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EDUCATION IN HUMAN BIOLOGY: AN ESSENTIAL FOR THE PRESENT AND FUTURE*

INTRODUCTION

The propositions here advanced are the natural steps of the moment in the evolution and execution of a program in physical anthropology which has been the writer's concern at the Howard University School of Medicine during the past ten years. The purpose of this program has been the establishment of a laboratory which would be a regular source of that share of significant contributions in this field which would be expected from a leading university. Such an objective has required sustained and simultaneous activity on many fronts, with the inevitable result of differential progress in the several sectors. Assemblage of materials and facilities has been slow, intramural recognition of the importance of the work not excessive, and the enlistment of trained aides circumstantially impossible. Encouraging progress has been possible in the realm of independent investigation and exposition, however, and it is in direct sequence to a series of publications in this sphere that the present discussion stands.

BASIC HUMAN VARIANTS

The principal subject matter of physical anthropology is human variation and attendant phenomena. The basic human

* Read at the Annual Meeting of the Association for the Study of Negro Life and History, Washington, D. C., October 30, 1942.

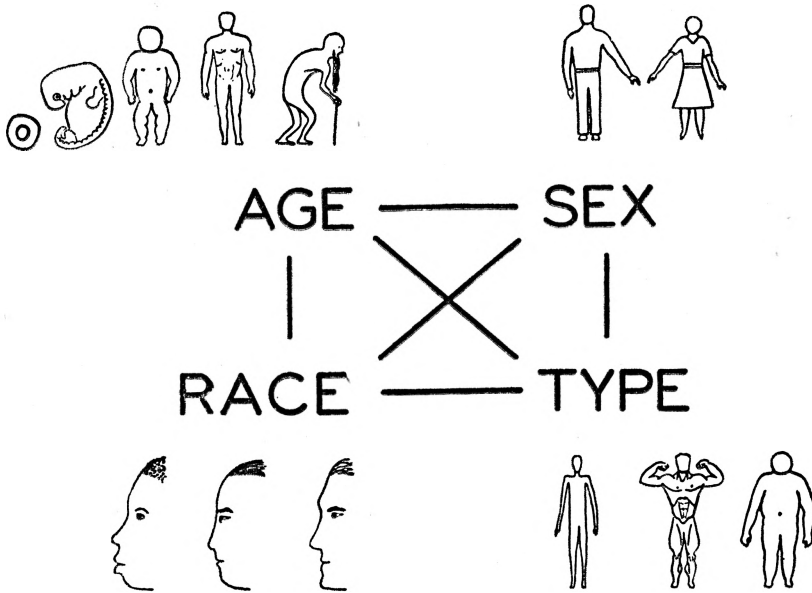


FIG 1. BASIC HUMAN VARIANTS

variables are age, sex, race and body type (fig. 1). These four irreducibles may be identified with more or less refinement in all human beings. Everyone represents some intergrade between the extremes of being young or old, male or female, black, yellow-brown or white, and lean, muscular or fat. None of these characters can be absent, for one cannot be ageless, or sexless, or without racial affinity or constitutional habitus, so the study of human variation is complicated by the fact that in dealing with any one of the fundamental variants, the influence of the other three must always be considered.

Further intricacy inheres in the fact that the structure of the body undergoes constant change in respect to age, sex, race and body build. Structural change related to age is familiar to all. It is similarly well known that although sex does not change, the expression of sex varies in different pe-

riods of the life span. Common, too, are changes in body type, where within normal limits the lean become fat and the reverse, due to alteration in habits and endocrine balance. Even the diagnostic characters of race may show change. The negroid pigmentation is not fully developed until some days after birth, while in white peoples a tendency to broadening of the features and frizzling of the hair may be noted in advanced years.

This complexity makes for great difficulty in acquiring the full complement of knowledge about the several variants, but this knowledge must be obtained because human social problems focus principally upon them. Although each of these variants has received a very considerable amount of scientific exploration, much remains to be done, despite the impressive yield of research so far. In addition, in a democracy it is necessary that as many people as possible be well informed on the nature and implications of these biological fundamentals, for only through general enlightenment can public opinion be developed which will seek and enforce the application of truth to the current urgent problems which center about the young and the old, men and women, racial groups and constitutional types.

STATUS OF VARIANTS IN THE PUBLIC MIND

The extent of scientific knowledge and the degree to which the public is informed differ for our four variants. The situation is best as concerns age. There have long been many auspices both private and public devoted to the study and teaching of human growth and development. The federal government has made freely available excellent information and assistance on prenatal, infant and child care. More recently the later end of the life span has been receiving increased attention both as to research and public education, because of the rising proportion of elderly people in the general population. The importance of continued investigation and publicity on the phenomena of aging is well recognized.

Biological research into the problems of sex has had great scope and attention in recent years and significant progress has been made in general education relating to sex. Progressive opinion today attaches great value to work of this kind.

Although the recognition of constitutional types is very ancient, the difficulties of classification and interpretation have been such that only recently has appreciation of this phase of human variation become widespread, and information is still not abundant enough to permit of much general education on the subject. Both the scientific and lay public, however, are favorably receptive to new knowledge in this field.

The situation in respect to race, on the other hand, is quite paradoxical. The social, though not the biological, significance of this variant approximates that of age and sex, and yet there is practically no public education on the facts of race beyond a few unscientific stereotypes, except for limited college groups. The well known reason for this is, of course, that the facts about race are at such variance with entrenched beliefs and social patterns that the subject is generally regarded as best left alone.

NECESSITY OF EDUCATION IN HUMAN BIOLOGY

Yet just as it is well recognized that to enhance the development of the young, it is necessary to study and understand how children grow, and that to provide for the greatest usefulness and comfort of the elderly, thorough study and exposition of their needs and potentialities are essential, so to make for stability and justice in a society composed of different races, there must be adequate study and education on the nature of race.

Although in biological perspective race has little of the importance it holds for social majority-minority relationships, it is certain that popular misinterpretation of the significance of race has resulted in more social harm than has accrued from lack of understanding of age, sex or body type. This

harm cannot be easily repaired. The factors which make for the entrenchment of popular attitudes on race are very powerful and not easily to be dislodged. There are many today who view with almost fatalistic pessimism the possibility of inducing revolutionary change in racial attitudes by rational methods. It is widely recognized that there are no panaceas. Concerning an educational program which would aim to let facts speak for themselves, the following comment of Aldous Huxley is relevant: "To recognize the truth that facts do not speak for themselves, but only as men's socially conditioned passions dictate, is to recognize that our current educational processes can do very little to ameliorate the state of the world. In the language of traditional theology, most ignorance is voluntary and depends upon acts of the conscious or subconscious will."¹

Irrespective of the degree to which education as a means of social advancement must be supplemented, however, it is an undisputed essential to the success of a democracy, because without informed public opinion, intelligent popular government cannot exist. The democratic method must begin attack upon a problem by getting facts and making them known. The lot of the child, the lot of the aged, and the lot of women have within our own memories been substantially improved by measures which owed much to educational programs, and accomplishments in race relations by this means are not insignificant.

