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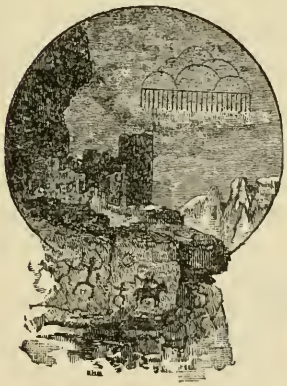

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The Quichua-Speaking Indians of the Province of Imbabura (Ecuador) and Their Anthropometric Relations With the Living Populations of the Andean Area

By JOHN GILLIN

167

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THE QUICHUA-SPEAKING INDIANS OF THE PROVINCE OF IMBABURA (ECUADOR) AND THEIR ANTHROPOMETRIC RELATIONS WITH THE LIVING POPULATIONS OF THE ANDEAN REGION

By John Gillin

INTRODUCTION

The writer and his wife visited the Province of Imbabura in November 1934, on behalf of the Peabody Museum of Harvard University. A superficial survey of the culture was made, but the primary object of this visit was to obtain a series of anthropometric measurements and physical observations for the Indians of this region, which represents the last conquest of the Incas toward the north.

Measuring and observing were done at Otavalo, near the southern limit of the Province; San Roqué, lying on the western slope of Mount Imbabura about 7 miles northeast of Otavalo; Agato, a community of free Indians about 6 miles south of Otavalo situated on the saddle which separates the basin of Otavalo from that of Lago de San Pablo; and Angachagua, a community of free Indians living in a closed valley at the foot of the Eastern Cordillera about 15 miles southeast of the city of Ibarra. The Indians of the first three localities—Otavalo, San Roqué, and Agato—consider themselves more or less related and, consequently, in the discussion of their anthropometry will be treated as one group in distinction to those of Angachagua. According to available information, both verbal and published, these localities have been least subject to acculturation and least exposed to possible admixture with other stocks (Garces, 1932; Saenz, 1933, pp. 30 ff.). All individuals who admitted Negro or white ancestors or relatives, or for whom such were suggested by our informants, were eliminated from our series after measurement. Only seven such doubtful subjects appeared. Furthermore, adult males only were selected, cripples and other deformed persons being eliminated. Such deformities included two acromegalic giants. Otherwise no selection was practised.

A total of 134 individuals was measured and observed, including 108 from Otavalo and associated localities, and 26 from Angachagua.

The writer is indebted in the following quarters and hereby wishes, even if inadequately, to express his gratitude to Prof. E. A. Hooton

of Harvard University, who advised and counselled him in all phases of this work and who placed the facilities of the Harvard Anthropometric Laboratory at his disposal; the Peabody Museum of Harvard University, which financed the expedition, and Mr. Donald Scott, Director; the Government of Ecuador and particularly Dr. Louis Alfonso Merlo, formerly Governor of the Province of Imbabura, who extended the expedition many favors which facilitated its efforts; Mr. Matthew W. Stirling, Chief of the Bureau of American Ethnology, who has undertaken the supervision of the publication of this paper by the Bureau over which he presides; and the writer's wife who contributed not only her presence but also her energy as recorder and assistant.

It is now proposed (1) to tell something of the present mode of life of the Indians; (2) to review pertinent facts from the prehistory of the region in an effort to establish the antecedents of the population under discussion; (3) to present and analyze the results of the anthropological work; (4) to compare these results with apposite series from outside the area; and (5) to present such conclusions as may result from the facts.

PRESENT MODE OF LIFE

Each community of Indians in the district is an ethnic group which possesses certain details of culture distinguishing it from other villages. For instance, the form of the large saucer-shaped felt hats worn by both men and women is a common feature of village identification (Garces, 1932; Saenz, 1933, pp. 30 ff.). Except for such minor distinctions, however, the culture of the region is essentially of one pattern.

The Indians are divided into two categories as regards social and economic position in the eyes of the law: (1) Those who own the plots of ground which they work and who are called "free" Indians; (2) those who live as tenant farmers on the lands of an hacienda, obtaining the use of a plot of ground in exchange for a specified number of days' work each week on the lands of the patrón. The modes of life of these two types are not essentially dissimiliar except that the free Indians tend to be much more independent in their political and economic activities.

Maize, barley, wheat, quinoa, potatoes, lentils, and beans are the principal vegetable crops, although many others are occasionally grown. The fields are cultivated by hand with wooden spades and sometimes with iron hoes. Mutton, guinea pigs, and, occasionally, wild rabbits contribute to the meat diet. Practically all of the fields, which are seldom larger than an acre, are irrigated with water which is brought from the mountain streams in ditches constructed by the community as a whole. Domestic animals consist of sheep, goats,

guinea pigs (which are usually kept in the houses), dogs, chickens, and, more rarely, asses and horses.

The latter are not plentiful among the Indians and are generally used for carrying loads rather than persons. The majority of persons depend upon the strength of their own backs for the transportation of goods.

The houses are built of wattle covered with mud, giving an external appearance of adobe construction and have gabled or four-sided pitched roofs with ridge poles. They are thatched with páramo

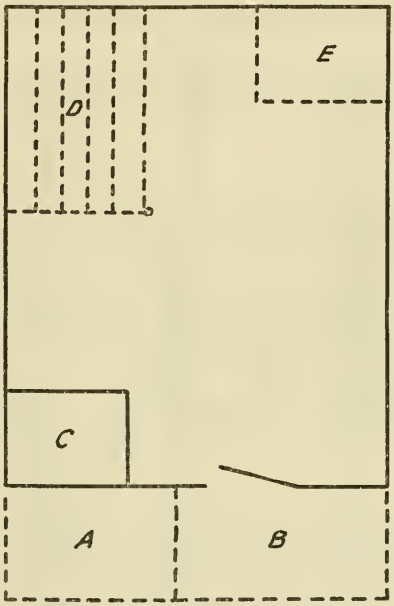

FIGURE 1.—Angachagua house plan.

A, Wood storeroom; *B*, open porch; *C*, wooden bed covered with mat of twilled leaves; *D*, loft for storage; *E*, rack for storing bags of wool and baskets.

grass. Each house is, as a rule, occupied by one family. The dwellings are usually grouped into communities, but they are not situated closely together because each is surrounded by its fields. Associated with the house is usually a kitchen, built on somewhat the same plan, while two or three houses share a large free-standing oven made of clay. In the center of each community is a plaza where is situated the church and the office of the alcade (appointed by the government and usually a literate Indian), and from this center the houses of the community spread out over the cultivated lands to a radius of a mile or two. Beyond the cultivated lands, on the slopes of the nearby mountains, are the community grazing grounds.

Figure 1 is a diagram indicating the plan of a typical house and

the uses to which the various parts are put. Figure 2 shows the construction of the roof frame. A group of four or five houses usually shares a watering hole and laundering place at one of the neighboring streams. In plates 19 to 21 are shown views of the houses and their furnishings. Physical types of the Indians of the Otovalo group and of Agato are shown in plates 22 to 29.

Clothes are woven at home from home-spun and home-woven wool and cotton. The costume of both men and women includes the large, platter-shaped felt hats which are made by specialists. Women wear blouses embroidered with colors, full colored skirts, bright sashes, and woolen shawls, as well as brass and silver rings and many strings

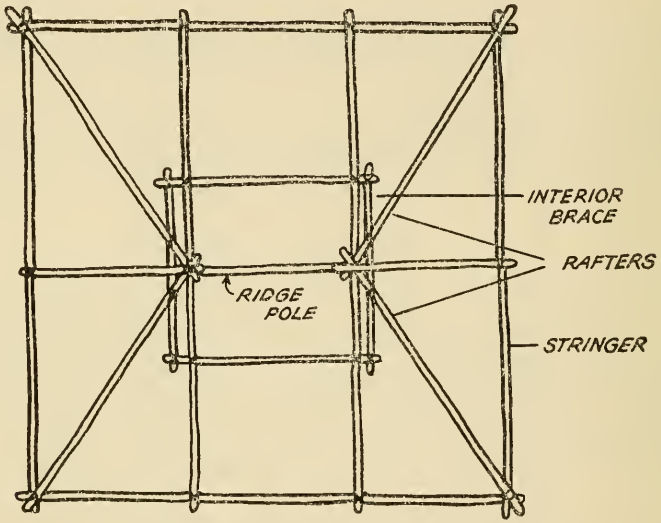

FIGURE 2.—Angachagua roof frame.

of gold or brass beads around the neck. Men wear loin cloths, shirts, pantaloons reaching to the calf, and ponchos. The clothing of both sexes is highly colorful and minor details of pattern differ according to the locality. Green dyes are made by mixing quillo and alpapoca plant juices. Most of the other colors are bought at the weekly markets, which move on a circuit and form the most important institution for the exchange of goods.

All the people are nominally Catholics, although many survivals of ancient superstition remain. The aboriginal social organization seems to be submerged almost entirely.

The language is a dialect of Quichua which is said to differ somewhat from that of Quito. In fact, the Angachagua dialect is in some respects different from that of Otavalo. The Quichua of the region contains a good many more or less modified Spanish words, but few

Indians are able to speak Spanish as such at all, and it is very unusual to find one who can speak it either fluently or grammatically.

As Jijón says (1920, p. 103), the people are living in much the same condition as they probably were at the arrival of the Spaniards, except for the introduction of iron, certain domestic animals and their products, the Catholic religion, and European political control. Of these it seems that the latter has had the most profound influence, because the political and economic life has been much more seriously disrupted than the material culture.

SOME ASPECTS OF THE PREHISTORY OF THE PROVINCE OF IMBABURA

Before considering the anthropometric work it seems necessary to consider what is known concerning the history and prehistory of the region, since, to a certain extent, the significance of our findings depends upon the proper identification of the people we are studying.

The people speak Quichua—are they predominately of Incaic or Peruvian blood; or, if not, what elements may have gone into their physical make-up? To shed some light on this question a survey of the literature has been made and the evidence will be summarized under the following heads: (1) Historical-traditional, (2) archeological, (3) linguistic. The physical evidence will be deferred to the fourth section after presenting the results of our own anthropometric investigation.

The present Province of Imbabura had been conquered by the Inca Huayna Capac some 70 years previous to the arrival of the Spaniards (Reyes, 1934, p. 26) and the traditions of the previous sovereigns were extant in the time of the chroniclers who followed the European invaders. Before the coming of the Incas, therefore, this region, according to Velasco (1841–44, vol. 2, pp. 4 ff.), was occupied by the tribe of the Caras. They lived in the interandine valley in what is now the major part of the Province of Imbabura. Their territory was bounded on the north by the Rio Chota, which separated them from the Tucano-speaking Pastos. On the west beyond the cordillera, lived the Barbacoas, and east of the region on the Amazonian side of the mountains, were the Cofanes and the Quijos. The Cara had extended their dominion over the Canaris probably south of Riobamba (Velasco, 1841–44, vol. 2, p. 6), although Rivet regards 0′31″ south as the southern limit of their effectual distribution, because of the absence of place names with the Cara ending, *-pi*, beyond this parallel. We are told that the *tola* burial mounds, associated with the Cara culture, are not found south of the Rio Guallabamba (Verneau and Rivet, 1912 and 1922, vol. 6, p. 15), and Cieza de León (1853, p. 392) reports that south of this river a

different language was spoken in the villages of Panzaleo and Machachi. There is thus some disagreement as to how far south the Cara occupation extended, but all reports point to the fact that they did occupy the Province of Imbabura.

In 1582 the villages inhabited by Indians in the region of Otavalo were enumerated by the local Spanish administrator who gave the Indian population of his district, which is roughly the southern two-thirds of the present Province of Imbabura, as 11,252 souls (Ponce de Léon, 1881–97, vol. 3, p. 111).

According to Velasco (1841–44, vol. 2, pp. 2–9), the Caras were invaders who arrived in Manabí on the Pacific coast of Ecuador on large rafts, coming from the west. They first occupied the region between the Bay of Charapotó and the Cape of San Francisco, and founded a village, or town, named Caraques. They later migrated along the coast toward the north, because increase of population and dissatisfaction with the tropical climate demanded territorial expansion. They discovered the mouth of the Rio Esmeraldas and an easy way into the interior by ascending the river.

About A. D. 980 the Caras found themselves far up the Rio Blanco, a tributary of the Esmeraldas, on the slopes of Mount Pichincha (Means, 1931, p. 147). After establishing themselves in the Otavalo region, they moved south under the leadership of the Scyri (meaning chief, or king) and conquered the so-called Kingdom of Quitu, which was apparently a loose confederation of rather low-cultured tribes or groups established very anciently in the region surrounding the present city of Quito.

The earliest conquests of the Caras, according to Velasco, lay north of Quito and included Cayambe, Otavalo, and Tusa (modern San Gabriel). The seventh Scyri extended the conquests south of Quito, conquering the present Province of Latacunga with little difficulty. Attempts to subdue the warlike tribe of Puruha, whose capital was Riobamba, were unsuccessful and finally a friendly alliance was made with this power. The eleventh Scyri, however, managed to arrange a marriage between his only child, a daughter named Toa, and the heir of the Puruha line, named Duchicela. Thus the Caras came into possession of the Puruha territory by marriage about the year 1300, continuing a peaceful expansion by making alliances with the Cañar and other tribes farther to the south in order to resist the expanding power of the Incas. The Cara period came to an end about 1450 when the Inca Tupac Yupanqui began his successful campaigns against the southern allies of the Scyri.

This account of Velasco has been accepted by Means (1931, p. 125), Gonzalez Suarez (1890–1903, vol. 1, chap. 1), and Verneau and Rivet (1912 and 1922, vol. 6, pp. 14–21), among others. The authenticity of the chronicler has been attacked principally by Jijón y Caamaño.

Although there seems to be good reason to doubt some of the details of Velasco's account of the Cara movements and political organization, there are, on the other hand, valid linguistic and archeological grounds for believing that the plateaux of Imbabura were populated by a people from the coast several hundred years before the Inca invasion.

The culture of the Caras, mostly on the authority of Velasco, may be summarized briefly as follows: Clothing consisted of a large cloth draped over the shoulders and held with a sash around the waist. The weaving of cotton and wool, as well as the tanning of hides, was well known. Houses were small and round, of wattle covered with mud, and with roofs thatched with páramo grass on wooden frames. Principal foods consisted of maize, beans, potatoes, camotes, rabbits, quina, and a plant called *huacamullu*. The tribes in the valleys of Quilca and Pimampiro cultivated coca, which they traded to neighboring groups at a profit which gave them a higher standard of living than the others.

Cultivation of the fields was performed with a sort of wooden digging stick. Llamas were raised, but the meat was eaten by chiefs only. Arms consisted of the javelin which was used with a throwing stick, lance, and sling. Stones were used for axes and clubs. The people were very warlike, and in order to secure their victories, constructed fortresses in conquered provinces in the form of quadrangular terraplanes of three or four stages, with palisades in which were located structures housing the store of arms. Near the forts were villages where the officers and chiefs of the Province lived. They used a war drum of cylindrical shape made from a single hollowed piece of wood and provided with ears at each end for suspension. In burying the dead, they first stretched the body on the ground at some distance from the house and surrounded it with the jewels and arms of the deceased. Then they raised around it a wall of rough stones, the nearest relatives having the privilege of placing the first stones. These structures are known as *tolas*.

The king's graves were provided with a circular stone chamber with pyramidal stone roof and a door opening toward the east, which was opened only for the interment of a new corpse. The bodies of the kings were "embalmed," clothed in the royal insignia, and placed in a sitting position around the wall of the chamber.

The Caras are said to have worshipped the sun and the moon, and to have venerated the two heroes Pacha and Eacha. The temple of the sun was on the Panecillo, an artificial (?) hill to the south of Quito. The temple was quadrangular in form, constructed of well-cut stone, with a pyramidal roof and a door facing the east. Inside was only an image of the sun in gold. On each side of the door were two columns which served as gnomons for observation of the solstices, and around

the building was a circle of 12 columns, indicating the position of their shadows at the beginning of each month. Offerings to the sun consisted mostly of perfumes, resins, fruits, and animals. The temples of the moon were situated on a hill at the opposite end of the city to the north. It was of circular form with round windows, and in the center a silver image of the moon. Above the moon hung a piece of blue cotton cloth representing the sky in which were fixed silver stars. The first day of each lunar month was consecrated to this divinity.

The foregoing is Velasco's account of the Cara religion, but other sources mention such customs as the worship of pumas and large snakes, which we may assume represented the more primitive aspect of Cara religion.[1]

Verneau and Rivet say "the sun cult seems to be of Peruvian origin as Cieza de León declares it to be in the case of the tribes of Chillo and Alangasi (near Quito). Before the coming of the Incas the Caras adored the sky, the high and snowy mountains, where they went under the conduct of their priests to carry sacrifices and offerings when they wished to obtain divine favors. The indigenes of Pimampiro and Chapi had wooden and stone representations of their gods to which they offered white maize, chicha, and coca" (Verneau and Rivet, 1912 and 1922, vol. 6, p. 19).

