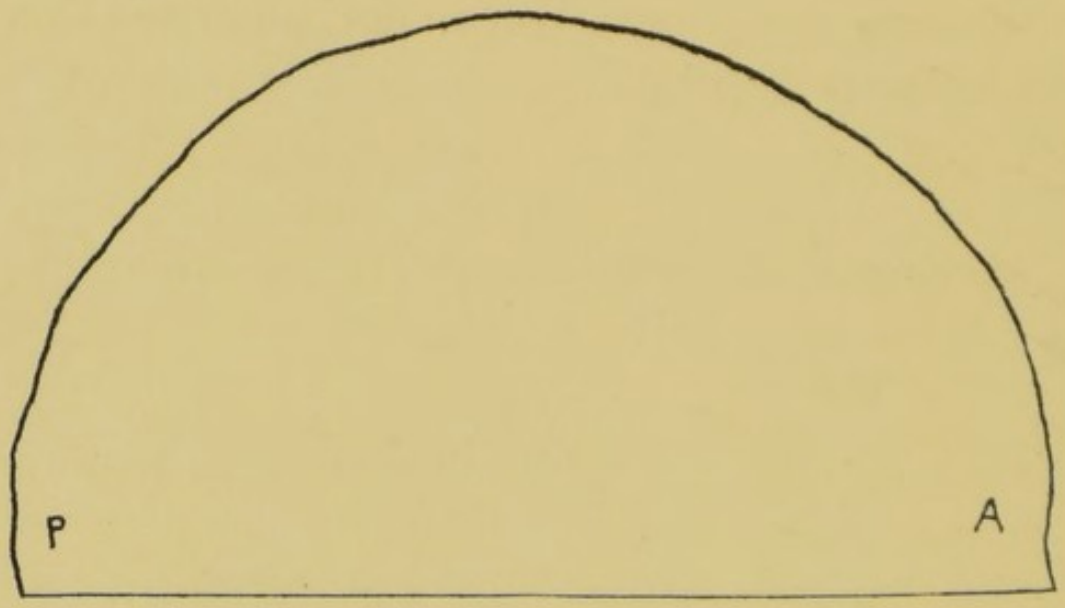

FIG. 26.—Sagittal outline from glabella to inion of Homo Philippinensis. A—Anterior. P—Posterior.

meters. The head height from the upper part of the external auditory meatus to the bregma is 12.5 centimeters. The ear is a combination of Primitive and Iberian, and should be called the Australoid ear. The orbits are large and round, the forehead is low and the glabella is prominent. The sagittal head outline is low, long, and somewhat flat over the lambda, and

might very well represent the combined Primitive and Iberian head outline in the form of the Australoid (see Figure 26). The type falls within the group I have designated as Australoid, because it is long headed, broad nosed and small in stature, but this man is a form somewhat apart, typical of neither the *primary* nor the *secondary* Australoid. The following actual dimensions are given to complete the description:

Name	Alejandro Mesa.
Age	55? years.
Stature	156.8 centimeters.
Sitting height	84.5 centimeters.
Heel to umbilicus	95.5 centimeters.
Heel to sternum	125.7 centimeters.
Heel to pubis	81.2 centimeters.
Heel to ankle	6.7 centimeters.
Heel to knee	44.0 centimeters.
Heel to trochanter	80.1 centimeters.
Heel to finger tip	54.0? centimeters.
Heel to wrist	73.4 centimeters.
Heel to elbow	95.0 centimeters.
Heel to acromion	125.6 centimeters.
Head length, glabella-maximum occipital	19.0 centimeters.
Head breadth	14.0 centimeters.
Head height	12.5 centimeters.
Bizygomatic diameter	14.1 centimeters.
Narrowest forehead	10.0 centimeters.
Chin to nasion	10.6 centimeters.

Nasion to hair line	6.0 centimeters.
Bimastoid diameter	13.0 centimeters.
Bigoniac diameter	10.2 centimeters.
Naso-buccal distance	7.2 centimeters.
Naso-alveolar distance	5.8 centimeters.
Nose height	2.3 centimeters.
Nose breadth	4.6 centimeters.
Nose length	4.5 centimeters.
Lip width (2)	1.8 centimeters.
Lip length	1.9? centimeters.
Ear breadth	3.6 centimeters.
Ear length	6.2 centimeters.
Distance between the eyes	3.5 centimeters.
Distance between the outer corners	9.7 centimeters.