Daily developments in current events emphasize that for future human security human problems must be viewed and treated on a global basis. Since education is one of the bulwarks of democracy and the major social problems have a biological core, every effort possible to further continued research and education in human biology is strongly indicated.

CURRENT TRENDS

In recent years there has been an increasing realization of

¹ In foreword to *Man's Most Dangerous Myth: The Fallacy of Race*, by M. F. Ashley Montagu, Columbia Univ. Press, 1942, 216 pp.

the need for the application of biological knowledge to social problems and a number of interpretations of human biological history suitable for practical application have been published under progressively more impressive auspices. The first of these were perhaps the pioneer experiments of H. G. Wells in his *Outline of History* and *Science of Life*, and the most recent the Science symposia which are still in process of publication and cover in up-to-date critical reviews every phase of biology from the cell to human population problems.²

In these critical times, hastily determined policy occasioned by the military emergency may drastically retard improvement of social conditions for years to come unless everything possible is done to provide a sound scientific background in the public mind from which equitable solutions may be developed.

While the problems of age, sex, race and body type may properly be regarded in the same perspective, today the need for biological education on the subject of race is most acute. It is our present belief that much good can be wrought by correct popularization of the facts of human biology through all of the techniques now known for the spread of knowledge—formal instruction, written word, cinema, animated cartoon, radio, drama, pamphlet and slogan.

The question becomes what shall be included in a program of popular education which shall be at the same time scientifically objective and effective both among Negroes and among whites with their opposite viewpoints of approach. None can deny that a very difficult challenge exists here. If to meet it were easy, this would have been done long ago.

With all humility then, criticism is respectfully invited on the following items which appear to qualify for inclusion in an educational program in human biology as being true, objective, provocative, constructive and timely. Moreover, these items can readily be adapted for presentation at any level.

² *Biological Symposia*, Jaques Cattell Press, Lancaster, Pa., Vols. 1-9 et add.

CONTENT OF EDUCATIONAL PROGRAM*

1. *Material Universe*.—As essential background, perspective upon man's place in the universe should be supplied. This may be done by brief citation of the facts of the material universe ranging from supergalaxies, its largest units, to electrons, its smallest.³ This should serve to inspire humility with the cosmic insignificance of man, confidence with the extent and precision of universal law and order, and awe at man's ability to have gained this wondrous knowledge. This elementary astronomy and nuclear physics merely confirm and elaborate the teaching of ancient religious doctrine. A beginning of this kind has the same purpose and propriety as prayer before a meeting or the blessing before a meal.

2. *Animal Evolution*.—Next, we should present by charts the essential facts of animal evolution. Although science is today absorbed in the minutiae of the means of evolutionary change, millions are unacquainted with the fact of evolution or are indoctrinated against it. On a good chart can be shown the age of the earth as about 2 billion years, with life existent for the latter half of that time. The origin of the vertebrate stem about 500 million years ago can be seen with the line and time scale of ascent from fishes, through amphibia, reptiles and mammals to man.⁴

It will be apparent that the human body will show characters of both ancient and recent origin. Thus Just's work on fertilization was done on marine invertebrates from which the vertebrate stem branched 500 million years ago, but the results are directly comparable to conditions in man because in that tremendous span of time the basic characteristics of sperm and ovum have undergone no evolutionary change. It will also be clear that although man is the dominant form of life upon

* In the reading of this paper lantern slides were used to illustrate clearly each point developed. This profuse illustration is necessary for any general educational procedure but is neither practicable nor essential in this publication. An adequate reference has been supplied for each point not illustrated here.

³ Cf. *Life Magazine*, October 20, 1941.

⁴ W. K. Gregory in *Human Biology and Racial Welfare*, E. V. Cowdry, Ed., Paul B. Hoeber, Inc., 1930, p. 54.

earth, he is ordinarily one of the most recent arrivals upon it and one will ask to what structural gifts he owes this dominance.

3. *Distinction between Primates.*—This leads to a consideration of the higher Primates. The distinctive features of the New World monkeys, the Old World monkeys, the anthropoid apes and man may easily be remembered in such form as to show their relationships (fig. 2).

The New World monkeys have a wide (platyrrhine) distance between the nostrils, three premolar (bicuspid) teeth and a grasping (prehensile) tail. The Old World monkeys have a narrow (catarrhine) distance between the nostrils, two premolar teeth and a tail without grasping power (non-prehensile). The chest of both is deep and narrow.

The four anthropoid apes, the gibbon of Malaysia, the orang utan of Borneo and Sumatra and the chimpanzee and gorilla of Africa have a narrow distance between the nostrils and two premolar teeth, which links them with the Old World monkeys, but the chest of the anthropoids has become shallow and broad from the habit of swinging by the arms (brachiation) in locomotion, and they have lost their tails. The orang, chimpanzee and gorilla have also attained giant size.

Man has a narrow distance between the nostrils and two premolar teeth, establishing his affinity with the Old World monkeys; he has a shallow, broad chest, no tail and giant size, showing his relationship with the anthropoids; but he has adopted the erect bipedal posture exclusively and the higher portions of his brain (cerebrum) have undergone very exceptional development, features which set him apart from the rest of the animal kingdom.

4. *Anatomy of Erect Posture.*—It is important that everyone have some understanding of the prime characteristics of human anatomy both for the appreciation of the relation of structure to function in general, and as a frame of reference for the appraisal of racial characters in particular. Since the erect posture has freed man's hands for skills and mischief, and free hands with accompanying intensified and diver-

























| DISTINCTIVE FEATURES OF THE HIGHER PRIMATES | | | | | | | | | |
|---|--|--|---|---|--|--|-----------------|--|--|
| GROUP | DISTANCE BETWEEN NOSTRILS | PREMOLAR TEETH | TAIL | CHEST | LOCOMOTION | BRAIN | SIZE | | |
| NEW WORLD MONKEYS | WIDE (PLATYRRHINE)  | THREE  | GRASPING (PREHENSILE)  | DEEP NARROW  (CROSS-SECTION) | FOUR-FOOTED (QUADRUPEDAL)  | SMALL TO MEDIUM  | SMALL TO MEDIUM | | |
| OLD WORLD MONKEYS | NARROW (CATARRHINE)  | TWO  | NON-GRASPING  | DEEP NARROW  | FOUR-FOOTED  | MEDIUM  | MEDIUM TO LARGE | | |
| ANTHROPOID APES | NARROW  | TWO  | NONE  | SHALLOW BROAD  | TWO-ARMED (BRACHIATING)  | LARGE  | LARGE TO GIANT | | |
| MAN | NARROW  | TWO  | NONE  | SHALLOW BROAD  | TWO-FOOTED (BIPEDAL)  | GIANT  | GIANT | | |

FIG. 2.—Distinctive features of the higher Primates.

sified activity of the brain have together been responsible for the great cerebral development to which man owes his planetary dominance, some of the features of the erect posture may well be chosen to illustrate simpler anatomical principles.

Adaptations for the erect posture involve every region of the body but our examples will be taken chiefly from the hind limb. We note first of all that since in the bipedal position two legs are doing the work of four, the human lower limb is relatively larger and stronger than that of quadrupeds.