The political organization, according to Velasco, was a centralized aristocratic monarchy consisting of three classes—the Scyris or kings the nobles, and the commoners. The power of the kings, as well as that of the nobles, was inherited by sons to the exclusion of daughters, and in default of sons the title passed to the son of the ruler's sister. The new king did not take power until recognized by an assembly of the nobles who, if they considered him unworthy, appointed one of their number to take his place. This assembly, together with the king, decided all questions of general interest and particularly those relating to war. Each social class had its special insignia. All those capable of bearing arms wore a feather crown with a single row of feathers. Nobles' crowns had two rows of feathers. The king wore the latter type, decorated with a large emerald suspended in the center of the forehead. Real and personal property were both inherited.

The Scyri had only one wife, but many concubines, a privilege which was allowed the nobles. Polygamy was prohibited for the common people but divorce was easy and frequent.

The Caras were known to be very good lapidaries, especially skillful in cutting emeralds.

Although they had no writing, they possessed a form of annotation of events and accounts which consisted of placing in compartments of

[1] For summaries of Cara culture, see Verneau and Rivet, 1912 and 1922, vol. 6, pp. 20 ff., Means, 1931, pp. 145–155, González Suarez, 1890–1903, vol. 1, pp. 86 ff.; for original source, see Velasco, 1841–44, vol. 2, pp. 393 ff.

wood, clay, or stone little pieces of stone of different colors and forms. These records were kept in the temples.

So much for a rapid sketch of the Cara culture at the time of the Spanish conquest, as reported by Velasco. Many features suggesting Peruvian influence on a substratum of independent culture will be at once recognized. From our point of view it is important to remember this Peruvian influence because it may indicate the possibility of the infusion of Peruvian blood as well. Other evidence also speaks for such admixture.

The resistance offered by the Cara tribes to the Inca conquest in the present Province of Imbabura was very fierce, and they succeeded in holding their own against the Peruvian armies for at least 17 years. In this struggle the people of Cayambe, Pifo, Otavalo, Cochasqui, and Caranqui were especially active, and they were only defeated in the end by a stratagem which resulted, as Cieza de León tells us (1853, pp. 255–260), in the slaughter of all the able-bodied men at Yaguarcocha (Quichua: Lake of Blood), some 5 miles north of the present town of Ibarra. The survivors were called *Huambracunas*, meaning "children." If this account is true, a large part of the Cara blood of the Province was wiped out about 1467.

After the massacre, Huayna Capac is said to have repeopled the Province with *mitimaes* sent from Peru (Cieza de León, 1853, p. 258). Unfortunately, we do not know from precisely which part of Peru these colonists came, but Verneau and Rivet (1912 and 1922, vol. 6, p. 21) on the authority of a reference the writer has not been able to check, mention that the village of Zambiza, situated across a mountain spur some 10 miles to the northeast of Quito, was entirely peopled by Indians sent from the boundary between Peru and Bolivia.

A review of the historical material, therefore, tells us of at least three physical strains which may be involved in the present population of Imbabura: (1) The first inhabitants of which we know anything, called *Quitus* by Velasco, the people who were inhabiting the plateau at the time of the Cara invasion; (2) the Caras, coming from the coast and probably possessing blood foreign to the territory of Ecuador, if the tradition of their arrival from overseas on rafts is to be taken seriously; (3) Peruvians of uncertain physical type, who came in as soldiers and colonists at the time of the Inca conquest. Let us see what light the other lines of evidence may throw on the problem.

Jijón (1920, pp. 103–105) summarizes the succession of cultures in Imbabura as follows: (1) Painted-vase period, which is earliest, characterized by painted vases of one or two colors on a clear ground; [2] (2) well-grave period, in which bodies are buried in lateral gallery at

[2] The author says that they are possibly associated with burials in wells under *tolas*, although this seems doubtful on the evidence which he presents.

the base of a well 2 to 4 meters deep; (3) *Tola* period, which the author and others have proved to precede the Inca period (Verneau and Rivet, 1912 and 1922, p. 125; von Buchwald, 1909, p. 156); (4) the Inca period, which in Imbabura was neither—

very durable nor very intense. In those places like Caraqui in which the Inca founded stable cities the people were made vassals. In other parts of the territory the Inca influence was confined to numerous intrenched camps and the leaving of vases, while aboriginal life went on side by side with the Peruvian. [Jijón, 1920, p. 105.]

In another work, Jijón (1930) has given a general chronology for the pleateau part of Ecuador, based principally on the stratified site of San Sabastian near the town of Guano in the Province of Cotopaxi. The succession of cultures, beginning with the oldest, is as follows: (1) Proto-Panzaleo I, wavy, comb-made figures incised on pottery, ?—200 B. C.; (2) Proto-Panzaleo II, large decorative motifs on pottery in negative painting, 200 B. C.–0; (3) Tuncahuan, pottery decoration consisting of negative and over-painting, A. D. 0–750; (4) Guano, pottery showing influence of Tiahuanaco, A. D. 755–850; (5) Elenpata, very stylized, small motifs of textile aspect in negative technique, common to Manta style of same date, A. D. 850–1300; (6) Huavalac, applied faces with bent noses, engraved figures, and remains of negative painting of the preceeding period, A. D. 1300–1450; (7) Puruhaincaico and Inca, 1450–1532.

The significance of this for us, lies in Jijón's views concerning the foreign affiliations of these cultures, which he supports with a thorough study of comparative material. According to him, a primitive population, like that of the Fuegians or the ancient fishermen of Africa, was succeeded by another which was represented by the diffusion of an archaic culture element somewhat like that of the Valley of Mexico, and here represented by Proto-Panzaleo I. This archaic culture was followed by new cultural waves connected with the southern advance of the Chorotegas before 100 B. C. and represented in Ecuador by Proto-Panzaleo II. This culture was, in turn, followed by yet another wave of Chorotegan influence (Tuncahuan) which was already influenced by the art of the old Maya Empire. The latter wave of culture was met by and blended with a wave of Tiahuanaco influence from Peru, represented by Jijón's Guano. Jijón claims that Proto-Panzaleo II and the Guano types have been found in the Province of Imbabura, thereby indicating early intrusions of culture, and possibly of peoples, first from the Chorotegan area and, secondly, from Bolivia and Peru.

Without repudiating the existence and direction of foreign influences, Means has criticized Jijón's succession of cultures as failing—

to show the existence of any vivid and deep-reaching contrast between the various types. It is quite possible to lump all his types together and say they represent

merely a culture which, beginning as a low archaic culture (an integral part of that so widespread in Central and South America), gradually worked its way up through the various grades of the archaic stage until it attained a stage which, though preserving traces of archism (in modelled human faces particularly), was, nevertheless, on a par with Tianhuanco II art in its later years and, like it, was possessed of a metallurgic art. Throughout all this long and gradual upward climb, influences were received far more constantly from the north, i. e., from Colombia and Central America, than they were from the south. Nevertheless, there are clear evidences of influences of an aesthetic sort derived from Tiahuanaco II art toward the end of its career. [Means, 1931, pp. 158–159].

In going through the literature, the writer has been able to find no evidence that an extensive migration accompanied the Tiahuanaco cultural influences from the south, and, since the latter occur with some scarcity in Imbabura, we may conclude for the time being that little infusion of Peruvian or Bolivian blood took place prior to the Inca invasion. There is more to be said, however, for both cultural and physical connection with the north.

Gonzalez Suarez was of the belief that the Caribs exercised a strong early influence in Imbabura, basing his belief on finds of occasional urn burials, which he apparently considered to be a Carib trait. Verneau and Rivet (1912 and 1922, vol. 6, p. 127), however, consider these interandiane urn burials to be diffusions from the coast, where such finds have been recovered as far south as central Peru. It is also claimed, on what seems to be rather insufficient evidence to date, that certain names, such as Imbabura, Cayambe, and Cotopaxi, are of Carib origin. One should not say, however, that there has been no Amazonian influence on the Plateau.

Uhle (1922, pp. 205 ff.; 1932) has summarized the archeological evidence and has made out a good case for the presence of strong Central American influence both on the coast and in the highlands, including Imbabura. This view is, the writer believes, accepted by most students of the subject (Means, 1921; Jijón, 1930, etc.), although Dr. Samuel Lothrop says that recent finds of Ecuadoran material in Nicaragua show that the cultural movement was not all in one direction.

Let us now return to Velasco's story of the Cara invasion of Imbabura via the Rio Esmeraldas and see what archeological evidence exists in support of it.

Jijón has summarized three facts which indicate, at least, that the pre-Inca inhabitants of Imbabura must have come from a forested region with a climate different from that of Imbabura, presumably a tropical forest region, since the nearest temperate forest is some 1,500 miles away in Chile (Jijón, 1920, pp. 117–120). These three indications are as follows, according to Jijón:

1. According to early accounts, the fort erected by the Caranquis for the defense of Yaguarcocha was made of wooden palisades

indicating an origin in a country where trees were plentiful. Except at Yaguarcocha there is no other locality in Imbabura where it is possible to obtain trees for this purpose.

2. The Caranquis used rafts on Yaguarcocha and the Lago de San Pablo, the only two lakes of any size in the region. These lakes, however, contain no fish and are too small to necessitate building rafts to cross them rather than walking around.

3. The house construction, depending on much use of wood is more appropriate to forested regions than to Imbabura.

The closest tropical forests are those of the Amazon valley and those of the Ecuadoran coast. Since the cultural elements in question are more like those of the latter region than the former, Jijón assumes that their presence among the Caras indicates a migration from the coast.

In addition to these facts, we may mention that the counting devices mentioned by Velasco have actually been found in strata immediately preceding the Inca (Verneau and Rivet, 1912 and 1922, pl. 15; Means, 1931, p. 168) and *tolas* are found in Manta and Esmeraldas which resemble those in Imbabura and also those described by Velasco. Further finds by Saville on the coast have been assigned to the Caras. There is, then, a strong presumption in favor of Velasco's account of an actual invasion from the coast. Furthermore, as we have said, there is good reason to believe that these people who came from the coast originally hailed from Central America. (See Gillin, 1936, p. 549, for short bibliography of coastal archeological finds attributed to the Caras.)

The language of the Caras is completely extinct except for 10 place names and their meanings. Say Verneau and Rivet (1912 and 1922, vol 6, p. 20):

> insufficient as they are, their study has permitted the recognition in two of these names of a root belonging without doubt to the language of the Barbacoa Indians who lived on the western slope of the cordillera and who themselves belonged to a Chibcha stock. There is every reason to believe that the language spoken by the ancient inhabitants of the region was a Barbacoan (i. e., Chibchan) dialect.

Beuchat and Rivet have established the fact that the three languages formerly known as Barbacoa, Paniquita, and Coconuco of the Ecuadoran and Colombian coasts all belong to the Chibchan stock. It also seems probable that the Chibcha languages were at some time spoken as far north as the frontier between Nicaragua and Costa Rica.

This summary of background material has been made by way of uncovering clues regarding the antecedents of the present inhabitants of Imbabura. On the basis of this material we may say that the Imbabura population *may* be composed of the following strains:

(1) A very ancient aboriginal element; (2) a coastal element which possibly came to the Ecuadoran coast from Central America or at least from the north; (3) possibly some Amazonian elements, although the linguistic, archeological and historical evidence is largely silent with respect to them; (4) a Peruvian factor which might have been introduced as a result of the Inca conquest; and (5) possibly some white admixture acquired since the Spanish conquest, although records of such miscegenation are lacking. We shall now consider the physical characteristics of the Indians actually studied. It should be understood, of course, that our use of the word "strain" here signifies only population elements derived from external geographical regions and does not necessarily imply major "racial" distinctions.

RESULTS OF ANTHROPOLOGICAL WORK

In table 1 are given the statistical results of the measurements of all the Imbabura Indians studied. Attention may be called to a few of the more important features of the group as a whole. The mean stature of 156.48 centimeters places the group within the range of the "short" portion of the human species (Martin, 1928, vol. 1, p. 246). With a mean cephalic index of 80.04, these Indians are on the average mesocephalic. The hypsicephalic mean length-height index of 72.44 and the acrocephalic breadth-height index of 90.26 indicate that the typical head is quite high relative to either the length or the breadth.

The typical face is of medium length relative to its breadth as shown by the mesoprosopic mean total facial index of 84, while the upper face is relatively somewhat broader with a euryene mean upper facial index of 47.54. The nose is of medium width compared with its height as indicated by the mesorrhine mean nasal index of 72.34.[3]

The shoulders (biacromial width) are 23.12 percent of the stature. The average chest is 78.58 percent as deep as it is wide. The relative sitting height is 52.6 percent. The forehead is narrow in comparison with the head, the fronto-parietal index being 70.12, but the head itself is very nearly as broad as the face, as shown by the mean cephalo-facial index of 96.71.

All the bodily and cephalic measurements fall within the small or medium ranges of the human species, with the exception of the head height, which is fairly large.[4]

In table 2 are the results of the morphological observations of the group as a whole.

[3] For indicial categories here mentioned, see Martin, 1928, vol. 1, pp. 199–202.

[4] Measuring technique followed the system taught by Prof. E. A. Hooton, of Harvard University. Head height was taken with anthropometer from tragion on left side; chest measurements were taken with anthropometer at height of nipples on the normally deflated chest from in front and from left side; skin color was determined by comparison with the Von Luschan porcelain color chart; eye and hair color were judged without reference to a chart. Calculations were performed by machine in the Harvard Anthropometric Laboratory by Mrs. Sarah Cotton. All measuring was done by the writer, recording by Helen N. Gillin.

Skin color is overwhelmingly red brown, with less than 14 percent of the cases distributed among other shades of brown (brunet, swarthy, light brown). Seven-tenths of the cases show no vascularity, with about 30 percent showing small or pronounced vascularity. The same proportions hold for freckles. About 69 percent of the subjects have a few moles and 25 percent have many, while only 5 percent are free of moles. The hair form is more curly than might be expected a priori in an Indian group, with only 19 percent showing straight hair, while 56 percent have light waves, and 25 percent deep waves. Hair texture is predominantly fine and medium, with only one case of coarse hair recorded.

The largest proportion of heads have a medium amount of hair, but 27 percent show a more than medium quantity. Less than 7 percent of baldness of any degree is recorded. The Imbabura men have scanty beards, 89 percent being recorded as "small" or "very small," while only 11 percent have beards of medium heaviness. Body hair is also small in quantity, with only 6 percent having even a medium amount.

One-tenth of the subjects showed gray hair on the head, while 17 percent showed grayness of some degree in the beard. Ninety-four percent of all head hair is black, with 5 percent dark brown, while 98 percent of all beards are black. Three-fifths of the eyes are black, with practically all the rest recorded as dark brown. Clear irises lead with 57 percent, followed by the rayed, zoned, and spotted types in order of diminishing frequency. Thus the pigmentation of these men is predominantly brunet, with only a small incidence of lighter factors which might indicate mixture with whites.

In regard to eyefolds, a greater tendency toward the external and median types is found than toward the internal eyefolds, although all types are fairly well distributed. Thus 16 percent of the subjects show no indication of external eyefold, 11 percent show no indication of median eyefold, but 21 percent are devoid of the internal type. Sixty-six percent, however, show some degree of eye obliquity. About two-thirds of the eye openings are small, with one-third medium in size.

The eyebrows tend to be small or medium in thickness, while nearly two-thirds of them meet over the nose, although the greater part of this concurrency is small. The greater part of brow ridges is small and less than 7 percent are medium in size. The forehead height is predominantly small or medium, with a slightly larger percentage falling in the latter category. The slope of the forehead is medium in slightly more than half the cases, but the two-fifths of nearly straight foreheads (as indicated by a "small" slope) is large enough to be remarked.

A nasion depression is always present and in 16 percent it is marked. A nasal root of some height is typical, with seven-tenths showing a medium height and one-quarter of the subjects showing a nasal root of some height. Three-fourths of the nasal roots are medium in breadth, while the remainder are about equally divided between narrower and wider types. The lower border of the nasal septum in profile tends toward convexity, with three-fifths of the subjects in this category and the other two-fifths showing concave or straight septa.

The nasal bridge is well elevated in the great majority of the cases, being of medium height in 69 percent and of more than medium height in 28 percent. The nose is not aquiline, however, for the bridge tends toward broadness with 97 percent showing double or triple-plus breadths. The largest proportion of noses are straight in profile (40 percent), while 23 percent are convex, and the concave and concavo-convex types are about equally divided with a little more than 17 percent each. Ninety percent of the tips show either medium or pronounced thickness, although the former type is twice as frequent as the latter. The up-tilted and down-tilted nasal tips occur in about equal proportions and only 15 percent of the nasal wings are compressed in some degree, with 66 percent medium and 19 percent flaring. The relatively high frequency of transverse nostrils (41 percent) indicates that there is no perfect correlation between shape of nostril and flare of wings in this group.

The integumental lips tend toward thickness (45 percent), while the medium type with 37 percent is about twice as frequent as the thin type with 19 percent. The membranous lips are for the most part of medium thickness but there are more full lower membranous lips than upper ones. Eversion is generally small and medium.

About 95 percent show some midfacial prognathism, although it is mostly small in size. Alveolar prognathism is more pronounced. The chin is prominent in roughly two-thirds of the cases and small in one-third. The bilateral type of chin is twice as frequent as the median type.