Eye color by Martin's artificial eyes No. 3.
Right handed.

The upper leg length, or approximately the femur length, is less than that of the lower leg or tibia, which would give a high crural index, a characteristic of the Australoid type.

A fair consideration of the physical characteristics of this man will show necessarily his close relationship to the Neanderthal type. The massive lower jaw, with its square ramus and receding chin; the low cephalic index, heavy brow ridges, rounded orbits, large nasal apertures and high nasal index; the small stature, but muscular frame, and the short upper leg or femur, all betoken a form similar to that

of the antediluvial man of Europe, *Homo Heidelbergensis.*

I believe this is the fundamental type of the Philippines, and it is closely allied to the Australoid type, which I have found in groups of individuals from all parts of the archipelago. Whether this form originated there or elsewhere may not be known, but the probability is that it is a production of the East rather than of Europe, although it may have wandered away from Europe during the ages of ice and cold, coming to the East for a more equable climate. The presence of a form resembling the Australoid that has been found in the great islands of the Pacific Ocean, Borneo, Java, Sumatra, Ceylon, Celebes, and in the Malay Peninsula, indicates that the original home may have been south of Asia, and they were cradled in the Pacific Ocean.

Whatever the origin of this type there can be no doubt of its presence in considerable numbers in the Philippine Islands, therefore I propose the name *Homo Philippinensis* for this form. The description and measurements given above serve to characterize the type.

Recent studies of paleolithic man in Europe and living man in the region about southeastern Asia indicate that a form similar to that

of *Homo Philippinensis* was the primordial form of man. Europeans are modified products of various forms that have evolved from the primordial. It is conceivable that a form similar to this primordial type produced *Homo Philippinensis.*

It is also conceivable that the *primary* and *secondary* Australoid types described among the Igorots, Manila Students, Morgue Subjects and the men of Taytay originated from *Homo Philippinensis.*

I will go even further and say that the Negrito and Negro Australoid types are nearly related to the primordial man.

It is even not inconceivable that the Primitive and Iberian types have become segregated as the two opposite end results of the differentiation of primordial man, the former in Asia, the latter around the Mediterranean basin. The subsequent union of the two diverse types, Primitive and Iberian, could very well produce the *primary* and *secondary* Australoid, the Alpine and the other types described among the different Filipino peoples; the Primitive and the Iberian acting as hybrids in their cross mating according to the laws of Mendel. The following outline of the evolution of modern races seems plausible:

Primordial man with a form similar to *Homo Heidelbergensis, Mousteriensis* and *Philippinensis* spread into Europe, Asia and Africa, in each place changing form. In Africa conditions were such that the original form became only slightly altered, and is now found as the Negro Australoid type, but the hair became kinky and the color black.

In Asia the original form persisted to some extent, but developed into the Primitive largely, with only slight pigmentation, and with straight hair. At a very early period the American Indian branched from the Asiatic, at a time when primordial man was beginning to differentiate into Iberian and Primitive. Conditions were such in America that little change has occurred since that time, and at present the American Indian is a conglomerate of the primordial form and the early Primitive and Iberian, with recent Iberian intrusions from Europe before the fifteenth century. In Europe the primordial man developed into the Iberian type, which afterwards spread into Asia, Africa and the Pacific Ocean. The Primitive has penetrated into Europe and modified the Iberian. Forms resembling primordial man persist, and the three types in

Europe, as elsewhere, form by interbreeding various composite and blended types. The Primitive is physically sluggish, therefore the frontal region of the brain with its motor activities has not developed to the extent that the frontal region of the Iberian with intense motor activity has developed.

The sequence of events in the Philippines has been something like the following: The Negritos and *Homo Philippinensis* inhabited the islands when the Malays came, although *Homo Philippinensis* may have come with the Malays. The earliest migrations into the archipelago brought the Hindus, largely of the Iberian type. Later came the Neo-Malays, who were largely of the Primitive type. The Moros or Mohammedans, also of the Iberian type, came afterwards, and more recently the Spaniards (Iberians) settled. The union of the Primitive with *Homo Philippinensis* and the Iberian produced the Australoid Igorot, or the *primary* Australoid. The union of the Primitive or the *primary* Australoid with the Indian and Spanish Iberian produced the *secondary* Australoid as found at Taytay. The other types represent re-combinations in various ways of the Primitive, Iberian and Australoid.