In the four-legged animal or quadruped, the vertebral column or spine is horizontal and presents a single slight curvature convex upward. The axis of the pelvis, which joins the hind limb to the spine, is also horizontal and the bones of the pelvis extend well in front of and behind the thigh bone or femur so that excellent leverage is afforded muscles which move the limb back and forth. The limb is approximately perpendicular to the spine (fig. 3a).

In the erect posture the human lower limb has been brought into the same straight line as the spine, but it is clear that if the trunk had been merely tilted upward, spine and pelvis being joined together, the muscles from pelvis to limb would have lost their leverage and so become useless (fig. 3b). Instead a compromise has been effected. The vertebral column has been carried up completely to the vertical position, but the pelvis has been turned upward only half way. This enables the crest of the upper part of the hip bone to protrude in front, undergoing some absolute lengthening as well, and the lower part to extend behind the thigh bone, thus preserving muscular leverage for limb motion. To compensate the failure of the pelvis to turn completely upward, the spine must bend forward slightly in the region of the loins. This feature, called the lumbar curvature, is unique to man (fig. 3c).

In the human body with the erect position, the trunk, thigh and leg are always held in the same straight line, while in the quadruped the thigh is nearly perpendicular to the trunk and the leg to the thigh. It is natural, therefore, to find in man that the muscles which hold trunk, thigh and leg in their hyper-

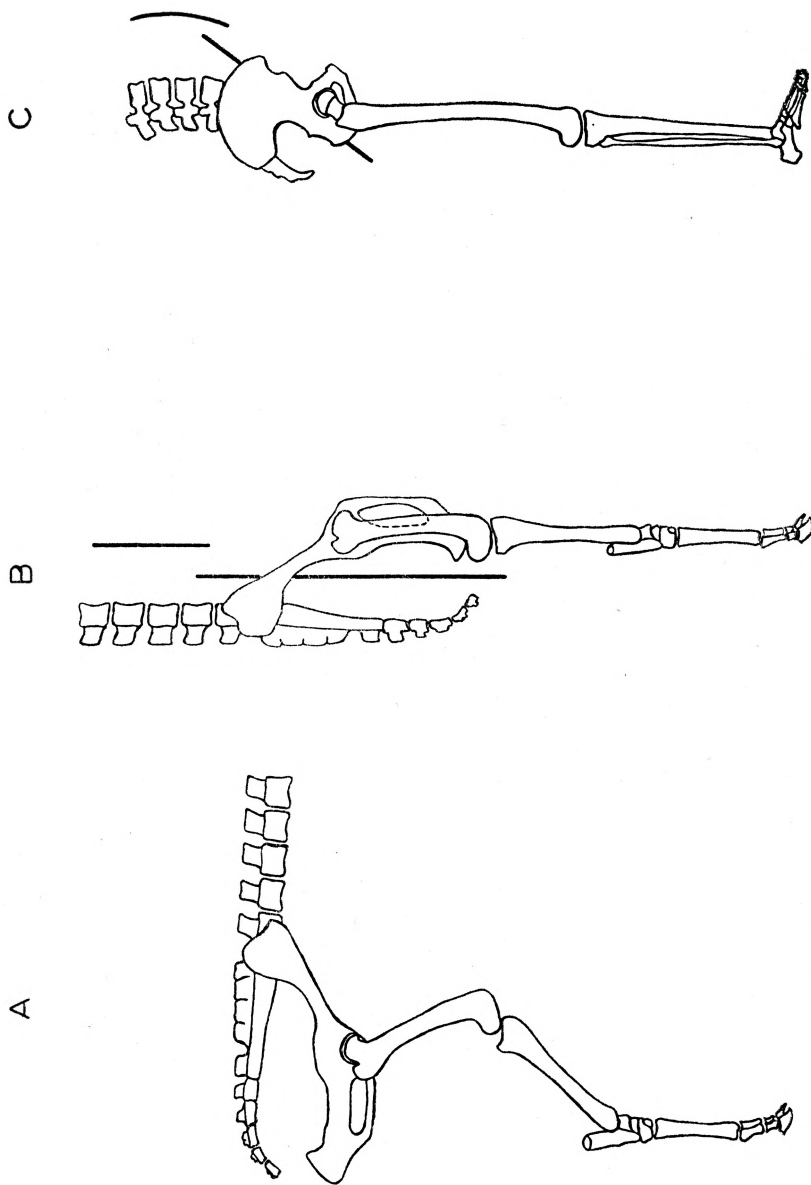


FIG. 3.—Changes in alignment of vertebral column, pelvis and bones of lower limb incidental to assumption of the erect posture. A, A quadruped (ox). B, Bones of same skeleton aligned for erect position. Note imbalance and loss of leverage for muscles from pelvis to thigh bone. In A and B axes of vertebral column and pelvic canal are parallel. C, Man. Balance and leverage retained through elongation of crest of hip bone and only partial upward tilting of pelvis. Axis of pelvis oblique to that of vertebral column necessitating lumbar curvature of latter, peculiar to man.

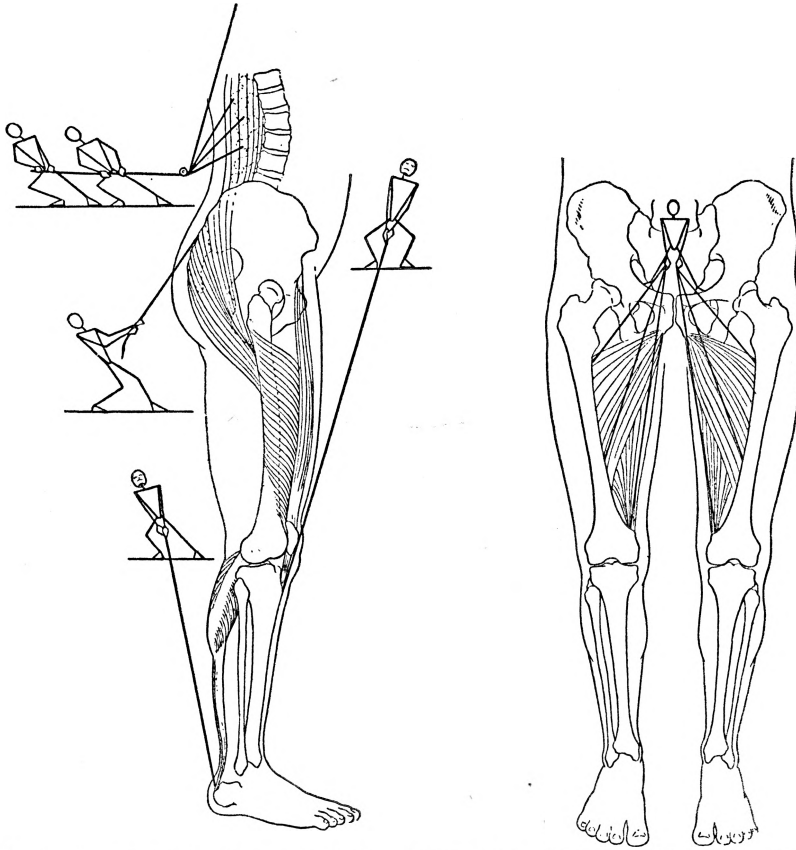


FIG. 4.—Human muscle groups exceptionally developed for maintenance of the erect posture. (Left.) Back (*M. sacrospinalis*), holds trunk erect. Buttock (*M. gluteus maximus*), holds trunk erect upon thigh. Thigh (*M. quadriceps femoris*), keeps thigh extended upon leg. Calf (*M. triceps surae*), raises heel. (Right.) Thigh (*Mm. adductores*), keeps limbs from spreading.

extended position are relatively larger in man than in any other animal, consequently the exceptional development of the muscles of the small of the back (*M. sacrospinalis*), of the buttock (*M. gluteus maximus*), of the thigh (*M. quadriceps femoris*), and of the calf (*M. triceps surae*), together with the surface prominences produced by them, are additional features peculiar to man alone (fig. 4).