Only about 11 percent of the men show partial eruption of the teeth. The majority bite edge-to-edge, with the overbite type accounting for roughly 40 percent and the underbite occurring in less than 4 percent of the cases. Only about two-fifths of the men have all their teeth, 31 percent have lost between 1 and 4 teeth, 11 percent have lost between 5 and 8 teeth, 7 percent have lost 9 to 16 teeth, and nearly 10 percent have lost more than 17 teeth. The largest proportion show heavy wear and less than one-fifth of the teeth show little or no wear. Only about 1½ percent of the men had no caries in their teeth and almost 30 percent had 17 or more cavities. Shortening

occurs in only a little over one-third of the cases, but crowding is present in about 86 percent.

The helix of the ear is of medium size in exactly half the cases, but the well rolled helix is about 10 percent more frequent than the slightly rolled type. The antihelix is medium in slightly more than half the cases, but here the small type is twice as frequent as the pronounced type. Darwin's point occurs in some form in 36 percent of the subjects. The attached ear lobe is most frequent (45 percent), while the soldered type occurs slightly oftener than the free type. Less than 10 percent of the ears are of markedly large size, while the majority are of medium size. Seventy-three percent show little protrusion. Temporal fullness tends to be medium (79 percent), while the incidence of submedium fullness (15.38 percent) is about three times as great as that of the pronounced type (5.38 percent).

The author regards the recorded incidence of occipital and lambdoid shapes as somewhat unreliable, due to the difficulty of taking precise observations on subjects who wear their hair braided in the back as these do. However, little evidence of marked cranial deformation was found.

The subjects are for the most part of medium or lateral body build, only 11 percent conforming to the linear type.

The whole group has been divided into two subgroups, which we shall term the Otavalo group and the Angachagua group respectively. The Otavalo group includes, as previously stated, Indians measured at Otavalo, San Roqué, and Agato. The Angachagua group is geographically more isolated than the Otavalo group and is also regarded by the Indians themselves and whites in the country as being of different physical aspect. The two groups have been compared statistically to see if this assumption is true from the anthropometric point of view. In table 3 are presented the statistical results of the measurements taken on the Otavalo group; in table 4 will be found the tabulation of the morphological observations on the same group. In table 5 are the results of the anthropometric measurements at Angachagua and in table 6 the listing of the morphological observations for the same group.

In comparing the two groups we find slight differences in variability, indicating that the Otavalo group is a bit less homogeneous than the Angachagua group, as would normally be expected because of its greater size. The average coefficient of variation for measurements of the Otavalo group is 5.37 as compared with 4.91 for the Angachagua group, while the average coefficient of variation for the indices is 5.57 for the Otavalo group as compared to 5.17 for the Angachagua group. (Coefficients of variation will be found in tables 3 and 5.)

When we compare the differences between the groups as expressed by the "×P.E."[5] (table 7), we find them of such a degree and character as to make it impossible for us to consider the two groups as samples of the same universe. An arbitrary measure of difference frequently used is 3×P.E., because, on the basis of the normal frequency curve, 95.70 percent of the differences between any two random samples of the same universe will fall below 3×P.E. In comparing the Angachagua and Otavalo samples (table 7), however, only 66.67 percent of the differences, both in measurements and indices, fall within 3×P.E. Actually, 69.23 percent of the measurements and 64.29 percent of the indices show ×P.E.'s of under 3. In other words, the number of insignificant differences is only about two-thirds as great as it should be were we to consider the two groups as members of the same population physically.

Angachagua exceeds Otavalo significantly in head height and sitting height, whereas Otavalo significantly exceeds Angachagua in head breadth and nose breadth. In indicial characters, Angachagua significantly exceeds Otavalo in relative shoulder breadth, length-height index of the head, and breadth-height index of the head, while Otavalo significantly exceeds in cephalo-facial and nasal indices. Thus these two groups, in accordance with popular belief previously mentioned, are actually different on the basis of the present samples. The Angachagua group typically has an absolutely and relatively higher head, an absolutely and relatively narrower nose, narrower shoulders relative to stature, an absolutely narrower head, and a face broader in relation to the breadth of the head.

COMPARISON OF RESULTS OF ANTHROPOLOGICAL WORK IN PROVINCE OF IMBABURA WITH APPOSITE SERIES FROM OUTSIDE THE AREA

In an effort to throw some light on the affinities of the Imbabura Indians we have collected a number of series of measurements made upon Indians who on the basis of historical, archeological, and linguistic evidence may possibly have sprung from stocks represented in the ancestry of the Imbabura. In these series are included all the measurements on Quichua Indians which are known to the author, namely, those reported by Chervin and Rouma from Bolivia and those reported by Ferris from Peru.

In tabulating the foreign series for comparison, males only have been selected and only those traits have been utilized in which the technique of the several investigators appears to have been identical with that of the present study. Since in only one case—Steggerda's series of Mayas—has the statistical treatment accorded these various

[5] $\times P.E. = \frac{\text{difference between two means}}{\text{probable error of the difference}}$. Probable error of the difference $= \sqrt{P.E._A^2 + P.E._B^2}$.

groups been sufficient to permit direct comparisons of any validity, putative probable errors and putative ×P.E.'s have been calculated for these comparative series.

The reader who is sophisticated in the interpretation of statistics will realize at once how tentative must be any conclusions drawn from the available anthropometric material of the Andean area. Anthropometric series are in most cases too small to be of high validity statistically. The factors which may have influenced investigators in selecting individuals for samples are not wholly clear in all cases. The number of traits measured by comparable methods varies from sample to sample. It will be clear, therefore, that the material as we have presented it is suggestive rather than conclusive. A service can be performed for future investigators, however, by drawing together the material available at the present time and giving it the statistical treatment which will make for ready comparison with new data as it is collected. In this sense it is hoped that the present paper may serve as a starting point for extensive anthropometric investigations which will finally provide us with a clear picture of the physical attributes of the Andean populations.

A few cautions should be mentioned. We have compared all series from this area by means of differences and probable errors. This was done in order to provide the most refined check available regarding the significance of the arithmetic means involved. It should be remembered, however, that good judgment and common sense are also part of the statistical method. Thus, until vastly more material is available the reader should not be too quick to form the conclusion that several different "races" are represented in the Andean area. No two of the series when compared with Otavalo and Angachagua, or when compared with each other, are statistically parts of the same population universe. Yet we must remember that the samples are in all cases relatively small, in some cases very small. Further sampling may show the apparent differences to be less important than they appear to be at present. In the second place, the number of comparable means provided by other investigators is in some cases very small. Thus Chervin provides only seven measurements and six indices which are comparable. A single significant difference between one of these means and that of another series will produce a percentage of significant differences between the two arrays sufficient to make it appear that the two populations involved are highly different. Yet, if a larger array of means were available for comparison, it is conceivable that the degree of difference would appear much less imposing. In short, the percentages of significant differences between means in small arrays and those in much larger arrays must not be considered of equal importance until more data is available. Third, it is never absolutely clear, unless the investigators have been able to compare

their methods of measurement in person, that the techniques are comparable. Particularly is this true in the present case where few of the investigators, who have provided us with comparative material, have described their techniques fully. A very slight error in locating nasion, say, would be sufficient to produce significant differences. Finally, it must be repeated that, with the exception of Steggerda's Maya series, all comparative series used here were published either in the form of raw data or were given that elementary mathematical treatment which consists of drawing up simple arithmetic means. In some quarters such simple treatment of anthropometric data at publication is praised for its "simplicity" and "common sense," but the fact is that it provides no check on the validity of the sample and greatly hinders the process of comparison with other samples. This lack of comparable statistical technique has meant that we have had to compare the series through putative probable errors, which we now proceed to do.

The putative probable error for statistically untreated series is obtained by the following formula:

$$\frac{0.6745 \text{ standard deviation of own series}}{\sqrt{N} \text{ of comparative series}}$$

The use of this formula, of course, involves the assumption of the same variability in the comparative series as in our own series and, therefore, cannot be regarded as being as precise as the regular method. However, with this putative probable error the $\times$P. E. may be calculated for comparison. As a test of this method the $\times$P. E. was calculated by both the regular and the putative methods in a comparison between the whole Imbabura series and Steggerda's series of Maya Indians. (The data for the latter are presented in table 35.) As shown in table 36, the average $\times$P. E. calculated by the regular method is somewhat larger (by 1.16 points) than that calculated by the putative method. In comparing the two series, the percentage of insignificant differences (as indicated by $\times$P. E. under 3) is the same in the comparison of measurements, but 20 percent of the indices are not significantly different under the regular method, whereas 40 percent of the indices are not significantly different under the putative method. (See table 41, ranks 2 and 3.) In order to allow for possible errors of variability, which the use of the putative method implies, it has been decided to use 4$\times$P. E. instead of 3$\times$P. E. as a test of group likeness in comparisons involving those groups with which the putative method must be used. In other words, we assume that 4 $\times$P. E. under the putative method marks the limit of insignificant differences, whereas 3$\times$P. E. is the limit of insignificant difference under the regular method.

Since it has been shown that the Otavalo and Angachagua groups are apparently not parts of the same physical group, the writer has compared the Otavalo group alone with each of the foreign series. In addition, however, because most of the comparative series are made up of measurements covering several localities within their respective general areas and, therefore, may possibly be somewhat heterogeneous, he has compared the whole Imbabura group (Angachagua and Otavalo groups combined, table 1) with each of the foreign series. If space had permitted, it would also have been logical to compare the Angachagua group alone with the several foreign groups, but since it is composed of only 26 individuals this procedure was omitted.

The data given by the several authors used in this comparison are to be found in tables 8 to 35 inclusive. The differences and $\times$P. E.'s involved in comparisons with the whole Imbabura group will be found in tables 9, 10, 14, 15, 19, 20, 21, 26, 29, 30, 31, and 36. The differences and $\times$P. E.'s. concerned in the comparisons with the Otavalo group are tabulated in tables 11, 12, 16, 17, 22, 23, 24, 27, 32, 33, 34, and 37.

No attempt at a trait-by-trait comparison will be made here, although in the indicated tables the statistical results of the comparison of each trait may be found. We shall content ourselves here with the measure of racial similarity indicated by the proportion of traits in the foreign groups which are not statistically differentiated from the Imbabura. In table 38 the percentages of comparable traits ($\times$P. E. of under 4) of the total Imbabura group and the 12 foreign groups have been tabulated. Separate percentages have been calculated for measurements and indices. On this basis the comparative groups may be ranked as follows in the order of their diminishing likeness to the Imbabura group as a whole for absolute measurements: (1) Ferris Machiganga (63.64 percent); (2) Chervin Quichua, Chervin Aymara, Farabee Machiyenga, and Steggerda Maya (all 50 percent); (3) Barrett Cayapa (44.44 percent); (4) Ferris Quichua, series 2 (36.36 percent); (5) Farabee Piro (35.71 percent); (6) Farabee Sipibo (28.57 percent); (7) Ferris Quichua, series 1 (20 percent); (8) Rouma Aymara and Rouma Quichua (both 18.18 percent). The percentages in parentheses in this ranking indicate in each case the percentage of insignificant differences shown by the series when compared with the whole Imbabura group.

When ranked on the basis of indices, the order is as follows: (1) Rouma Aymara (71.42 percent); (2) Chervin Quichua, Ferris Quichua, series 2, Ferris Machiganga, Farabee Machiyenga, Farabee Sipibo (all 50 percent); (3) Ferris Quichua, series 1 (42.86 percent); (4) Steggerda Maya (40 percent); (5) Farabee Piro (33.33 percent); (6) Rouma Quichua (28.57 percent); (7) Chervin Aymara (25 percent); (8) Barrett Cayapa (no insignificant differences).

If the measurements and indices are thrown together and percentages of likeness calculated, as in table 39, the order of diminishing likeness is as follows: (1) Ferris Machiganga (58.82 percent); (2) Chervin Quichua and Farabee Machiyenga (50 percent); (3) Steggerda Maya (47.37 percent); (4) Ferris Quichua, series 2 (41.18 percent); (5) Chervin Aymara (40 percent); (6) Rouma Aymara (38.89 percent); (7) Farabee Sipibo and Farabee Piro (35 percent); (8) Barrett Cayapa (30.77 percent); (9) Ferris Quichua, series 1 (29.41 percent); (10) Rouma Quichua (22.22 percent).

The group which consistently shows the greatest affinity for the Imbabura total group is the Machiganga or Machiyenga, a jungle tribe on the upper Rio Huallaga in Peru. Of the four Quichua groups that of Chervin from Bolivia shows consistently the greatest similarity to the Imbabura Quichuas, but this comparison is based on a smaller number of traits than is the case with the other Quichua groups. On the whole the Aymara groups show more similarity than do the Quichua groups. None of these foreign groups is a sample of the same statistical universe as the Imbabura group.

In table 40 will be found the percentages of like traits in the comparison of the Otavalo group alone with the foreign groups. Ranking of measured traits in order of diminishing likeness to Otavalo follows: (1) Chervin Quichua and Chervin Aymara (67 percent); (2) Ferris Machiganga (64 percent); (3) Farabee Machiyenga (50 percent); (4) Farabee Sipibo and Steggerda Maya (43 percent); (5) Farabee Piro (33 percent) and Barrett Cayapa (33 percent); (6) Ferris Quichua, series 2 (27 percent); (7) Ferris Quichua, series 1, and Rouma Aymara (20 percent); (8) Rouma Quichua (18 percent). Ranking on the basis of insignificant differences in indicial traits follows: (1) Rouma Aymara (83 percent); (2) Ferris Quichua, series 2, and Farabee Sipibo (67 percent); (3) Chervin Quichua, Ferris Machiganga, and Farabee Machiyenga (50 percent); (4) Steggerda Maya and Farabee Piro (40 percent); (5) Ferris Quichua, series 1, (33 percent); (6) Chervin Aymara (25 percent); (7) Rouma Quichua (17 percent); (8) Barrett Cayapa (no insignificant differences). When both measurements and indices are lumped together and like traits calculated on this basis, the order of diminishing likeness to Otavalo is as follows: (1) Chervin Quichua (60 percent); (2) Ferris Machiganga (59 percent); (3) Chervin Aymara, Farabee Machiyenga and Farabee Sipibo (50 percent); (4) Rouma Aymara (44 percent); (5) Steggerda Maya (42 percent); (6) Ferris Quichua, series 2 (41 percent); (7) Farabee Piro (35 percent); (8) Ferris Quichua, series 1 (25 percent); (9) Barrett Cayapa (23 percent); (10) Rouma Quichua (18 percent).

Of the comparative groups, Chervin's Quichua and Ferris' Machiganga are most like the Otavalo group, in the sense that they have the highest porportion of traits like Otavalo. If we consider, not

percentages, but the absolute number of similar traits, an examination of the comparative tables will show that the Machiganga, Machiyenga, and Sipibo lead the field in this respect, each with 10 traits similar to Otavalo. Of the Quichua-speaking groups, Ferris' Peruvian series 2 leads with 7 traits similar to Otavalo, followed by Chervin's Quichuas from Bolivia.

CONCLUSIONS

If we bear in mind the inadequacy of the comparative material and the possible weaknesses of the method used here, we may draw some tentative conclusions which may be helpful for future research:

1. The Otavalo and Angachagua populations do not show enough similarities of a significant kind to be considered, on the basis of the present samples, parts of the same statistical universe. Larger samples might, of course, alter this picture.

2. Neither the whole Imbabura group nor the Otavalo section of it shows enough traits in common with any of the other groups used for comparison to be considered, in the light of the present data, samples of the same physical type.

3. We have compared the Imbabura samples with series from a number of foreign areas which, in the light of cultural evidence, might conceivably have contributed at some time to the make-up of the present Imbabura population. The foreign groups showing the greatest affinities for the Otavalo population are now living in the Amazon drainage—the Machiganga, Machiyenga, and the Sipibo. Since these peoples live close to the mountains and there is some reason to believe that they may have had access to the highlands and vice versa, it is conceivable that the Otavalo and the Machiganga-Machiyenga, in particular, represent marginal peoples of an earlier physical strain of the Inca area, modified or pushed back in later Inca times by other elements from the Peruvian highlands. Our facts no more than hint at this, but it is at least interesting to note the relatively small and inconsistent similarity between Otavalo and the Quichua-speaking groups.

4. The four comparative Quichua groups plus the Imbabura groups show so many differences of statistical significance when compared with each other that we have no basis for believing in a "Quichua" or an "Inca" physical type among living inhabitants of the Inca area which might represent a universal correlation with the Quichua language. This will not be surprising to those who are familiar with the methods whereby the Quichua language was spread by conquest.

5. The differences between the Otavalo group and the Chibcha-speaking Cayapa, living on the tributaries of the Esmeraldas and possibly to be regarded as descendants of the ancient Cara, are so great as to indicate, at least, that the Cara blood has completely disappeared either from the Cayapa or the Otavalo.