Another group of muscles, exceptionally developed in man, is found on the inner side of the thigh and contribute to its

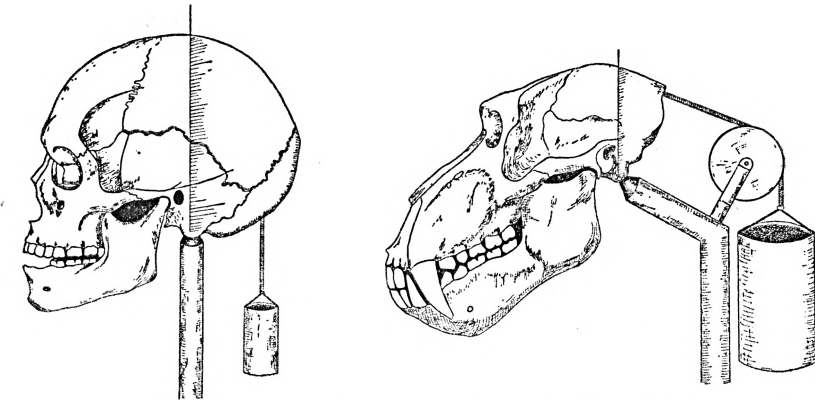


FIG. 5—Comparison of skulls of baboon and man, to show reduction in musculature made possible by the form of the human cranium and its balance upon the vertebral column. (Modified from Martin, after Mollison.)

relatively great size (*Mm. adductores*). These are attached to the pelvis above and the thigh bone below. They draw the legs together and in a two-legged animal like man are of great importance in keeping the limbs from spreading apart (fig. 4).

In the skull we see that the small brain-case and large protruding face of the pithecoïd necessitate strong bony scaffoldings on the skull for the attachment of the powerful musculature necessary to hold the head onto the body. In man, on the other hand, the greater expansion of the brain-case upward, backward and forward over the face, together with great reduction in the size of the face, has resulted in a skull which may be readily balanced upon the vertebral column and requires no extra crests for attachment of the moderate human neck musculature (fig. 5).

Now nature like man is fond of decorating a structure once she has developed it. This is manifest in the ornate plumage of many birds and the mustache, beard and eyebrow patterns of many monkeys. In one particular strain of the human family, the prominence of the nates or buttock has been adorned with an extraordinary fat pad, giving rise to the name *steatopygia*. The ladies of the African Bushman tribes are the only members of the human family so endowed nor-

mally. Despite many hypotheses, the explanation of this phenomenon is wanting and for our purposes we can be one with the Bushman males, who ascribe decorative value to the peculiarity and accord highest preferment to the most steatopygous ladies of their few remaining communities.

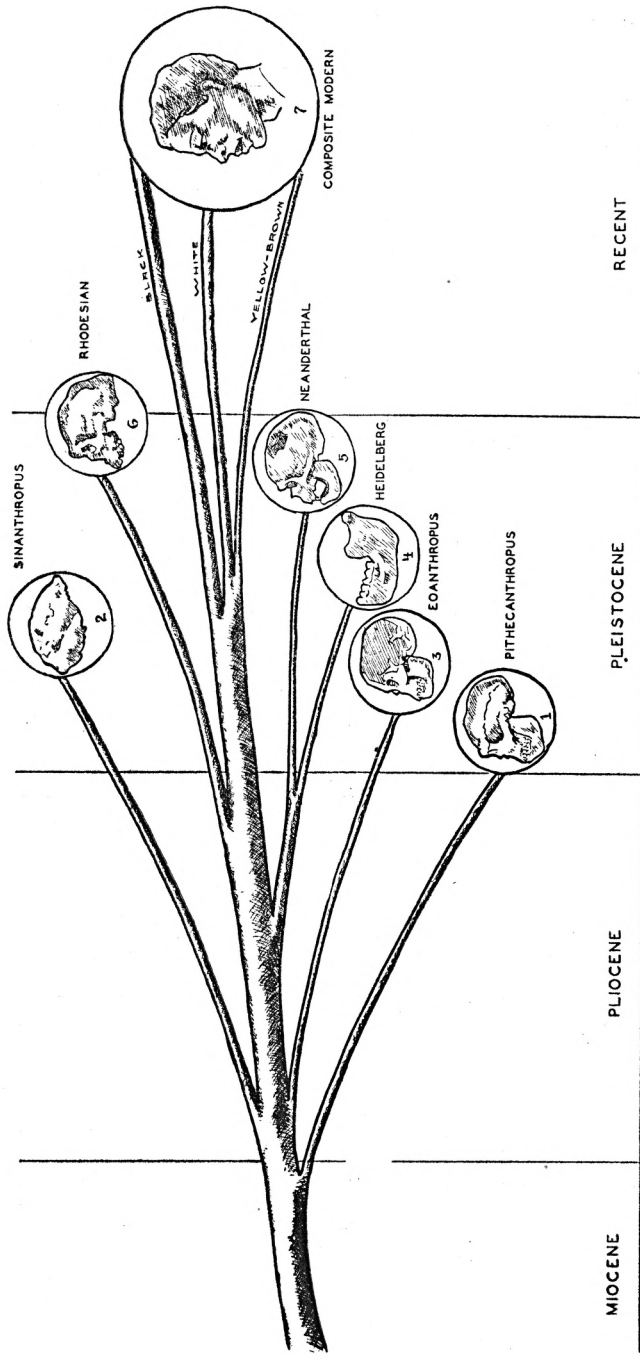
5. *Prehistoric Forms of Man.*—Equipped now with some anatomical insight, a brief introduction to the prehistoric branches of mankind may follow.⁵ There are but seven of these: Java man, Peking man, Rhodesian man, Piltdown man, Heidelberg man, Neanderthal man and Aurignacian man (fig. 6). Although detailed study of primitive man will repay all the attention one can give the subject, an initial contact of this kind can aim simply to convey through illustrations a strong visual impression of what the several forms looked like, the number and character of the specimens upon which knowledge of each is based, their wide geographical dispersion and the fact that no human remains have been found which antedate the Pleistocene or Ice Age. This does not extend back more than a million years.