6. Very few similarities exist between Otavalo and the Maya group used for comparison.

To sum up, the present study has indicated a considerable heterogeneity of physical type among living populations of the Andean highlands and contiguous areas, with the Quichua-speaking population of the Province of Imbabura showing the greatest affinities with certain tribes of the upper Amazon drainage. Further research on a fairly large scale will be required to answer the questions thus raised.

APPENDIX

TABLES OF ANTHROPOMETRIC MEASUREMENTS AND PHYSICAL OBSERVATIONS

TABLE 1.—*Anthropometric measurements and indices of male Indians from the Province of Imbabura, Ecuador, including all measurements taken from Otavalo, Agato, San Roqué, and Angachagua* [1]

Trait	Number	Range	Mean	P.E.	S.D.	P.E.	*v*	P.E.
Measurements:								
Stature	133	140–172 (c)	156.48	±0.33	5.67	±0.23	3.62	±0.15
Biacromial	134	28– 45 (c)	36.35	±.12	1.98	±.08	5.45	±.22
Chest breadth	133	23– 37 (c)	27.69	±.10	1.72	±.07	6.18	±.26
Chest depth	133	18– 29 (c)	21.74	±.09	1.54	±.06	7.08	±.29
Sitting height	133	75– 95 (c)	82.48	±.19	3.24	±.13	3.93	±.16
Head length	134	167–208 (m)	184.65	±.37	6.39	±.26	3.46	±.14
Head breadth	134	135–158 (m)	147.76	±.27	4.71	±.19	3.19	±.13
Head height	110	110–153 (m)	133.82	±.43	6.76	±.31	5.05	±.23
Minimum frontal	134	89–120 (m)	101.34	±.27	4.56	±.19	4.50	±.18
Bizygomatic	134	130–164 (m)	142.80	±.29	5.05	±.21	3.50	±.14
Bigonial	134	94–145 (m)	107.06	±.42	7.28	±.30	6.80	±.28
Total face height	134	100–144 (m)	120.10	±.34	5.90	±.24	4.91	±.20
Upper face height	134	55– 74 (m)	67.75	±.27	4.60	±.19	6.79	±.28
Nose height	134	44– 67 (m)	52.58	±.23	3.92	±.16	7.46	±.31
Nose breadth	133	31– 57 (m)	38.15	±.21	3.51	±.15	9.20	±.38
Indices:								
Relative shoulder breadth	134	16– 27	23.12	±.07	1.24	±.05	5.36	±.22
Thoracic index	133	65–100	78.58	±.32	5.40	±.22	6.87	±.28
Relative sitting height	133	46– 57	52.60	±.10	1.64	±.07	3.12	±.13
Cephalic index	134	68– 88	80.04	±.19	3.18	±.13	3.97	±.16
Length-height index	110	61– 81	72.44	±.23	3.60	±.16	4.97	±.23
Breadth-height index	110	76–111	90.26	±.31	4.89	±.22	5.42	±.25
Fronto-parietal index	134	63– 83	70.12	±.18	3.09	±.13	4.41	±.18
Cephalo-facial index	134	88–108	96.71	±.19	3.30	±.14	3.41	±.14
Zygo-frontal index	134	64– 83	72.62	±.18	3.16	±.13	4.35	±.18
Fronto-gonial index	134	90–139	103.40	±.40	6.90	±.28	6.67	±.27
Zygo-gonial index	134	66–104	75.16	±.27	4.56	±.19	6.07	±.25
Facial index	134	70– 94	84.00	±.27	4.70	±.19	5.60	±.23
Upper facial index	134	37– 57	47.54	±.20	3.36	±.14	7.07	±.29
Nasal index	133	52– 99	72.34	±.46	7.80	±.32	10.78	±.45

[1] The following abbreviations are used in this and the following tables: "Number" signifies number of individuals measured, "P.E." signifies probable error, "S. D." signifies standard deviation, "*v*" signifies coefficient of variation, "(c)" indicates that the measurement in question is given in centimeters, "(m)" indicates that the measurement in question is given in millimeters.

TABLE 2.—*Total Imbabura group: Morphological observations*

Observations	Individuals	
	Number	Percent
Marital state:		
Single	11	8.40
Married	116	88.55
Widowed	4	3.05
Total	131	
Skin, color, breast, inner arm:		
Brunet	5	3.79
Swarthy	9	6.82
Red brown	114	86.36
Light brown	4	3.03
Total	132	
Skin, vascularity:		
Absent	93	69.40
Small	32	23.88
Medium	9	6.72
Total	134	
Freckles:		
Absent	93	69.40
Small	32	23.88
Medium	3	2.24
Pronounced	1	.75
Massed	5	3.73
Total	134	
Moles:		
Absent	7	5.22
Few	93	69.40
Many	34	25.37
Total	134	
Hair, form:		
Straight	25	18.66
Low waves	75	55.97
Deep waves	34	25.37
Total	134	
Hair, texture:		
Coarse	70	52.24
Medium	63	47.01
Fine	1	.75
Total	134	
Head hair, quantity:		
Small	5	3.73
Medium	93	69.40
Pronounced	36	26.87
Total	134	

Observations	Individuals	
	Number	Percent
Baldness:		
Absent	125	93.28
Small	7	5.22
Medium	2	1.49
Total	134	
Beard, quantity:		
Very small	60	44.78
Small	59	44.03
Medium	15	11.19
Total	134	
Body hair:		
Absent	2	1.50
Small	123	92.48
Medium	8	6.02
Total	133	
Grayness, head:		
Absent	119	89.47
Small	13	9.77
Pronounced	1	.75
Total	133	
Grayness, beard:		
Absent	111	82.84
Small	20	14.93
Medium	2	1.49
Pronounced	1	.75
Total	134	
Hair color, head:		
Black	126	94.03
Dark brown	7	5.22
Ash gray	1	.75
Total	134	
Hair color, beard, mustache:		
Black	131	97.76
Dark brown	2	1.49
Ash gray	1	.75
Total	134	
Eye color:		
Black	82	61.19
Dark brown	50	37.31
Dark light brown	2	1.49
Total	134	

TABLE 2.—*Total Imbabura group: Morphological observations*—Continued

Observations	Individuals	
	Number	Percent
Iris:		
Clear	76	56.72
Rayed	32	23.88
Zoned	25	18.66
Spotted	1	.75
Total	134	
Eyefold, external:		
Absent	22	16.42
Small	26	19.40
Medium	60	44.78
Pronounced	26	19.40
Total	134	
Eyefold, median:		
Absent	15	11.19
Small	13	9.70
Medium	77	57.46
Pronounced	29	21.64
Total	134	
Eyefold, internal:		
Absent	28	20.90
Small	54	40.30
Medium	40	29.85
Pronounced	12	8.96
Total	134	
Eye, obliquity:		
Absent	37	27.61
Small	51	38.06
Medium	36	26.87
Pronounced	1	.75
Down	1	.75
Down and small	7	5.22
Down and absent	1	.75
Total	134	
Eye, opening height:		
Small	86	64.18
Medium	48	35.82
Total	134	
Eyebrow, thickness:		
Small	54	40.30
Medium	75	55.97
Pronounced	5	3.73
Total	134	
Eyebrow, concurrency:		
Absent	52	38.81
Small	73	54.48
Medium	9	6.72
Total	134	

Observations	Individuals	
	Number	Percent
Brow ridges:		
Absent	1	0.75
Small	124	92.54
Medium	9	6.72
Total	134	
Forehead, height:		
Small	60	44.78
Medium	65	48.51
Pronounced	9	6.72
Total	134	
Forehead, slope:		
Small	56	41.79
Medium	70	52.24
Pronounced	8	5.97
Total	134	
Nasion depression:		
Very small	1	.75
Small	35	26.12
Medium	77	57.46
Pronounced	21	15.67
Total	134	
Nasal root, height:		
Small	7	5.22
Medium	93	69.40
Pronounced	34	25.37
Total	134	
Nasal root, breadth:		
Small	16	11.94
Medium	101	75.37
Pronounced	17	12.69
Total	134	
Nasal septum:		
Concave and straight	53	39.55
Convex	81	60.44
Total	134	
Alveolar prognathism:		
Absent	1	.75
Small	48	35.82
Medium	74	55.22
Pronounced	11	8.21
Total	134	
Chin, prominence:		
Small	46	34.33
Medium	86	64.18
Pronounced	2	1.49
Total	134	

TABLE 2.—*Total Imbabura group: Morphological observations*—Continued

Observations	Individuals	
	Number	Percent
Chin, type:		
Median	44	33.08
Bilateral	89	66.92
Total	133	
Teeth, eruption:		
Complete	117	88.64
Partial	15	11.36
Total	132	
Teeth, bite:		
Under	5	3.82
Edge to edge	74	56.49
Small, over	41	31.30
Pronounced, over	11	8.40
Total	131	
Teeth, loss:		
None	55	41.04
Very small, 1–4	42	31.34
Small, 5–8	15	11.19
Medium, 9–16	9	6.72
Pronounced, 17+	13	9.70
Total	134	
Teeth, wear:		
Absent, small	26	19.70
Medium	42	31.82
Pronounced and very pronounced	64	48.48
Total	132	
Teeth, caries:		
Absent	2	1.54
Very small, 1–4	42	32.31
Small, 5–8	25	19.23
Medium, 9–16	23	17.69
Pronounced, 17+	38	29.23
Total	130	
Teeth, shortening:		
Absent	82	62.12
Small	30	22.73
Medium	18	13.64
Pronounced	2	1.52
Total	132	
Teeth, crowding:		
Absent	19	14.50
Medium	90	68.70
Pronounced	22	16.79
Total	131	

Observations	Individuals	
	Number	Percent
Malars, frontal projection:		
Absent, small	4	2.98
Medium	42	31.34
Pronounced	88	65.67
Total	134	
Malars, lateral projection:		
Small	1	.75
Medium	31	23.13
Pronounced	102	76.11
Total	134	
Gonial angles:		
Small	6	4.48
Medium	57	42.54
Pronounced	71	52.98
Total	134	
Ear, helix (degree of roll):		
Small	27	20.15
Medium	67	50.00
Pronounced	40	29.85
Total	134	
Ear, antihelix (prominence):		
Absent	1	.75
Small	41	30.60
Medium	71	52.98
Pronounced	21	15.67
Total	134	
Ear, Darwin's point:		
Absent	85	63.43
Small	39	29.10
Medium	8	5.97
Pronounced	2	1.49
Total	134	
Nasal bridge, height:		
Small	3	2.24
Medium	93	69.40
Pronounced	38	28.36
Total	134	
Nasal bridge, breadth:		
Small	4	2.98
Medium	95	70.90
Pronounced	35	26.12
Total	134	

TABLE 2.—*Total Imbabura group: Morphological observations*—Continued

Observations	Individuals	
	Number	Percent
Nasal profile:		
Concave	23	17.16
Straight	54	40.30
Convex	31	23.13
Concavo-convex	26	19.40
Total	134	
Nasal tip, thickness:		
Small	12	8.96
Medium	83	61.94
Pronounced	38	28.36
Very pronounced	1	.75
Total	134	
Nasal tip, inclination:		
Up, medium	5	3.73
Up, small	63	47.01
Down, small	55	41.04
Down, medium	11	8.21
Total	134	
Nasal tip, wings:		
Compressed	20	14.92
Medium	89	66.42
Flaring	25	18.66
Total	134	
Nostrils, visible front:		
Absent	57	42.54
Small, medium	75	55.97
Pronounced	2	1.49
Total	134	
Nostrils, visible lateral:		
Absent	17	12.69
Present	117	87.31
Total	134	
Nostrils, shape:		
Thin	42	31.34
Medium	84	62.69
Round	8	5.97
Total	134	
Nostrils, axes:		
Parallel	1	.75
Oblique, small	12	8.96
Oblique, medium	66	49.25
Transverse	55	41.04
Total	134	

Observations	Individuals	
	Number	Percent
Lips; integumental:		
Small	25	18.66
Medium	49	36.57
Pronounced	60	44.78
Total	134	
Lips; membranous, upper:		
Small	33	24.63
Medium	74	55.22
Pronounced	27	20.15
Total	134	
Lips; membranous, lower:		
Small	16	11.94
Medium	73	54.48
Pronounced	44	32.84
Very pronounced	1	.75
Total	134	
Lips, eversion:		
Small	61	45.52
Medium	68	50.75
Pronounced	5	3.73
Total	134	
Lips, seam:		
Absent	5	4.03
Small	48	38.71
Medium	36	29.03
Pronounced	35	28.23
Total	124	
Midfacial prognathism:		
Absent	2	1.49
Small	86	64.18
Medium	42	31.34
Pronounced	4	2.98
Total	134	
Ear, lobe:		
Soldered	40	29.85
Attached	60	44.78
Free	34	25.37
Total	134	
Ear, size:		
Small	36	26.87
Medium	85	62.43
Pronounced	13	9.70
Total	134	

TABLE 2.—*Total Imbabura group: Morphological observations*—Continued

Observations	Individuals		Observations	Individuals	
	Number	Percent		Number	Percent
Ear, protrusion:			Lambdoid flattening:		
Small	98	73.13	Absent	2	6.67
Medium	34	25.37	Small	7	23.33
Pronounced	2	1.49	Medium	6	20.00
			Pronounced	15	50.00
Total	134				
			Total	30	
Temporal fullness:			Occipital flattening:		
Small	20	15.38	Absent	21	77.78
Medium	103	79.23	Medium	5	18.52
Pronounced	7	5.38	Pronounced	1	3.70
Total	130				
			Total	27	
Occipital protrusion:			Body build:		
Absent	1	3.23	Linear	15	11.19
Small	9	29.03	Medium	62	46.27
Medium	20	64.52	Lateral	57	42.54
Pronounced	1	3.23			
Total	31		Total	134	

TABLE 3.—*Otavalo group: Anthropometric measurements and indices*

Trait	Number	Range	Mean	P. E.	S. D.	P. E.	v	P. E.
Measurements:								
Stature	107	140–172 (c)	156.03	±0.37	5.64	±0.26	3.61	±0.17
Biacromial	108	28– 45 (c)	36.23	±.13	2.04	±.09	5.63	±.26
Chest breadth	107	23– 37 (c)	27.45	±.10	1.59	±.07	5.79	±.27
Chest depth	107	18– 27 (c)	21.56	±.09	1.42	±.07	6.59	±.30
Sitting height	107	75– 95 (c)	82.18	±.22	3.30	±.15	4.02	±.19
Head length	108	167–208 (m)	184.38	±.41	6.36	±.29	3.45	±.16
Head breadth	108	135–159 (m)	147.55	±.32	4.98	±.23	3.38	±.16
Head height	84	110–153 (m)	132.54	±.50	6.76	±.35	5.10	±.27
Minimum frontal	108	89–120 (m)	103.70	±.29	4.40	±.20	4.24	±.19
Bizygomatic	108	130–164 (m)	142.90	±.33	5.05	±.23	3.53	±.16
Bigonial	108	94–145 (m)	107.14	±.48	7.36	±.34	6.87	±.32
Total face height	108	105–144 (m)	120.25	±.38	5.85	±.27	4.86	±.22
Upper face height	108	55– 79 (m)	68.05	±.30	4.60	±.21	6.76	±.31
Nose height	108	44– 67 (m)	52.74	±.26	3.96	±.18	7.51	±.34
Nose breadth	108	31– 57 (m)	38.57	±.23	3.60	±.17	9.33	±.43
Average							5.37	
Indices:								
Relative shoulder breadth	108	16– 27	23.08	±.09	1.32	±.06	5.72	±.26
Thoracic index	107	65– 92	78.54	±.35	5.32	±.25	6.77	±.31
Relative sitting height	107	48– 57	52.56	±.11	1.64	±.08	3.12	±.14
Cephalic index	108	68– 88	80.04	±.20	3.15	±.14	3.94	±.18
Length-height index	84	61– 81	71.93	±.27	3.72	±.19	5.17	±.27
Breadth-height index	84	76–111	89.57	±.36	4.89	±.25	5.46	±.28
Fronto-parietal index	108	63– 83	70.21	±.20	3.15	±.14	4.49	±.21
Cephalo-facial index	108	88–108	96.92	±.22	3.39	±.16	3.50	±.16
Zygo-frontal index	108	64– 83	72.50	±.21	3.28	±.15	4.52	±.21
Fronto-gonial index	108	90–139	103.50	±.46	7.15	±.33	6.91	±.32
Zygo-gonial index	108	66–104	75.16	±.30	4.62	±.21	6.15	±.28
Facial index	108	70– 94	84.20	±.29	4.40	±.20	5.23	±.24
Upper facial index	108	37– 51	47.72	±.21	3.30	±.15	6.92	±.32
Nasal index	108	52– 99	73.02	±.51	7.84	±.36	10.74	±.49
Average							5.57	