The scientific names of our forerunners seem formidable but are really romantic and help in remembering relevant facts.

The name of Java man, *Pithecanthropus erectus*, comes from the Greek “*pithecos*” meaning ape and “*anthropos*” meaning man. So we interpret, the ape-man who walked erect. This is just what the discoverer, Dr. Eugene Dubois, thought about his find.

The recovered remains of *Pithecanthropus* consist of remnants of three skulls, fragments of two lower jaws, four teeth and a thigh bone, all found on the island of Java. The type was defined on the basis of the original recoveries made between 1890 and 1897 by Dubois in or near the bed of the Trinil River. A child's skull was found in Modjokerto, Eastern Java, in 1935, and the major part of a female skull salvaged

⁵ Hrdlicka, A., *Skeletal Remains of Early Man*, *Smithsonian Misc. Coll.*, Vol. 83, 1930, 379 pp.



THE HUMAN FAMILY

FIG. 6.—Schematic drawing showing: (1) presumptive relationships of members of the human family; (2) restriction of known fossil forms to Pleistocene period (Ice Age); (3) recent tendency toward fusion rather than differentiation of racial types, as illustrated by the American Negro, a composite of the three major divisions of modern man, the black, the white and the yellow-brown. Shrinkage of world boundaries favors continuance of this tendency.

from the lower Trinil beds in 1937.⁶ It is said that the latter skull was found whole by natives, who, having acquired the white man's feel for the profit motive, broke the specimen into fragments, of which they brought in 50 pieces, one at a time, so as to claim a separate reward for each.

The Pithecanthropus is the most primitive human yet discovered. Positive proof that the thigh bone belongs to the skull is lacking, but this does not detract from the importance of the skull remnants. The long, narrow form of the skull, its low vault and great brow ridges constitute a structural pattern manifest also, with variations, in the Peking, Rhodesian and Neanderthal men. The brain space or cranial capacity of Pithecanthropus is about 950 cubic centimeters. This is smaller than the average 1350 cc. of modern races (Keith), but much greater than that of any ape. The most capacious anthropoid skull, that of the gorilla, seldom exceeds 650 cc. in cranial capacity.

Peking man is called in science *Sinanthropus pekinensis*, "Sin" meaning China, "anthropos," now familiar for man, and "pekinensis," of course, the former capital Peking, near which the remains have been found.

We know *Sinanthropus* from the fossil remains of about 25 individuals, including 4 skulls, 5 fragmentary skulls, 5 lower jaws, fragments of 2 thigh bones, a collar bone and miscellaneous other specimens.

The first skull, which positively established the character of Peking man, was recovered by a Chinese anthropologist, Dr. W. C. Pei, in 1929. This discovery had been foreshadowed, however, by peculiar teeth obtained in the area having both human and anthropoid characters. The first was secured in 1903, from among items dispensed by a Chinese drug store for the cure of disease. The second was excavated in 1926. Interest was by then aroused and in 1927 a third tooth was recovered on the basis of which Prof. Davidson Black correctly

⁶ Koenigswald, G. H. R., "Pithecanthropus received into the Human Family," *Ill. Lond. News*, Vol. 101, 1937, pp. 1039-1041, 1086. Dec. 11.

described the existence of a new species of mankind. This is regarded as one of the brilliant feats of comparative anatomy.

Sinanthropus had a cranial capacity of about 1000 cc., slightly though not significantly larger than Pithecanthropus. He was anatomically much similar to the latter although in a number of details his skull was less primitive. Dr. Franz Weidenreich, the leading student of Sinanthropus, has directed attention to certain skull resemblances which indicate the blood kinship of modern mongoloid peoples, even as Dr. Ales Hrdlicka has maintained on the basis of similar resemblances that the blood of Neanderthal man flows in the veins of many modern Europeans. The thigh bone fragments indicate that Peking man had a completely upright posture. The charred condition of many of the remains suggests that he was a cannibal.⁷

Homo rhodesiensis is the Latin equivalent for Rhodesian man. He is known from a single skull found in 1921 in a locality called Broken Hill in Northern Rhodesia, South Africa. Other bones—two parts of a thigh bone, a sacrum and a shin bone—have been described as belonging to the skull, but the evidence is disputed and the skull considered alone is of major scientific import.

The skull is unique among the finds of primitive man in being recovered nearly intact. It was, incidentally, uncovered by the pick of a Negro workman who has not shared in credit for the discovery, official acknowledgment going to the white laborer whose helper the Negro was.⁸

The Rhodesian skull has a cranial capacity of about 1300 cc., near the modern average, and is remarkable in a number of ways. The great development of the brow ridges is unparalleled in any type of man. The palate is also the largest known of human forms. Ten of the 16 upper teeth present were diseased, constituting the earliest proof that dental decay is not an affliction of modern civilization. In spite of the

⁷ Weidenreich, F., "The Discovery of the Femur of *Sinanthropus pekinensis*," *Science*, Vol. 87 (1938), p. 322.

⁸ Hrdlicka, *op. cit.*

projecting brow ridges and huge palate which made for a very brutish appearance, Rhodesian man in many resemblances, chiefly in the teeth, about the temple and in the neck attachment, is nearer modern man than the more specialized Neanderthal man, so that Keith has termed him the ancestral type of modern races.⁹

Eoanthropus dawsoni is the scientific name of Piltdown man. "Eo" signifies dawn in Greek and "dawsoni" refers to Charles Dawson the discoverer. The name thus means Dawson's dawn man, a very appropriate term if it should be true as claimed that this was a form in which the part of the skull housing the brain approached the modern in size and form while the jaw remained ape-like in character. A violent scientific controversy has raged over whether or not the jaw belonged to the skull and the student still is at liberty to make up his own mind on the evidence.

It appears that the skull was found intact by workmen who were excavating gravel for road building. They thoughtlessly broke it up in sport by throwing stones at it. The fragments and gravel were subsequently shovelled onto a road under construction and rolled under a steam roller. This is one of the costliest bits of horse-play known to science.

The few fragments recovered were from two sites. The first, where the skull was found, yielded between 1908 and 1913 portions of a right parietal bone, a frontal, an occipital, two nasals, the right half of a lower jaw and a canine tooth. At the second site, about two miles from the first, a right frontal bone, an occipital and a molar tooth were found in 1915.

Assuming, as many anthropologists do, that the evidence justifies placing the jaw with the skull, the importance of this find lies in the demonstration afforded that evolution could proceed independently in the two parts of the skull, the brain-case having advanced toward the modern while the face remained simian in character.

⁹ Keith, A., *The Antiquity of Man*, Williams & Norgate, Ltd., London, 1929, p. 386.

Homo heidelbergensis means simply Heidelberg man. He is known only from a lower jaw found in the Mauer sand pit near Heidelberg, Germany, in 1907. The great importance of this find is that it can be definitely dated at about 500,000 years ago. The peculiar large pulp cavities of the teeth identify the jaw with Neanderthal man, but the jaw is more primitive than the latter in a number of respects, so that the Heidelberg specimen is recognized as representing a pre-Neanderthal phase of man.