TABLE 4.—*Otavalo group: Morphological observations*

Observations	Individuals	
	Number	Percent
Marital state:		
Single	8	7.62
Married	94	89.52
Widow	3	2.86
Total	105	
Skin color; breast, inner arm:		
Brunet	3	2.83
Swarthy	8	7.55
Red brown	94	88.68
Light brown	1	.94
Total	106	
Vascularity:		
Absent	79	73.15
Small	22	20.37
Medium	7	6.48
Total	108	
Freckles:		
Absent	75	69.44
Small	24	22.22
Medium	3	2.78
Pronounced	1	.93
Massed	5	4.63
Total	108	
Moles:		
Absent	7	6.48
Few	78	72.22
Many	23	21.30
Total	108	
Hair, form:		
Straight	11	10.19
Low waves	70	64.81
Deep waves	27	25.00
Total	108	
Hair, texture:		
Coarse	44	40.74
Medium	63	58.33
Fine	1	.93
Total	108	
Head hair, quantity:		
Small	3	2.78
Medium	85	78.70
Pronounced	20	18.52
Total	108	

Observations	Individuals	
	Number	Percent
Baldness:		
Absent	100	92.59
Small	6	5.56
Medium	2	1.85
Total	108	
Beard, quantity:		
Slight	53	49.07
Small	47	43.52
Medium	8	7.41
Total	108	
Body hair:		
Absent	1	.93
Small	104	97.20
Medium	2	1.87
Total	107	
Grayness, head:		
Absent	96	88.89
Small	11	10.19
Pronounced	1	.93
Total	108	
Grayness, beard:		
Absent	89	82.41
Small	16	14.81
Medium	2	1.85
Pronounced	1	.93
Total	108	
Hair color, head:		
Black	100	92.59
Dark brown	7	6.48
Ash-gray	1	.93
Total	108	
Hair color, beard, mustache:		
Black	105	97.22
Dark brown	2	1.85
Ash	1	.93
Total	108	
Eye color:		
Black	73	67.59
Dark brown	33	30.56
Dark light brown	2	1.85
Total	108	

TABLE 4.—*Otavalo group: Morphological observations*—Continued

Observations	Individuals	
	Number	Percent
Iris:		
Clear	62	57.41
Rayed	24	22.22
Zoned	21	19.44
Spotted	1	.93
Total	108	
Eyefold, external:		
Absent	17	15.74
Small	22	20.37
Medium	44	40.74
Pronounced	25	23.15
Total	108	
Eyefold, median:		
Absent	14	12.96
Small	9	8.33
Medium	59	54.63
Pronounced	26	24.07
Total	108	
Eyefold, internal:		
Absent	26	24.07
Small	40	37.04
Medium	32	29.63
Pronounced	10	9.26
Total	108	
Eye, obliquity:		
Absent	30	27.78
Small	48	44.44
Medium	22	20.37
Pronounced	1	.93
Down	1	.93
Small and down	6	5.56
Total	108	
Eye, opening height:		
Small	70	64.81
Medium	38	35.19
Total	108	
Eyebrow, thickness:		
Small	49	45.37
Medium	57	52.78
Pronounced	2	1.85
Total	108	
Eyebrow, concurrency:		
Absent	45	41.67
Small	58	53.70
Medium	5	4.63
Total	108	

Observations	Individuals	
	Number	Percent
Brow ridges:		
Absent	1	0.93
Small	101	93.52
Medium	6	5.56
Total	108	
Forehead, height:		
Small	51	47.22
Medium	48	44.44
Pronounced	9	8.33
Total	108	
Forehead, slope:		
Small	48	44.44
Medium	56	51.85
Pronounced	4	3.70
Total	108	
Nasion depression:		
Slight	1	.93
Small	31	28.70
Medium	62	57.41
Pronounced	14	12.96
Total	108	
Nasal root, height:		
Small	5	4.63
Medium	74	68.52
Pronounced	29	26.85
Total	108	
Nasal root, breadth:		
Small	13	12.04
Medium	78	72.22
Pronounced	17	15.74
Total	108	
Nasal septum:		
Straight, concave	42	38.89
Convex	66	61.11
Total	108	
Nasal bridge, height:		
Small	3	2.78
Medium	77	71.30
Pronounced	28	25.93
Total	108	
Nasal bridge, breadth:		
Small	2	1.85
Medium	76	70.37
Pronounced	30	27.78
Total	108	

TABLE 4.—*Otavalo group: Morphological observations*—Continued

Observations	Individuals	
	Number	Percent
Chin, type:		
Median	35	32.71
Bilateral	72	67.29
Total	107	
Teeth, eruption:		
Complete	100	94.34
Partial	6	5.66
Total	106	
Teeth, bite:		
Under	5	4.76
Edge to edge	55	52.38
Small, over	34	32.38
Medium, over	11	10.48
Total	105	
Teeth, loss:		
None	42	38.89
Slight, 1–4	35	32.41
Small, 5–8	14	12.96
Medium, 9–16	8	7.41
Pronounced, 17+	9	8.33
Total	108	
Teeth, wear:		
Absent, small	20	18.87
Medium	33	31.13
Pronounced, very pronounced	53	50.00
Total	106	
Teeth, caries:		
Absent	2	1.92
Slight, 1–4	31	29.81
Small, 5–8	22	21.15
Medium, 9–16	19	18.27
Pronounced, 17+	30	28.85
Total	104	
Teeth, shortening:		
Absent	64	60.38
Small	26	24.53
Medium	15	14.15
Pronounced	1	.94
Total	106	
Teeth, crowding:		
Absent	14	13.33
Medium	72	68.57
Pronounced	19	18.10
Total	105	

Observations	Individuals	
	Number	Percent
Malars, front projection:		
Absent, small	4	3.70
Medium	33	30.56
Pronounced	71	65.74
Total	108	
Malars, lateral projection:		
Medium	24	22.22
Pronounced	84	77.78
Total	108	
Gonial angles:		
Small	1	.93
Medium	51	47.22
Pronounced	56	51.85
Total	108	
Ear, helix:		
Small	18	16.67
Medium	56	51.85
Pronounced	34	31.48
Total	108	
Ear, Darwin's point:		
Absent	71	65.74
Small	31	28.70
Medium	5	4.63
Pronounced	1	.93
Total	108	
Ear, lobe:		
Soldered	30	27.78
Attached	51	47.22
Free	27	25.00
Total	108	
Ear, size:		
Small	29	26.85
Medium	69	63.89
Pronounced	10	9.26
Total	108	
Ear, protrusion:		
Small	78	72.22
Medium	29	26.85
Pronounced	1	.93
Total	108	

TABLE 4.—*Otavalo group: Morphological observations*—Continued

Observations	Individuals	
	Number	Percent
Temporal fullness:		
Small	18	17.14
Medium	82	78.10
Pronounced	5	4.76
Total	105	
Nasal profile:		
Concave	18	16.67
Straight	45	41.67
Convex	24	22.22
Concavo-convex	21	19.44
Total	108	
Nasal tip, thickness:		
Small	8	7.41
Medium	63	58.33
Pronounced	36	33.33
Very pronounced	1	.93
Total	108	
Nasal tip, inclination:		
Up, medium	5	4.63
Up, small	50	46.30
Down, small	44	40.74
Down, medium	9	8.33
Total	108	
Nasal tip, wings:		
Compressed	14	12.96
Medium	70	64.81
Flaring	24	22.22
Total	108	
Nostrils visible, front:		
Absent	46	42.59
Small, medium	60	55.56
Pronounced	2	1.85
Total	108	
Nostrils visible, lateral:		
Absent	15	13.89
Present	93	86.11
Total	108	
Nostrils, shape:		
Thin	31	28.70
Medium	71	65.74
Round	6	5.56
Total	108	
Nostrils, axes:		
Parallel	1	.93
Oblique, small	10	9.26
Oblique, medium	51	47.22
Transverse	46	42.59
Total	108	

Observations	Individuals	
	Number	Percent
Lips, integumental:		
Small	22	20.37
Medium	46	42.59
Pronounced	40	37.04
Total	108	
Lips; membranous, upper:		
Small	29	26.85
Medium	57	52.78
Pronounced	22	20.37
Total	108	
Lips; membranous, lower:		
Small	14	12.96
Medium	61	56.48
Pronounced	32	29.63
Very pronounced	1	.93
Total	108	
Lips, eversion:		
Small	54	50.00
Medium	50	46.30
Pronounced	4	3.70
Total	108	
Lip, seam:		
Absent	5	4.63
Small	45	41.67
Medium	28	25.93
Pronounced	30	27.78
Total	108	
Midfacial prognathism:		
Absent	2	1.85
Small	67	62.04
Medium	35	32.41
Pronounced	4	3.70
Total	108	
Alveolar prognathism:		
Absent	1	.93
Small	39	36.11
Medium	58	53.70
Pronounced	10	9.26
Total	108	
Chin prominence:		
Small	34	31.48
Medium	72	66.67
Pronounced	2	1.85
Total	108	

TABLE 4.—*Otavalo group: Morphological observations*—Continued

Observations	Individuals		Observations	Individuals	
	Number	Percent		Number	Percent
Occipital protrusion:			Cranial asymmetry:		
Small	4	66.67	Absent	1	50.00
Medium	2	33.33	Left	1	50.00
Total	6		Total	2	
Lambdoid flattening:			Facial asymmetry:		
Small	2	40.00	Absent	1	33.33
Medium	2	40.00	Left	2	66.67
Pronounced	1	20.00	Total	3	
Total	5		Body build:		
Occipital flattening:			Linear	13	12.04
Absent	102	97.10	Medium	50	46.30
Medium	2	1.90	Lateral	45	41.67
Pronounced	1	.85	Total	108	
Total	105				

TABLE 5.—*Angachagua group: Anthropometric measurements and indices*

Trait	Number	Range	Mean	P. E.	S. D.	P. E.	v	P. E.
Measurements:								
Stature	26	143–169 (c)	158.31	±0.71	5.34	±0.50	3.37	±0.32
Biacromial	26	31– 39 (c)	36.86	±.22	1.68	±.16	4.56	±.43
Chest breadth	26	26– 34 (c)	28.74	±.22	1.71	±.16	5.96	±.56
Chest depth	26	20– 29 (c)	24.42	±.24	1.78	±.17	7.29	±.68
Sitting height	26	78– 92 (c)	83.74	±.37	2.79	±.26	3.33	±.31
Head length	26	170–199(m)	185.76	±.84	6.33	±.59	3.41	±.32
Head breadth	26	141–158(m)	145.57	±.45	3.42	±.32	2.35	±.22
Head height	26	130–153(m)	137.98	±.62	4.72	±.44	3.42	±.32
Minimum frontal	26	93–116(m)	103.58	±.67	5.04	±.47	4.87	±.46
Bizygomatic	26	130–164(m)	142.40	±.65	4.95	±.46	3.48	±.33
Bigonial	26	94–125(m)	106.74	±.92	6.92	±.65	6.48	±.61
Total face height	26	100–134(m)	119.50	±.81	6.10	±.57	5.10	±.48
Upper face height	26	55– 74(m)	66.40	±.60	4.50	±.42	6.78	±.63
Nose height	26	44– 63(m)	51.98	±.49	3.68	±.34	7.08	±.66
Nose breadth	25	31– 42(m)	36.20	±.30	2.25	±.21	6.22	±.59
Average							4.91	
Indices:								
Relative shoulder breadth	26	22 –25	23.60	±.13	.98	±.09	4.21	±.39
Thoracic index	26	69–100	78.66	±.77	5.84	±.55	7.42	±.69
Relative sitting height	26	46– 55	52.80	±.22	1.64	±.15	3.11	±.29
Cephalic index	26	71– 88	80.07	±.44	3.30	±.31	4.12	±.39
Length-height index	26	70– 81	74.12	±.32	2.43	±.23	3.28	±.31
Breadth-height index	26	88–108	92.45	±.57	4.29	±.40	4.64	±.43
Fronto-parietal index	26	66– 77	69.64	±.37	2.79	±.26	4.01	±.38
Cephalo-facial index	26	91–102	95.81	±.25	2.70	±.25	2.82	±.26
Zygo-frontal index	26	68– 79	73.02	±.34	2.56	±.24	3.51	±.33
Fronto-gonial index	26	90–114	102.95	±.75	5.70	±.53	5.54	±.52
Zygo-gonial index	26	66– 86	76.19	±.56	4.20	±.39	5.59	±.52
Facial index	26	70– 94	83.15	±.74	5.80	±.52	6.73	±.63
Upper facial index	26	40– 64	46.76	±.45	3.42	±.32	7.31	±.68
Nasal index	25	56– 83	69.34	±.94	7.00	±.67	10.10	±.96
Average							5.17	

TABLE 6.—*Angachagua group: Morphological observations*

Observations	Individuals	
	Number	Percent
Marital state:		
Single	3	11.54
Married	22	84.62
Divorced	1	3.85
Total	26	
Skin color; beard, inner arm:		
Brunet	2	7.69
Swarthy	1	3.85
Red brown	20	76.92
Light brown	3	11.54
Total	26	
Vascularity:		
Absent	14	53.85
Small	10	38.46
Medium	2	7.69
Total	26	
Freckles:		
Absent	18	69.23
Small	8	30.77
Total	26	
Moles:		
Few	15	57.69
Many	11	42.31
Total	26	
Hair, form:		
Straight	14	53.85
Low waves	5	19.23
Deep waves	7	26.92
Total	26	
Hair, texture; coarse	26	100.00
Head hair, quantity:		
Small	2	7.69
Medium	8	30.77
Pronounced	16	61.54
Total	26	
Baldness:		
Absent	25	96.15
Small	1	3.85
Total	26	
Beard, quantity:		
Slight	7	26.92
Small	12	46.15
Medium	7	26.92
Total	26	

Observations	Individuals	
	Number	Percent
Body hair:		
Absent	1	3.85
Small	19	73.08
Medium	6	23.08
Total	26	
Grayness, head:		
Absent	23	92.00
Small	2	8.00
Total	25	
Hair color; head, black	26	100.00
Hair color; beard, mustache:		
Black	26	100.00
Eye, color:		
Black	9	34.62
Dark brown	17	65.38
Total	26	
Iris:		
Clear	14	53.85
Rayed	8	30.77
Zoned	4	15.38
Total	26	
Eyefold, external:		
Absent	5	19.23
Small	4	15.38
Medium	16	61.54
Pronounced	1	3.85
Total	26	
Eyefold, median:		
Absent	1	3.85
Small	4	15.38
Medium	18	69.23
Pronounced	3	11.54
Total	26	
Eyefold, internal:		
Absent	2	7.69
Small	14	53.85
Medium	8	30.77
Pronounced	2	7.69
Total	26	
Eye, obliquity:		
Absent	7	26.92
Small	3	11.54
Medium	14	53.85
Down and small	1	3.85
Down and absent	1	3.85
Total	26	

TABLE 6.—*Angachagua group: Morphological observations*—Continued

Observations	Individuals	
	Number	Percent
Eye, opening height:		
Small	16	61.54
Medium	10	38.46
Total	26	
Eyebrow, thickness:		
Small	5	19.23
Medium	18	69.23
Pronounced	3	11.54
Total	26	
Eyebrow, concurrency:		
Absent	7	26.92
Small	15	57.69
Medium	4	15.38
Total	26	
Brow ridges:		
Small	23	88.46
Medium	3	11.54
Total	26	
Forehead, height:		
Small	9	34.62
Medium	17	65.38
Total	26	
Forehead, slope:		
Small	8	30.77
Medium	14	53.85
Pronounced	4	15.38
Total	26	
Nasion depression:		
Small	4	15.38
Medium	15	57.69
Pronounced	7	26.92
Total	26	
Nasal root, height:		
Small	2	7.69
Medium	19	73.08
Pronounced	5	19.23
Total	26	
Nasal root, breadth:		
Small	3	11.54
Medium	23	88.46
Total	26	

Observations	Individuals	
	Number	Percent
Nasal septum:		
Straight, concave	11	42.31
Convex	15	57.69
Total	26	
Nasal bridge, height:		
Medium	16	61.54
Pronounced	10	38.46
Total	26	
Nasal bridge, breadth:		
Small	2	7.69
Medium	19	73.08
Pronounced	5	19.23
Total	26	
Nasal profile:		
Concave	5	19.23
Straight	9	34.62
Convex	7	26.92
Concavo-convex	5	19.23
Total	26	
Nasal tip, thickness:		
Small	4	15.38
Medium	20	76.92
Pronounced	2	7.69
Total	26	
Nasal tip, inclination:		
Up, small	13	50.00
Down, small	11	42.31
Down, medium	2	7.69
Total	26	
Nasal tip, wings:		
Compressed	6	23.08
Medium	19	73.08
Flaring	1	3.85
Total	26	
Nostrils, visibility front:		
Absent	11	42.31
Small, medium	15	57.69
Total	26	
Nostrils, visibility lateral:		
Thin	2	7.69
Medium	24	92.31
Total	26	