Neanderthal man, *Homo neanderthalensis*, is the cave man or Old Stone Age man of common parlance. He is represented by skeletal remains of more than 125 individuals found over most of Europe, in Palestine and in Siberia. His artefacts or stone handiwork indicate an even wider geographical distribution, including North Africa. No one knows whence he came or why he disappeared except that modern types suddenly appeared living alongside him and have been presumed to be causally related to his extinction.

The first Neanderthal find was the Gibraltar skull unearthed in 1848, but the type specimen after which the race was named was not discovered until 1856 in the Neanderthal cave near Düsseldorf, Germany.

In this branch of the human family the cranial pattern represented by a long flat skull with overhanging brow ridges attained its most capacious development. The cranial capacity of some Neanderthals exceeded the modern average of 1350 cc., e.g., 1620 cc. for the La Chapelle Neanderthal, while the thoroughly modern Australian skull is of smaller capacity than the Neanderthal average.¹⁰ The proportionate size of the several lobes of the Neanderthal brain, however, was different from that of modern man.

Neanderthal man was in varying degree characterized by several other features, most obvious of which were the large pulp cavities of the teeth (taurodontism), a front to back flattening of the thigh bones (platymeria) and a side to side flat-

¹⁰ Howells, W. W., "Fossil Man and the Origin of Races," *Am. Anthropologist*, Vol. 44 (1942), pp. 182-193.

tening of the shin bones (platycnemia). These specialized characters have caused the Neanderthals to be regarded as having branched from the ancestral tree of modern man in the very remote past, although as stated previously, unmistakably neanderthaloid features in some modern heads have been taken by some anthropologists as evidence that neanderthal and modern peoples have mingled their blood before the dawn of history.

Thus we come to modern man, the oldest representatives of whom are called *Homo aurignacensis*, after Aurignac, a locality in France. The Cro-Magnon finds, consisting of the bones of an old man and 4 other individuals recovered in 1868, may be cited as representative of these people. While the Aurignacians showed significant individual variability in physique, as do moderns, they were generally of tall, robust build, with large brains modern in all structural aspects.

Our principal interest here thus turns to the time at which they lived. That Aurignacian man lived as long ago as 95,000 years is undisputed. Certain mooted finds of modern type skulls, most particularly that of Galley Hill, appear to indicate an antiquity for modern man greater by an additional 100,000 years. Cultural remains much older than any discovered human fossil are known and there is no doubt that modern man is much older than chance fortunate discoveries have yet proved him to be.

The point of significance here is that man had attained anatomically his present physical status in brain and body at least 95,000 years ago, and yet the beginnings of our civilization do not antecede 8,000 years past by the most generous estimate. This is of greatest importance in the study of human progress because it is conclusive evidence that the possession of a given model of brain and physique alone is no index of cultural attainment or possibilities.

6. *Brain Size*.—Considering next the important subject of brain size, the oft cited facts may be admitted at once that people of exceptional ability tend to have larger than average brains, that men tend to have larger brains than women, and

that some men of genius have had very small brains (Anatole France) while many morons have extremely large ones. Although the subtleties of anatomical analysis of the brain may be adequately simplified for the layman, this would require more extensive treatment than is necessary in this connection. It will suffice to point out: (1) that modern neurology has been unable to make inferences as to mental capacity from the cellular structure of the brain nor have any stigmata of "superiority" or "inferiority" been identified; (2) that the brain like all other vital organs has a great reserve capacity. To survive one needs but a third of one lung, a tenth of one kidney, an eighth of the liver and cardiac power, a fraction of ovary or testis, no spleen and about four of the twenty-six feet of intestinal tract. Sir Arthur Keith has estimated that most individuals use only about one-eighth of the gray matter of their brains (cerebral cortex) in daily life. Certainly no one knows how much brain is necessary to be "successful" in modern civilization. The fact that the age of attainment of distinction varies greatly in different occupations is of significant collateral interest.

7. *Racial Differences.*—We come thus to the matter of racial differences and taking as an example the extremes manifest in the form of the nose, it is clear that here one does not deal with structural differences of survival value such as were encountered in the adaptive modifications for the erect posture. The nose of the tropical Pigmy is very broad, while that of the Alpine Tyrolean is extremely narrow. The bridge of the Armenoid nose is very high while that of the Bushman is hardly elevated above the face.¹¹

One can admit that the narrow nose is better suited for slow intake and easier warming of air in a cool climate, while a more ample aperture is permissible in a warmer climate, yet one could not infer that the Bushman could not survive in the Alps or the Tyrolean on the Kalahari because of their nasal

¹¹ Gregory, W. K., *Our Face from Fish to Man*, G. P. Putnam's Sons, N. Y., 1929, p. 170.

form. In general, characteristics used as racial criteria have taxonomic rather than survival value.

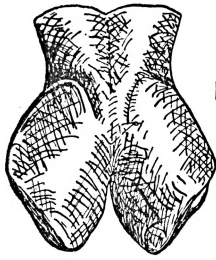
Since racial differences are popularly conceived to be of such pervasive significance, however, it will be appropriate at this point to treat two features which are readily shown to be based on fallacious concepts. A distinguished medical author not long ago asserted that the possession of a one-piece cartilage in the nose was a reliable test of Negro blood even to the dilution known as octoroon (one-eighth Negro—seven-eighths white). He stated that all other groups had a split cartilage in the nose.

A moment's examination of the accompanying chart showing the phylogeny of the nasal cartilages shows that not only do all men have two cartilages in the nose, but all apes and monkeys as well (fig. 7). The error was probably due to the fact that the cartilages might not be felt as easily in noses covered by thick skins as in those with thin skin, but whatever its cause, the grossness of the error, which was very widely circulated, is clear.¹²

As another example, the assertion that the success of the recent conspicuous crop of Negro track and field stars was due to a longer heel bone than that of the white may be disposed of. Here is a roentgenogram of the heel bone of Jesse Owens, the champion sprinter and broad jumper, compared with that of an average white of even shorter stature selected at random (fig. 8). It is quite clear that Owens had a shorter heel bone than this unselected white whereas the expectancy under the allegation would be that Owens have a long heel because he is a Negro and an exceptionally long one because he is a champion.

The futility of basing conclusions about athletic capacity on racial characters is further evident from this photograph of Owens and Frank Wycoff (fig. 9). These men are co-holders of the world's record of 9.4 seconds for the 100 yard dash. The Negro calf muscle characteristically tends to have a short belly

¹² Cobb, W. M., "Your Nose Won't Tell," *The Crisis*, Vol. 45 (1938), pp. 332, 336.