TABLE 6.—*Angachagua group: Morphological observations*—Continued

Observations	Individuals	
	Number	Percent
Nostrils, shape:		
Thin	11	42.31
Medium	13	50.00
Round	2	7.69
Total	26	
Nostrils, axes:		
Oblique, small	2	7.69
Oblique, medium	15	57.69
Transverse	9	34.62
Total	26	
Lips, integumental:		
Small	3	11.54
Medium	3	11.54
Pronounced	20	76.92
Total	26	
Lips, membranous, upper:		
Small	4	15.38
Medium	17	65.38
Pronounced	5	19.23
Total	26	
Lips, lower:		
Small	2	7.69
Medium	12	46.15
Pronounced	12	46.15
Total	26	
Lips, eversion:		
Small	7	26.92
Medium	18	69.23
Pronounced	1	3.85
Total	26	
Lips, seam:		
Small	13	50.00
Medium	8	30.77
Pronounced	5	19.23
Total	26	
Midfacial prognathism:		
Small	19	73.08
Medium	7	26.92
Total	26	
Alveolar prognathism:		
Small	9	34.62
Medium	16	61.34
Pronounced	1	3.85
Total	26	

Observations	Individuals	
	Number	Percent
Chin, prominence:		
Small	12	46.15
Medium	14	53.85
Total	26	
Chin, type:		
Median	9	34.62
Bilateral	17	65.38
Total	26	
Teeth, eruption:		
Complete	17	65.38
Partial	9	34.62
Total	26	
Teeth, bite:		
Edge to edge	19	73.08
Small over	7	26.92
Total	26	
Teeth, loss:		
None	13	50.00
Slight, 1–4	7	26.92
Small, 5–8	1	3.85
Medium, 9–16	1	3.85
Pronounced, 17+	4	15.38
Total	26	
Teeth, wear:		
Absent, small	6	23.08
Medium	9	34.62
Pronounced	11	42.31
Total	26	
Teeth, caries:		
Slight, 1–4	11	42.31
Small, 5–8	3	11.54
Medium, 9–16	4	15.38
Pronounced, 17+	8	30.77
Total	26	
Teeth, shortening:		
Absent	18	69.23
Small	4	15.38
Medium	3	11.54
Pronounced	1	3.85
Total	26	
Teeth, crowding:		
Absent	5	19.23
Medium	18	69.23
Pronounced	3	11.54
Total	26	

TABLE 6.—*Angachagua group: Morphological observations*—Continued

Observations	Individuals	
	Number	Percent
Molars projection, front:		
Medium	9	34.62
Pronounced	17	65.38
Total	26	
Molars, lateral projection:		
Small	1	3.85
Medium	7	26.92
Pronounced	18	69.23
Total	26	
Gonial angle:		
Small	5	19.23
Medium	6	23.08
Pronounced	15	57.69
Total	26	
Ear, helix:		
Small	9	34.62
Medium	11	42.31
Pronounced	6	23.08
Total	26	
Ear, antihelix:		
Small	7	26.92
Medium	15	57.69
Pronounced	4	15.38
Total	26	
Darwin's point:		
Absent	14	53.85
Small	8	30.77
Medium	3	11.54
Pronounced	1	3.85
Total	26	
Ear, lobe:		
Soldered	10	38.46
Attached	9	34.62
Free	7	26.92
Total	26	

Observations	Individuals	
	Number	Percent
Ear, size:		
Small	7	26.92
Medium	16	61.54
Pronounced	3	11.54
Total	26	
Ear, protrusion:		
Small	20	76.92
Medium	5	19.23
Pronounced	1	3.85
Total	26	
Temporal fullness:		
Small	2	8.00
Medium	21	84.00
Pronounced	2	8.00
Total	25	
Occipital protrusion:		
Absent	1	4.00
Small	5	20.00
Medium	18	72.00
Pronounced	1	4.00
Total	25	
Lambdoid flattening:		
Absent	2	8.00
Small	5	20.00
Medium	4	16.00
Pronounced	14	56.00
Total	25	
Occipital flattening:		
Absent	19	86.36
Medium	3	13.64
Total	22	
Body build:		
Linear	2	7.69
Medium	12	46.15
Lateral	12	46.15
Total	26	

TABLE 7.—*Differences of Angachagua over Otavalo indices and measurements, with values in terms of × P. E.*[1]

Trait	Difference	×P. E.	Trait	Difference	×P. E.
Measurements:			Indices:		
Stature	+2.28	2.85	Relative shoulder breadth	+0.52	3.47
Biacromial	+.63	2.31	Thoracic index	+.12	.14
Sitting height	+1.56	3.55	Relative sitting height	+.24	1.00
Head length	+1.38	1.47	Cephalic index	+.03	.06
Head breadth	−1.98	3.60	Length-height index	+2.19	5.21
Head height	+5.44	5.89	Breadth-height index	+2.88	4.30
Minimum frontal	−.12	.16	Fronto-parietal index	−.57	1.36
Bizygomatic	−.50	.68	Cephalo-facial index	−1.11	3.36
Bigonial	−.40	.38	Zygo-frontal index	+.52	1.30
Total face height	−.75	.84	Fronto-gonial index	−.55	.62
Upper face height	−1.65	2.46	Zygo-gonial index	+.03	.05
Nose height	−.76	1.36	Facial index	−1.05	1.33
Nose breadth	−2.37	6.41	Upper facial index	−.96	1.92
			Nasal index	−3.68	3.44

[1] Percentage of measurements under 3×P. E.=69; percentage of indices under 3×P. E.=64.

TABLE 8.—*Comparison of means for measurements and indices of Imbabura Indians with those of Quichua and Aymara Indians of Bolivia measured by Chervin*[1]

Trait	Imbabura[2] (column A)	Bolivian Quichua (column B)	Bolivian Aymara (column C)
Number in series	133–4	66–67	111
Measurements:			
Stature	1,564 (m)	1,580 (m)	1,570 (m)
Sitting height	824 (m)	840 (m)	870 (m)
Head length	185 (m)	182 (m)	183 (m)
Head breadth	148 (m)	147 (m)	150 (m)
Head height (110 cases)	134 (m)	134 (m)	130 (m)
Bizygomatic	143 (m)	138 (m)	142 (m)
Indices:			
Cephalic index	80	82	82
Length-height index	72	73	69
Breadth-height index	90	87	89
Relative sitting height	53	52	54

[1] Chervin, 1907–08, vol. 2.
[2] Round numbers.

TABLE 9.—*Differences of male Indians of the Province of Imbabura (including all measurements from Otavalo, Agato, San Roqué, and Angachagua) and male Quichua Indians measured in Bolivia by Chervin, calculated by means of the putative method* [1]

Trait	Difference [2]	P. E.	×P. E.
Measurements:			
Stature	−1.52	±0.57	2.67
Sitting height	−1.52	±.33	4.61
Head length	+2.65	±.65	4.08
Head breadth	+.76	±.46	1.65
Head height	−.18	±.71	.25
Bizygomatic	+1.80	±.51	9.41
Indices:			
Cephalic index	−1.96	±.32	6.12
Length-height index	−.56	±.37	1.51
Breadth-height index	+3.26	±.51	6.39
Relative sitting height	+.60	±.17	3.53

[1] Percentage of measurements below 4×P. E.=50; percentage of indices below 4×P. E.=50.

[2] Differences calculated from actual values; cf. table 1.

TABLE 10.—*Differences between male Indians of the Province of Imbabura (including all measurements from Otavalo, San Roqué, Angachagua) and male Aymara Indians measured in Bolivia by Chervin,* [1] *calculated by means of the putative method* [2]

Trait	Differences	P. E.	×P. E.
Measurements:			
Stature	−0.52	±0.49	1.06
Sitting height	−4.52	±.28	16.14
Head length	+1.65	±.55	3.00
Head breadth	−2.24	±.40	5.60
Head height	+3.82	±.61	6.26
Bizygomatic	+.80	±.44	1.82
Indices:			
Cephalic index	−1.96	±.28	7.00
Length-height index	+3.44	±.33	10.42
Breadth-height index	+1.26	±.44	2.86
Relative sitting height	−1.40	±.14	10.00

[1] Differences calculated from actual values; cf. table 1.

[2] Percentage of measurements below 4×P. E.=50; percentage of indices below 4×P. E.=25.

TABLE 11.—*Differences between the Otavalo group and male Quichuas of Bolivia measured by Chervin, calculated by means of the putative method* [1]

Trait	Difference	P. E.	×P. E.
Measurements:			
Stature	−1.97	±0.60	3.28
Sitting height	−1.82	±.35	5.20
Head length	+2.38	±.67	3.55
Head breadth	+.55	±.52	1.06
Head height	−1.46	±.75	1.95
Bizygomatic	+4.90	±.54	9.07
Indices:			
Cephalic index	−1.96	±.33	5.94
Length-height index	−1.07	±.44	2.43
Breadth-height index	+2.57	±.55	4.67
Relative sitting height	+.56	±.18	3.11

[1] Percentage of measurements below 4×P. E.=67; percentage of indices below 4×P. E.=50.

TABLE 12.—*Differences between the Otavalo group and male Aymaras of Bolivia measured by Chervin, calculated by means of the putative method* [1]

Trait	Difference	P. E.	×P. E.
Measurements:			
Stature	−0.97	±0.52	1.87
Sitting height	−4.82	±.30	16.07
Head length	+1.38	±.58	2.38
Head breadth	−2.45	±.45	5.44
Head height	+2.54	±.66	3.85
Bizygomatic	.90	±.46	1.96
Indices:			
Cephalic index	−1.96	±.28	7.00
Length-breadth index	+2.93	±.36	8.14
Breadth-height index	+.57	±.48	1.19
Relative sitting height	−1.44	±.15	9.60

[1] Percentage of measurements below 4×P. E.=67; percentage of indices below 4×P. E.=25.

TABLE 13.—*Comparison of means for measurements and indices of Imbabura Indians with those of Quichua and Aymara Indians measured in Bolivia by Rouma, in millimeters in round numbers* [1]

Trait	Imbabura Quichua (column A, No. 134)	Bollvia Quichua (column B, No. 245)	Bolivia Aymara (column C, No. 52)
Measurements:			
Stature	1,564	1,601	1,599
Biacromial	363	365	362
Chest breadth			
Chest depth			
Sitting height	825	852	850
Head length	185	181	180
Head breadth	148	148	148
Head height	134	126	129
Minimum frontal	101	109	111
Bizygomatic	143	141	140
Bigonial	107	104	103
Total face height	120	(2)	
Upper face height			
Nose height	52.6	48.6	50.4
Nose breadth	38.1	35.3	35.5
Indices:			
Relative shoulder breadth	23.12	22.7	22.7
Thoracic index			
Cephalic index	80.04	81.5	81.7
Length-height index	72.44	69.5	71.7
Breadth-height index	90.26	84.9	87.9
Fronto-parietal index	70.12		
Cephalo-facial index			
Zygo-frontal index			
Fronto-gonial index			
Zygo-gonial index	75.16	73.7	73.7
Facial index			
Upper face index			
Nasal index	72.34	73.2	71.2
Relative sitting height	52.60	53.2	53.1

[1] Rouma, G., 1933. The Quichua series is composed of 10 groups of men measured in the following localities: Tarabuco, Chaqui, Puna, Vacas, Colomi, Punata, Novillero, Potolo, Anfaya, and Caraza, in the Departments of Chuquisaca, Cochabamba, and Potosi. The Aymara series is composed of 2 groups of males measured in Cañaviri and Pillapi of the Department of La Paz.

[2] Measured from hair line, not comparable.

TABLE 14.—*Differences between the whole Imbabura group and Quichua Indians measured in Bolivia by Rouma, with value in terms of probable error, calculated by the putative method* [1]

Trait	Difference	P. E.	×P. E.
Measurements:			
Stature	−3.62	±0.41	8.83
Biacromial	+.15	±.15	1.00
Sitting height	−2.72	±.24	11.33
Head length	+3.65	±.47	7.77
Head breadth	−.24	±.30	.80
Head height	+7.82	±.52	15.04
Minimum frontal	−7.66	±.33	23.21
Bigonial	+3.06	±.52	5.88
Nose height	+3.98	±.29	13.72
Nose breadth	+2.85	±.26	10.96
Bizygomatic	+1.80	±.36	5.00
Indices:			
Relative shoulder breadth	+.42	±.09	4.67
Cephalic index	−1.46	±.24	6.08
Length-height index	+2.94	±.27	10.89
Breadth-height index	+5.36	±.37	14.49
Zygo-gonial index	+1.46	±.40	3.65
Relative sitting height	−.60	±.12	5.00
Nasal index	−.86	±.57	1.51

[1] Percentage of measurements under 4×P. E.=18 percent; percentage of indices under 4×P. E.=29 percent.

TABLE 15.—*Differences between the whole Imbabura group and Aymara Indians measured in Bolivia by Rouma, with value in terms of probable error, calculated by the putative method* [1]

Trait	Difference	P. E.	×P. E.
Measurements:			
Stature	−3.42	±0.62	5.52
Biacromial	+.15	±.22	.68
Sitting height	−2.52	±.36	7.00
Head length	+4.65	±.71	6.55
Head breadth	−.24	±.52	.46
Head height	+4.82	±.76	6.34
Minimum frontal	−9.66	±.51	18.94
Bizygomatic	+2.80	±.55	5.09
Bigonial	+4.06	±.80	5.07
Nose height	+2.18	±.44	4.95
Nose breadth	+2.65	±.44	6.02
Indices:			
Relative shoulder breadth	+.42	±.13	3.23
Cephalic index	−1.66	±.36	4.61
Length-height index	+.74	±.41	1.80
Breadth-height index	+2.36	±.56	4.21
Zygo-gonial index	+1.46	±.71	2.06
Nasal index	+1.14	±.86	1.33
Relative sitting height	−.50	±.18	2.78

[1] Percentage of measurements under 4×P. E.=18; percentage of indices under 4×P. E.=71.

TABLE 16.—*Differences between the Otavalo group and Quichua Indians of Bolivia measured by Rouma, with value in terms of probable error, calculated by the putative method* [1]

Trait	Difference	P. E.	×P. E.
Measurements:			
Stature	−3.98	±0.44	9.05
Biacromial	−.27	±.16	1.69
Sitting height	−3.02	±.26	11.62
Head length	+3.38	±.49	6.90
Head breadth	−.45	±.39	1.15
Head height	+6.54	±.57	11.47
Minimum frontal	−5.30	±.35	15.14
Bizygomatic	+1.90	±.40	4.75
Bigonial	+3.14	±.57	5.51
Nose height	+4.14	±.31	13.35
Nose breadth	+3.27	±.28	11.68
Indices:			
Cephalic index	−1.46	±.24	6.08
Length-height index	+2.43	±.31	7.84
Breadth-height index	+4.67	±.41	11.39
Zygo-gonial index	+1.46	±.36	4.06
Nasal index	−.18	±.61	.29
Relative sitting height	−.64	±.13	4.92

[1] Percentage of measurements under 4×P. E.=18; percentage of indices under 4×P. E.=17.

TABLE 17.—*Differences between Otavalo group and Aymara Indians of Bolivia measured by Rouma, with value in terms of probable error, calculated by the putative method* [1]

Trait	Difference	P. E.	×P. E.
Measurements:			
Stature	−1.87	±0.65	5.95
Biacromial	+.03	±.23	.13
Sitting height	−2.82	±.37	7.62
Head length	+4.38	±.72	6.08
Head breadth	−.45	±.57	.79
Head height	+3.54	±.81	4.37
Minimum frontal	−7.30	±.50	14.60
Bizygomatic	+4.14	±.84	4.93
Nose height	+2.34	±.45	5.20
Nose breadth	+3.07	±.41	7.49
Indices:			
Cephalic index	−1.66	±.35	4.74
Length-height index	+.23	±.45	.51
Breadth-height index	+1.67	±.58	2.88
Zygo-gonial index	+1.46	±.52	2.81
Nasal index	+1.82	±.89	2.04
Relative sitting height	−.54	±.19	2.84

[1] Percentage of measurements below 4×P. E.=20; percentage of indices below 4×P. W.=83.33.

TABLE 18.—*Comparison of means for measurements and indices of Imbabura Indians with those of Quichua and Machiganga Indians of Peru studied by Ferris in millimeters in round numbers* [1]

Trait	Imbabura Quichua (column A, No. 134)	Peruvian Quichua (column B, No. 124)	Peruvian Quichua (column C, No. 85)	Peruvian Machiganga (column D, No. 18)
Measurements:				
Stature	1,565	1,584	1,584	1,559
Biacromial	363	381	----	----
Chest breadth	277	----	304	275
Chest depth	217	----	224	218
Sitting height	825	836	830	781
Head length	185	185	190	181
Head breadth	148	148	150	145
Head height	134	146	134	128
Minimum frontal	101	----	----	----
Bizygomatic	143	141	141	141
Bigonial	107	104	----	----
Total face height	120	116	[2] 135	[2] 125
Upper face height	68	65	----	----
Nose height	52.6	----	57	50
Nose breadth	38.1	----	40	42
Indices:				
Relative shoulder breadth	23.12	24.0	----	----
Relative sitting height	52.60	51.8	52.54	50.09
Thoracic index	78.58	----	73.83	79.38
Cephalic index	80.04	79.9	79.46	80.38
Length-height index	72.44	68.6	70.46	70.9
Breadth-height index	90.26	----	----	----
Fronto-parietal index	70.12	----	----	----
Cephalo-facial index	96.71	----	----	----
Zygo-gonial index	75.16	73.5	----	----
Facial index	84.00	82.9	[2] 96.35	[2] 88.44
Upper facial index	47.54	45.9	----	----
Nasal index	72.34	----	69.98	85.37

[1] The data in column B are from H. B. Ferris (1921), and comprise the pure Quichuas only, measured by Dr. L. T. Nelson, from the localities mentioned in pp. 62-63 of Ferris' work. The data in column C are from Ferris (1916), and refer to Indians measured by Dr. D. E. Ford in the Provinces of Urubamba and Convención of the Department of Cuzco. They comprise supposedly pure Quichuas, although the author states that there is a possibility of 8 percent admixture with Spanish whites. Data in column D are from Ferris (1921), and refer to Indians measured by Dr. Ford in the San Miguel Valley.