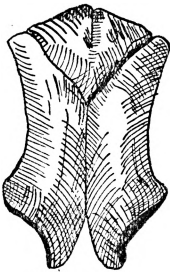


DOUROGOLIS

NEW WORLD MONKEYS

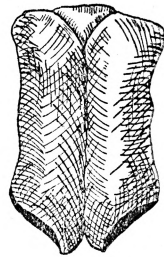


SPIDER MONKEY

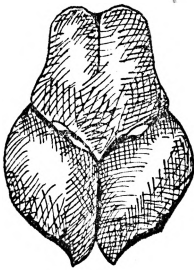


MACAQUE

OLD WORLD MONKEYS

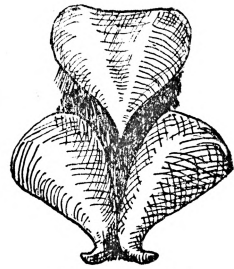


LANGUR

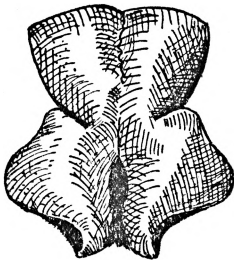


ORANG UTAN

ANTHROPOID APES

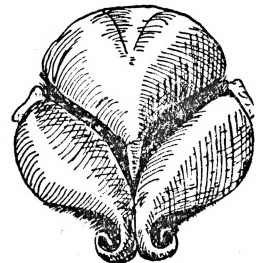


CHIMPANZEE



FETUS, 7 MO.

MAN



ADULT

FIG. 7.—The cartilages of the nose in monkeys, apes, and man. (Modified from Schultz after I. C. Wen.)

and long tendon whereas the white has generally a long belly and short tendon but this photograph shows a Negro with a long bellied, short tendoned calf and a white man with a short bellied, long tendoned calf, both of whom have run the standard sprint in world record time.¹³

Many other examples might be cited of the error resulting from the use of race undefined or of specific racial traits as indices of qualities to which race has no organic relation.

Race is a biological reality, not a myth, and as such is a very proper object of scientific study. No harm can result from the objective investigation of one of the most obvious aspects of human variation and much good can be derived from the full and honest exposition of the nature and import of racial differences. These have been shown to involve much more than surface characters and no one knows their fullest extent. It is known, however, that racial traits have in themselves practically no survival value in life as man lives it today. Race as a biological is no index of physical, mental or cultural capacity.

8. *Measurements of Capacities.*—Physical superiority in any line is the product of innate capacities and training or conditioning. Certain of these capacities can be measured by scientific tests. The speed of the knee-jerk reflex may be used as an example. If a person crosses one leg over the other in ordinary fashion and taps the upper limb just below the knee cap, the tapped limb will jump slightly. This reaction is termed the knee-jerk (patellar tendon reflex). Its speed may be measured by a device which determines the time interval between the tap and the movement of the limb. It has been found that a direct relationship exists between the speed of this reflex and running events in track, sprinters showing the

¹³ For additional discussion see: Cobb, W. M., "Race and Runners," *J. Health and Phys. Ed.*, Vol. 7 (1936), pp. 1-8. Readers who would explore further the physical aspects of the Negro will find useful the following reviews: Cobb, W. M., "The Physical Constitution of the American Negro," *J. Negro Educ.*, Vol. 3 (1934), pp. 340-388; Cobb, W. M., "Physical Anthropology of the American Negro," *Am. J. Phys. Anthropol.*, Vol. 29 (1942), pp. 113-223; Lewis, J. H., *The Biology of the Negro*, Univ. of Chicago Press, Chicago, Ill., 1942, 433 pp.

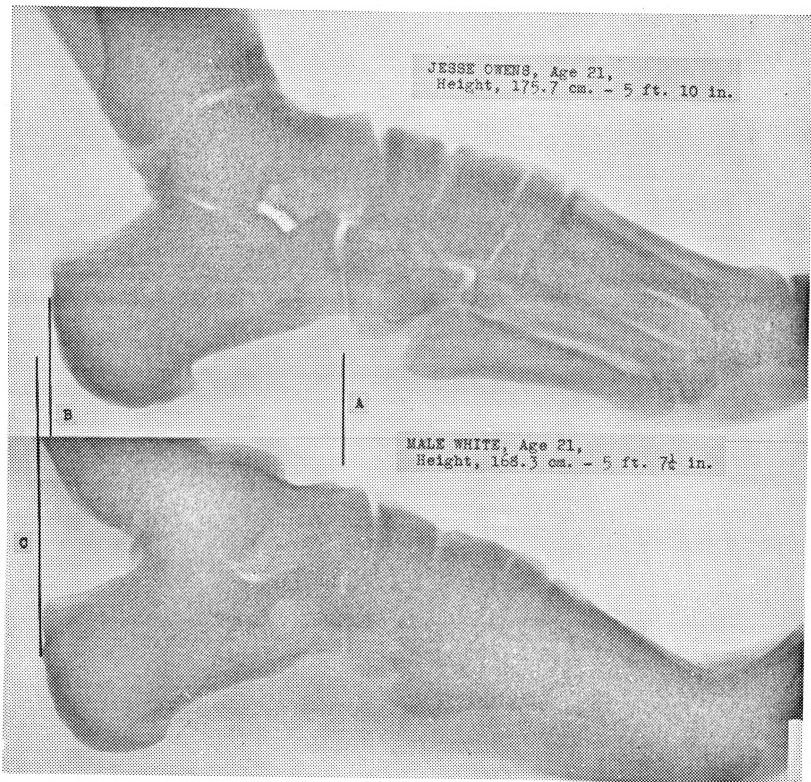


FIG. 8.—Roentgenogram of the foot of the sprint and broad-jump champion, Jesse Owens, compared with that of an unselected white male, to show absence of protruding heel bone in the Negro champion.