[2] Probably glabella-menton height.

TABLE 19.—*Differences between whole Imbabura group and Quichua series 1 reported from Peru by Ferris, with value in terms of probable error, calculated by putative method* [1] [2]

Trait	Difference	P. E.	×P. E.
Measurements:			
Stature	−1.92	±0.47	4.09
Biacromial	−1.65	±.17	9.71
Sitting height	−1.12	±.28	4.00
Head length	−.35	±.54	.65
Head breadth	−.24	±.40	.60
Head height	−12.18	±.59	20.64
Bizygomatic	+1.80	±.42	4.29
Bigonial	+3.06	±.61	5.02
Total face height	+4.10	±.50	8.20
Upper face height	+2.75	±.39	7.05
Indices:			
Relative shoulder breadth	−.88	±.10	8.80
Relative sitting height	+.80	±.14	5.71
Cephalic index	+.14	±.27	.52
Length-height index	+3.84	±.32	12.00
Zygo-gonial index	+1.66	±.50	3.32
Facial index	+1.10	±.39	2.82
Upper facial index	+1.64	±.28	5.86

[1] Percentage of measurements below 4×P. E.=20; percentage of indices below 4×P. E.=43.
[2] See table 18, column B.

TABLE 20.—*Differences between whole Imbabura group and Quichua Indians series 2 reported from Peru by Ferris, with value in terms of probable error, calculated by putative method* [1] [2]

Trait	Difference	P. E.	×P. E.
Measurements:			
Stature	−1.92	±0.53	3.62
Chest breadth	−2.71	±.16	16.94
Chest depth	−.66	±.14	4.71
Sitting height	−.52	±.31	1.68
Head length	−5.35	±.60	8.92
Head breadth	−2.24	±.44	5.09
Head height	−.18	±.65	.28
Bizygomatic	+1.80	±.47	3.83
Total face height	−14.90	±.55	27.09
Nose height	−4.42	±.37	11.95
Nose breadth	−1.85	±.33	5.61
Indices:			
Relative sitting height	+.06	±.16	.37
Thoracic index	+4.75	±.50	9.50
Cephalic index	+.58	±.30	1.93
Length-height index	+1.98	±.35	5.66
Facial index	−12.35	±.44	28.07
Nasal index	+2.36	±.73	3.23

[1] Percentage of measurements under 4×P. E.=36; percentage of indices under 4×P. E.=50.
[2] See table 18, column C.

TABLE 21.—*Differences between whole Imbabura group and Machiganga Indians reported from Peru by Ferris, with value in terms of probable error, calculated by putative method* [1] [2]

Trait	Difference	P. E.	× P. E.
Measurements:			
Stature	+0.58	±0.96	0.60
Chest breadth	+ .19	± .29	.66
Chest depth	− .06	± .26	.23
Sitting height	+4.38	± .56	7.82
Head length	+3.65	±1.09	3.35
Head breadth	+2.76	± .80	3.45
Head height	+5.82	±1.16	5.02
Bizygomatic	+1.80	± .85	2.12
Total face height	−4.90	±1.00	4.90
Nose height	+2.58	± .66	3.91
Nose breadth	−3.85	± .60	6.42
Indices:			
Relative sitting height	+2.51	± .28	8.96
Thoracic index	− .80	± .92	.87
Cephalic index	− .34	± .55	.62
Length-height index	+1.54	± .62	2.48
Facial index	−4.44	± .80	5.55
Nasal index	−13.03	±1.26	10.34

[1] Percentage of measurements under 4×P. E.=63; percentage of indices under 4×P. E.=50.
[2] See table 18, column D.

TABLE 22.—*Differences between male Otavalo and Quichua Indians of Peru reported by Ferris (column B, table 18), series 1, with value in terms of probable error calculated by putative method* [1]

Trait	Difference	P. E.	× P. E.
Measurements:			
Stature	−2.37	±0.50	4.74
Biacromial	−1.87	± .18	10.39
Sitting height	−1.42	± .30	4.73
Head length	− .62	± .56	1.11
Head breadth	− .45	± .44	1.02
Head height	−13.46	± .65	20.71
Bizygomatic	1.90	± .45	4.22
Bigonial	3.14	± .66	4.76
Total face height	4.25	± .52	8.17
Upper face height	3.05	± .41	7.44
Indices:			
Relative shoulder breadth	− .92	± .12	7.67
Relative sitting height	− .76	± .15	5.07
Zygo-gonial index	1.66	± .41	4.05
Cephalic index	.14	± .28	.50
Length-height index	3.33	± .36	9.25
Facial index	1.30	± .40	3.25

[1] Percentage of measurements below 4×P. E.=20; percentage of indices below 4×P. E.= 33.

TABLE 23.—*Differences between Otavalo group and Quichua Indians, series 2, reported from Peru by Ferris, with value in terms of probable error, calculated by putative method* [1]

Trait	Difference	P. E.	×P. E.
Measurements:			
Stature	−2.37	±0.55	4.31
Chest breadth	−2.95	±.16	18.44
Chest depth	−.84	±.13	6.46
Sitting height	−.82	±.33	2.48
Head length	−5.62	±.62	9.06
Head breadth	−2.45	±.48	5.10
Head height	−1.46	±.70	2.09
Bizygomatic	+1.90	±.50	3.80
Total face height	−14.75	±.57	25.88
Nose height	−4.26	±.37	11.51
Nose breadth	−1.43	±.35	4.09
Indices:			
Length-height index	+1.47	±.39	3.79
Relative sitting height	−.02	±.16	.12
Cephalic index	+.58	±.30	1.93
Facial index	−12.16	±.44	27.64
Nasal index	+3.04	±.76	4.00
Thoracic index	+4.71	±.30	1.93

[1] Percentage of measurements below 4×P. E.=27; percentage of indices below 4×P. E.=67.

TABLE 24.—*Differences between Otavalo group and Machiganga of Peru reported by Ferris, with value in terms of probable error, calculated by putative method* [1]

Trait	Difference	P. E.	×P. E.
Measurements:			
Stature	+0.13	±0.97	0.13
Chest breadth	−.05	±.27	.19
Chest depth	−.24	±.25	.96
Sitting height	+4.08	±.57	7.16
Head length	+3.38	±1.09	3.10
Head breadth	+2.25	±.85	3.00
Head height	+4.52	±1.19	3.80
Bizygomatic	+1.90	±.87	2.18
Total face height	−4.75	±1.00	4.75
Nose height	+2.74	±.68	4.03
Nose breadth	−3.43	±.62	5.53
Indices:			
Relative sitting height	+2.47	±.28	8.82
Thoracic index	−.84	±.92	.91
Cephalic index	−.34	±.54	.63
Facial index	−4.24	±.75	5.65
Nasal index	−12.35	±1.35	9.15
Length-height index	+1.03	±.65	1.58

[1] Percentage of measurements under 4×P. E.=64; percentage of indices under 4×P. E.=50.

TABLE 25.—*Comparison of means of measurements and indices of male Imbabura Indians and Cayapas Indians measured by Barrett, in millimeters* [1]

Trait	Imbabura (column A, series No. 134)	Cayapas (column B, series No. 36)	Trait	Imbabura (column A, series No. 134)	Cayapas (column B, series No. 36)
Measurements:			Measurements—Continued.		
Stature	1,564.8	1,551.31	Nose height	52.58	46.68
Sitting height	824.8	836.84	Nose breadth	38.15	36.42
Biacromial	363.5	399.21	Indices:		
Head length	184.65	178.36	Relative sitting height	52.60	53.88
Head breadth	147.76	148.94	Facial index	84.00	79.59
Bizygomatic	142.80	139.89	Nasal index	72.34	78.46
Face height	120.10	111.21	Cephalic index	80.04	83.58

[1] Barrett, 1925, vol. 2, p. 423.

TABLE 26.—*Differences between total Imbabura series and male Cayapas of the Ecuadorean coast measured by Barrett, with value in terms of probable error, computed by putative method* [1]

Trait	Difference	P. E.	×P. E.
Measurements:			
Stature	+1.35	±0.72	1.87
Sitting height	−1.20	±.41	2.93
Biacromial	−3.57	±.25	14.28
Head length	+6.29	±.81	7.77
Head breadth	−1.18	±.59	2.00
Bizygomatic	+2.91	±.64	4.55
Face height	+8.89	±.74	12.01
Nose height	+5.90	±.50	11.80
Nose breadth	+1.73	±.45	3.84
Indices:			
Relative sitting height	−1.28	±.21	6.10
Facial index	+4.41	±.59	7.47
Nasal index	−6.12	±.90	6.80
Cephalic index	−3.54	±.41	8.63

[1] Percentage of measurements under 4×P. E.=44; percentage of indices under 4×P. E.=0.

TABLE 27.—*Differences between male Otavalo and male Cayapas of Ecuadorean coast measured by Barrett, with value in terms of probable error, calculated by putative method* [1]

Trait	Difference	P. E.	×P. E.
Measurements:			
Stature	+0.72	±0.73	0.99
Sitting height	−1.50	±.44	3.41
Biacromial	−3.69	±.26	14.19
Head length	+6.02	±.82	7.37
Head breadth	−1.39	±.65	2.14
Bizygomatic	+3.01	±.66	4.56
Face height	+9.04	±.76	11.89
Nose height	+6.06	±.52	11.65
Nose breadth	+2.15	±.46	4.67
Indices:			
Relative sitting height	−1.32	±.21	6.29
Facial index	+4.61	±.57	8.09
Nasal index	−5.44	±1.01	5.39
Cephalic index	−3.54	±.40	8.85

[1] Percentage of measurements below 4×P. E.=33; percentage of indices below 4×P. E.=0.

TABLE 28.—*Comparison of means for whole Imbabura group with those of Piro, Machiyenga, and Sipibo of eastern Peru reported by Farabee* [1]

Trait	Imbabura[2] (column A, series No. 134)	Piro (column B, series No. 23)	Machiyenga (column C, series No. 19)	Sipibo (column D, series No. 14)
Measurements:				
Stature	1,564	1,613	1,610	1,586
Sitting height	824	866	832	797
Biacromial	363	379	406	381
Chest breadth	277	283	293	292
Chest depth	217	237	234	235
Head length	185	194	184	182
Head breadth	148	150	146	156
Head height	134	134	134	135
Bizygomatic	143	145	145	147
Total face height	120	118	112	122
Nose height	53	48	50	48
Nose breadth	38	41	40	41
Minimum frontal	101	121	121	124
Bigonial	107	127	119	128
Indices:				
Relative sitting height	52.60	53.77	51.10	50.97
Thoracic index	78.58	83.87	80.20	78.58
Cephalic index	80.04	77.43	78.99	85.69
Length-height index	72.44			
Breadth-height index	90.26	89.71	92.50	86.82
Facial index	84.00	81.45	77.50	82.88
Nasal index	72.34	86.59	80.10	84.63

[1] Farabee, 1922, pp. 168–179.

[2] Round numbers.

TABLE 29.—*Differences between total Imbabura group and Piro Indians reported by Farabee, with value in terms of probable error, calculated by putative method* [1]

Trait	Difference	P. E.	×P. E.
Measurements:			
Stature	−4.82	0.87	5.54
Sitting height	−4.12	.50	8.24
Biacromial	−1.55	.30	5.17
Chest breadth	−.61	.26	2.35
Chest depth	−1.96	.24	8.17
Head length	−0.35	.97	9.64
Head breadth	−2.24	.71	3.15
Head height	−.18	1.04	.17
Bizygomatic	−2.20	.77	2.86
Total face height	3.10	.89	2.36
Nose height	4.85	.69	7.63
Nose breadth	−2.58	.53	5.38
Minimum frontal	−19.66	.69	28.49
Bigonial	−19.94	1.10	18.13
Indices:			
Relative sitting height	−1.17	.25	4.68
Thoracic index	−5.29	.82	6.45
Cephalic index	2.61	.49	5.33
Breadth-height index	.55	.75	.73
Facial index	2.55	.71	3.59
Nasal index	−14.25	1.19	11.97

[1] Percentage of measurements below 4×P. E.=36; percentage of indices below 4×P. E.=33.

TABLE 30.—*Differences between total Imbabura group and Arawak Machiyenga reported by Farabee, with value in terms of probable error, calculated by putative method* [1]

Trait	Difference	P. E.	×P. E.
Measurements:			
Stature	−4.52	0.94	4.81
Sitting height	−.72	.54	1.33
Biacromial	−4.25	.33	12.88
Chest breadth	−1.61	.29	5.55
Chest depth	−1.66	.26	6.38
Head length	.65	1.06	.61
Head breadth	1.76	.78	2.26
Head height	−.18	1.14	.16
Bizygomatic	−2.29	.83	2.65
Total face height	8.10	.97	8.35
Nose height	2.58	.65	3.97
Nose breadth	−1.85	.58	3.19
Minimum frontal	−19.66	.76	26.21
Bigonial	−11.94	1.20	9.95
Indices:			
Relative sitting height	1.50	.27	5.56
Thoracic index	−1.62	.90	1.80
Cephalic index	1.05	.53	1.98
Breadth-height index	−2.24	.82	2.73
Facial index	6.50	.78	8.33
Nasal index	−7.76	1.30	5.97

[1] Percentage of measurements below 4×P. E.=36; percentage of indices below 4×P. E.=50.

TABLE 31.—*Differences between whole Imbabura group and Pano Sipibo Indians reported by Farabee, with value in terms of probable error, calculated by putative method* [1]

Trait	Difference	P. E.	×P. E.
Measurements:			
Stature	−2.12	±1.07	1.98
Sitting height	2.78	±.61	4.56
Biacromial	−1.75	±.37	4.73
Chest breadth	−1.51	±.33	4.58
Chest depth	−1.76	±.29	6.07
Head length	2.65	±1.21	2.19
Head breadth	−8.24	±.89	9.26
Head height	−1.18	±1.29	.91
Bizygomatic	−4.20	±.95	4.42
Total face height	−1.90	±1.11	1.71
Nose height	4.58	±.75	6.11
Nose breadth	−2.85	±.66	4.32
Minimum frontal	−22.60	±.87	26.05
Bigonial	−20.94	±1.37	15.28
Indices:			
Relative sitting height	1.63	±.32	5.09
Thoracic	0	±1.02	0
Cephalic	−5.65	±.60	9.42
Breadth-height	3.44	±.93	3.70
Facial	1.12	±.89	1.26
Nasal	−12.29	±1.48	8.30

[1] Percentage of measurements below 4×P. E.=29; percentage of indices below 4×P. E.=50.

TABLE 32.—*Differences between Otavalo group and Arawak Piro measured in eastern Peru by Farabee, with value in terms of probable error, calculated by putative method* [1]

Trait	Difference	P. E.	×P. E.
Measurements:			
Stature	−5.27	±0.87	6.06
Sitting height	−4.42	±.51	8.67
Biacromial	−1.67	±.32	5.22
Chest breadth	−.85	±.24	3.54
Chest depth	−2.14	±.22	9.73
Head length	−9.62	±.98	9.82
Head breadth	−2.45	±.77	3.18
Bizygomatic	−2.10	±.78	2.69
Total face height	+2.25	±.91	2.47
Nose height	+4.74	±.66	7.18
Nose breadth	−2.43	±.58	4.19
Head height	−1.46	+1.07	1.36
Bigonial	−19.86	±1.14	17.42
Nasal	−13.57	±1.21	11.21
Indices:			
Minimum frontal index	−17.30	±.69	25.10
Relative sitting height	−1.21	±.25	4.89
Thoracic index	−5.33	±.82	6.50
Cephalic index	+2.61	±.44	5.93
Breadth-height index	−.14	±.78	.06
Facial index	+2.75	±.69	3.99

[1] Percentage of measurements below 4×P. E.=36; percentage of indices below 4×P. E.=33.

TABLE 33.—*Differences between Otavalo males and Arawak Machiyenga males measured by Farabee in eastern Peru with value in terms of probable error, calculated by putative method* [1]

Trait	Difference	P. E.	×P. E.
Measurements:			
Stature	−4.97	±0.94	5.28
Sitting height	−1.02	±.56	1.82
Biacromial	−4.37	±.35	12.48
Chest breadth	−1.85	±.28	6.60
Chest depth	−1.84	±.22	8.36
Head length	+0.38	±1.06	.35
Head breadth	+1.55	±.84	1.85
Head height	−1.46	±1.16	1.26
Bizygomatic	−2.10	±.85	2.47
Total face height	+8.25	±.97	8.50
Nose height	+2.74	±.71	3.86
Nose breadth	−1.43	±.61	2.34
Minimum frontal	−17.30	±.73	23.70
Bigonial	−11.86	±1.23	9.64
Indices:			
Relative sitting height	+1.46	±.27	5.42
Thoracic index	−1.66	±.89	1.87
Cephalic index	+1.05	±.53	1.98
Breadth-height index	−2.03	±.83	3.53
Facial index	+6.70	±.73	9.18
Nasal index	−7.08	±1.31	5.40

[1] Percentage of measurements under 4×P. E.=50; percentage of indices under 4×P. E.=50.

TABLE 34.—*Differences between Otavalo and Pano Sipibo measured in Peru by Farabee, with value in terms of probable error, calculated by putative method* [1]

Trait	Difference	P. E.	×P. E.
Measurements:			
Stature	−2.57	±1.08	2.38
Sitting height	+2.48	±.64	3.87
Biacromial	−1.87	±.39	4.79
Chest breadth	−1.75	±.30	5.83
Chest depth	−1.94	±.28	6.93
Head length	+3.38	±1.22	1.95
Head breadth	−8.45	±.95	8.89
Head height	−2.46	±1.32	1.86
Bizygomatic	−4.10	±.97	4.23
Total face height	−1.75	±1.12	1.56
Nose height	+4.74	±.79	6.00
Nose breadth	−2.43	±.78	3.11
Bigonial	−20.86	±1.41	14.48
Minimum frontal	−20.30	±.84	24.19
Indices:			
Relative sitting height	+1.59	±.32	4.97
Thoracic index	−.04	±1.02	.00
Cephalic index	−5.56	±.60	.94
Breadth height index	+2.65	±.95	2.89
Facial index	+1.32	±.84	1.57
Nasal index	−11.61	±1.50	7.74

[1] Percentage of measurements below 4×P. E.=43; percentage of indices below 4×P. E.=67.

TABLE 35.—*Measurements and indices reported by Steggerda on Maya Indians of Yucatan* [1]

Trait	Mean	S. D.	×P. E.
Measurements:			
Stature	155.11±.40	5.25±.29	3.38±.18
Sitting height	83.67±.28	2.96±.20	3.54±.24
Chest breadth	28.05±.13	1.39±.09	4.96±.33
Chest depth	20.55±.12	1.22±.08	5.94±.40
Biacromial	30.01±.14	1.51±.10	3.97±.27
Head length	180.41±.41	5.33±.29	2.95±.16
Head breadth	153.71±.36	4.64±.25	3.02±.17
Head height	117.50±.37	3.91±.26	3.33±.22
Bizygomatic	142.98±.49	5.14±.35	3.59±.24
Minimum frontal	110.86±.44	4.58±.31	4.13±.28
Bigonial	106.06±.53	5.54±.37	5.22±.35
Nose height	55.78±.30	3.14±.21	5.63±.38
Nose breadth	38.22±.24	2.51±.17	6.57±.44
Face height	118.48±.64	6.58±.45	5.64±.38
Indices:			
Relative sitting height	53.02±.11	1.14±.08	2.15±.15
Thoracic index	(2)	(2)	(2)
Relative shoulder breadth	24.28±.08	0.80±.06	3.29±.22
Cephalic index	85.01±.22	2.80±.16	3.29±.18
Nasal index	68.50±.57	5.95±.40	8.28±.57
Facial index	82.46±.37	3.90±.26	4.73±.32

[1] Steggerda, 1932.
[2] Not comparable.

TABLE 36.—*Differences between whole Imbabura group and Maya group reported by Steggerda, with values in terms of probable error, calculated by regular and by putative methods*

Trait	Regular method			Putative method		
	Difference	P. E.	×P. E.	Difference	P. E.	×P. E.
Measurements:						
Stature	1.37	±0.52	2.63	1.37	±0.55	2.49
Sitting height	−1.19	±.33	3.61	−1.19	±.36	3.31
Chest breadth	−.36	±.16	2.00	−.36	±.19	1.89
Chest depth	1.19	±.15	7.93	1.19	±.17	7.00
Biacromial	6.34	±.18	35.22	6.34	±.22	28.22
Head length	3.24	±.55	5.89	3.24	±.60	5.31
Head breadth	−5.95	±.46	12.93	−5.95	±.45	13.22
Head height	16.32	±.57	28.63	16.32	±.77	21.19
Minimum frontal	−9.52	±.52	18.31	−9.52	±.51	18.67
Bizygomatic	−.18	±.57	.32	−.18	±.56	.32
Bigonial	1.00	±.68	1.47	1.00	±.81	1.23
Total face height	1.64	±.73	2.25	1.64	±.66	2.48
Nose height	−3.20	±.37	8.65	−3.20	±.44	7.27
Nose breadth	−.07	±.32	.22	−.07	±.39	.18
Indices:						
Relative shoulder breadth	−1.16	±.11	10.55	−1.16	±.14	8.29
Relative sitting height	−.42	±.15	2.80	−.42	±.19	2.21
Cephalic index	−4.97	±.29	17.14	−4.97	±.31	16.03
Facial index	1.54	±.46	3.35	1.54	±.53	2.91
Nasal index	3.84	±.73	5.26	3.84	±.87	4.41
Average			8.90			7.74

TABLE 37.—*Differences between Otavalo males and male Mayas measured by Steggerda in Yucatan* [1]

Trait	Regular method		
	Difference	P. E.	×P. E.
Measurements:			
Stature	+0.92	±0.55	1.69
Sitting height	−1.49	±.36	4.14
Chest breadth	−.60	±.16	3.75
Chest depth	+1.01	±.15	6.31
Biacromial	+6.32	±.19	32.74
Head length	+2.97	±.58	5.12
Head breadth	−6.16	±.49	12.57
Head height	+15.04	±.62	24.26
Minimum frontal	−7.16	±.53	13.51
Bizygomatic	−.08	±.59	.14
Bigonial	+1.08	±.60	1.80
Total face height	+1.79	±.74	2.42
Nose height	−3.04	±.35	8.68
Nose breadth	+.35	±.33	1.06
Indices:			
Relative shoulder breadth	−1.20	±.12	10.00
Relative sitting height	−.46	±.16	2.88
Cephalic index	−4.97	±.30	16.57
Facial index	+1.74	±.47	3.70
Nasal index	+4.52	±.76	5.95

[1] Percentage of measurements under 3×P. E.=36; percentage of indices under 3×P. E.=20.

TABLE 38.—*Percentages of insignificant differences, as shown by putative × P. E. under 4, between total Imbabura group and various foreign groups*

Group	Percentage under 4×P. E.			
	Measurements		Indices	
	Rank	Percent	Rank	Percent
1. Expected differences in random samples of same universe	----------	99.38	----------	99.38
2. Imbabura compared with Chervin Quichua (table 9)	2	50.00	2	50.00
3. Imbabura compared with Rouma Quichuas (table 14)	8	18.18	6	28.57
4. Imbabura compared with Ferris Quichuas (table 19)	7	20.00	3	42.86
5. Imbabura compared with Ferris Quichuas (table 20)	4	36.36	2	50.00
6. Imbabura compared with Chervin Aymaras (table 10)	2	50.00	7	25.00
7. Imbabura compared with Rouma Aymaras (table 15)	8	18.18	1	71.42
8. Imbabura compared with Barrett Cayapas (table 26)	3	44.44	8	----------
9. Imbabura compared with Ferris Machiganga (table 21)	1	63.64	2	50.00
10. Imbabura compared with Farabee Machiyenga (table 30)	2	50.00	2	50.00
11. Imbabura compared with Farabee Sipibo (table 31)	6	28.57	2	50.00
12. Imbabura compared with Farabee Piro (table 29)	5	35.71	5	33.33
13. Imbabura compared with Steggerda Maya (table 36)	2	50.00	4	40.00

TABLE 39.—*Distribution of differences as expressed by × P. E., calculated by putative method, between total Imbabura group and respective apposite series.*

Group	Distribution of × P. E. in categories of size by percentages							Percentage below 3 × P. E.	Percentage below 4 × P. E.	Rank
	1	2	3	4	5	6	7			
1. Expected difference in random samples of same universe[1]	50.00	17.73	4.30	0.698	0.074	0.005	0.0002	95.70	99.38	
2. Imbabura compared with Chervin Quichuas (table 9)	10.00	20.00	10.00	10.00	20.00	0	30.00	40.00	50.00	2
3. Imbabura compared with Rouma Quichuas (table 14)	5.56	11.11	.00	5.56	5.56	16.69	55.56	16.57	22.22	10
4. Imbabura compared with Ferris Quichuas (table 19)	17.65	0	5.88	5.88	17.65	17.65	35.29	23.53	29.41	9
5. Imbabura compared with Ferris Quichuas (table 20)	11.76	11.76	.00	17.65	5.88	17.65	35.29	23.53	41.18	4
6. Imbabura compared with Chervin Aymaras (table 10)	.00	20.00	10.00	10.00	.00	10.00	50.00	30.00	40.00	5
7. Imbabura compared with Rouma Aymaras (table 15)	11.11	11.11	11.11	5.56	16.63	16.67	27.78	33.33	38.89	6
8. Imbabura compared with Barrett Cayapas (table 26)	0	7.69	15.38	7.69	0.69	0	61.54	23.08	30.77	8
9. Imbabura compared with Ferris Machiganga (table 21)	29.41	0	11.76	17.65	5.88	11.76	23.53	41.18	58.82	1
10. Imbabura compared with Farabee Machiyenga (table 30)	10.00	15.00	15.00	10.00	5.00	15.00	30.00	40.00	50.00	2
11. Imbabura compared with Farabee Sipibo (table 31)	10.00	15.00	5.00	5.00	25.00	5.00	35.00	30.00	35.00	7
12. Imbabura compared with Farabee Piro (table 29)	10.00	0	15.00	10.00	5.00	20.00	40.00	25.00	35.00	7
13. Imbabura compared with Steggerda Maya (table 36)	10.53	5.26	21.05	10.53	.00	10.53	42.11	36.84	47.37	3

[1] From Mathematical Tables from Handbook of Chemistry and Physics, 5th ed., p. 183, Cleveland, 1936.

TABLE 40.—*Percentage of insignificant differences between Otavalo group and various foreign groups as shown by × P. E. under 4 in round numbers*

Group	Percentage under 4 × P. E.				Measurements and indices	
	Measurements		Indices			
	Rank	Percent	Rank	Percent	Rank	Percent
1. Expected differences in random sample of same universe	-------	99. 38	-------	99. 38	-------	---------
2. Otavalo compared with Chervin Quichuas (table 11)	1	67	3	50	1	60
3. Otavalo compared with Rouma Quichuas (table 16)	8	18	7	17	10	18
4. Otavalo compared with Ferris Quichuas table (22)	7	20	5	33	8	25
5. Otavalo compared with Ferris Quichuas (table 23)	6	27	2	67	6	41
6. Otavalo compared with Chervin Aymaras (table 12)	1	67	6	25	3	50
7. Otavalo compared with Rouma Aymaras (table 17)	7	20	1	83	4	44
8. Otavalo compared with Barrett Cayapas (table 27)	5	33	8	0	9	23
9. Otavalo compared with Ferris Machiganga (table 24)	2	64	3	50	2	59
10. Otavalo compared with Farabee Machiyenga (table 33)	3	50	3	50	3	50
11. Otavalo compared with Farabee Sipibo (table 34)	4	43	2	67	3	50
12. Otavalo compared with Farabee Piro (table 32)	5	36	4	33	7	35
13. Maya (table 37)	4	43	4	40	5	42

TABLE 41.—*Percentages of insignificant differences between Otavalo, whole Imbabura group, and Maya, as shown by × P. E. under 3*

Group	Percentage under 3 × P. E.	
	Measurements	Indices
1. Angachagua compared with Otavalo (table 7)	69	64
2. Imbabura compared with Maya, regular method (table 36)	43	20
3. Imbabura compared with Maya, putative method (table 36)	43	40
4. Otavalo compared with Maya, regular method (table 37)	36	20

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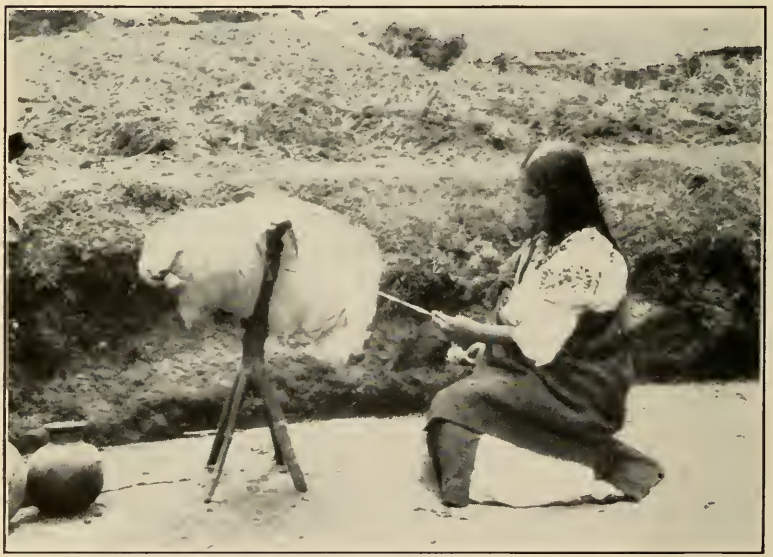
1. General View of the Village of Angachagua.

2. Houses and Fields at Angachagua. Note Four-Sided Roof Construction.

1. HOUSE AT ANGACHAGUA.



2. QUICHUA INDIAN WOMAN SPINNING WOOL, ANGACHAGUA.

1. Native Quichua Indians of Angachagua, Showing Typical Costume.

2. Household Utensils: Pottery Vessels.

INDIAN OF OTOVALO GROUP.

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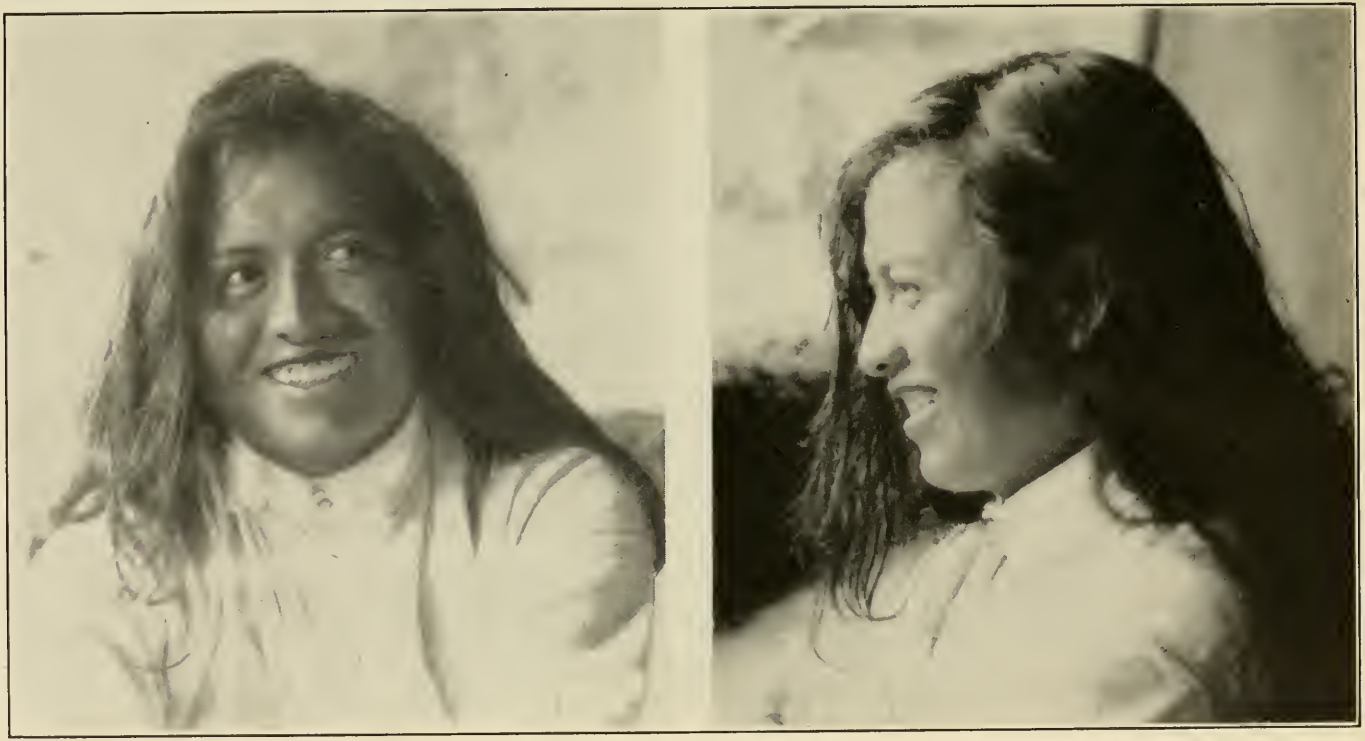

INDIAN OF AGATO, NEAR OTOVALO.