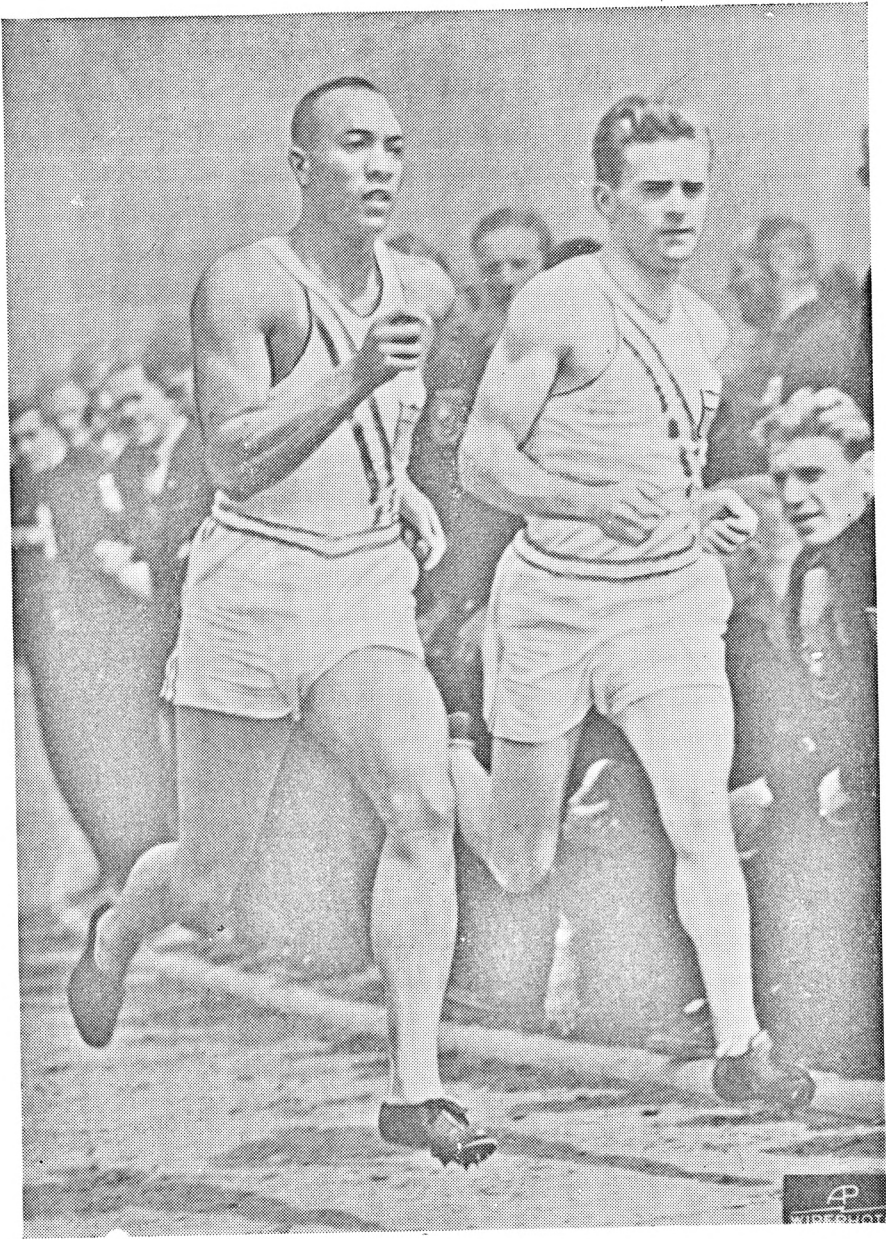


FIG. 9.—Photograph showing legs of Jesse Owens (left) and Frank Wycoff (right) co-holders of world's record for the 100 yard dash. Note long (Caucasoid) calf in a Negro and short (Negroid) calf in a white. (Courtesy, Press Association, Inc.)

shortest reflex time and distance men the longest.¹⁴ In a sample of 82 Negro and 82 white subjects it was found that the Negroes showed a significantly shorter reflex time.¹⁵

Would this justify the conclusion that Negroes as a group were adapted for the sprints and coaching them for the mile would be a waste of time? Obviously not, as the achievements of both white sprinters and Negro distance men deny, yet such is the pattern of the fallacious thinking which conditions many popular attitudes on the association between race and other matters. Public educational measures can be of great value in showing that the results of physiological tests have implications only for matters closely correlated with the items tested.

9. *Human Hybridization.*—The evidence of both history and prehistory attest that human groups in contact have always mingled their bloods. The results of this mixture have been viewed with all shades of opinion, ranging from enthusiastic optimism over what have been interpreted as evidences of hybrid vigor to lugubrious pessimism over alleged signs of racial decay, with intermediate affirmations that race mixture has had good results in some cases and bad in others. The public should by all means have the available facts clearly set forth and attention may be directed to a wide variety of items.

The evidence of genealogies involving known degrees of admixture may be considered first. Day's families are the best documented of the few series available with this type of data, which is very difficult to obtain in scientific form.¹⁶ One may search the interesting photographs of this monograph in vain for evidences of "deterioration" in the mixed progeny, who in many cases appear decided improvements over both sides of the ancestral crossing.

Next reference may be made to scientific studies which

¹⁴ Lautenbach, R., and W. W. Tuttle, "The Relationship between Reflex Time and Running Events in Track," *Res. Quar.*, Vol. 3 (1932), pp. 138-143.

¹⁵ Browne, R. L., *Res. Quar.*, Vol. 6 (1935), pp. 121-126.

¹⁶ Day, C. B., *Negro-White Families in the United States*, Harvard Univ. Press, Cambridge, 1932.

have been made of a number of kinds of race crossing. These include: Polynesian-white; Australian-white; Indian-white; Negro-white; Dutch-Hottentot; Mongoloid-white; and Chinese-white crosses. In a succinct evaluation of the details of these studies Ashley-Montagu states, "It is certainly unequivocally clear, to those who are capable of viewing the evidence dispassionately, that biologically the offspring of mixed unions are, on the whole, *at least* as good human beings in most respects, and better in some, than their parents."¹⁷

This pronouncement gains weight from the views of several distinguished scientists. In a discussion of the biological and social consequences of race crossing, the geneticist, W. E. Castle, in a much quoted statement has said, "So far as a biologist can see, human race problems are not biological problems any more than rabbit crosses are social problems. The rabbit breeder does not cross his selected races of rabbits unless he desires to improve upon what he has. The sociologist who is satisfied with human society as now constituted may reasonably decry race crossing. But let him do so on social grounds only. He will wait in vain, if he waits to see mixed races vanish from any biological unfitness."¹⁸

In referring to Mrs. Day's aforementioned study, the anthropologist, E. A. Hooton, says, "I cannot see that these data afford any comfort to those who contend that miscegenation between Negroes and whites produces anthropologically inferior types. There is nothing mysterious or unnatural in the mixture of races and nothing very extraordinary in the physical results of such mixtures."¹⁹

Franz Boas, one of the foremost modern anthropologists, has commented, "If we were to select the most intelligent, imaginative, energetic and emotionally stable third of mankind, all races would be represented,"²⁰ and has seen no harm

¹⁷ *Op. cit.*

¹⁸ *Am. J. Phys. Anthropol.*, Vol. 9 (1926), pp. 145-156.

¹⁹ E. A. Hooton, in C. B. Day, *op. cit.*, p. 106.

²⁰ Boas, F., *Anthropology and Modern Life*, W. W. Norton Co., N. Y., 1928, p. 75.

for the United States in the promotion of homogeneity in the population by the assimilation of the various elements in it, including the Negro.

Since racial traits are hereditary in nature, an understanding of the principles of modern genetics can contribute much to clarification of the realities and vagaries of the racial concept and the implications of racial mixture. An elucidation of these principles in simple terms is entirely practicable and an essential item in any educational project in human biology.

10. *Comparative Study of Behavior*.—Just as comparative anatomy shows the relationships between our bodily structure and that of other animals, so comparative psychology reveals the roots and patterns of human behavior, not only in other mammals but in birds, reptiles, amphibia, fish and insects.²¹ In the lower forms it is possible to analyze separately and in less complicated form many of the drives responsible for human behavior.

For instance, there are among incubator chicks of the same breed and sex, hatched at the same time, no race problem, no class struggle, no socio-economic hierarchy, or any non-biological differentials, yet the element of dominance as a fundamental of behavior is fully demonstrated in the pecking order.²² This is established by competitive elimination alterations which begin soon after hatching and determine who can peck whom, even as dominance order among the small boys of a not too good neighborhood is determined by impromptu engagements which show who can lick whom.

Human social problems cannot be solved without being understood, and so much insight into our behavior can be gained from comparative psychology that the import of the findings of this young science should be disseminated as widely as possible. Many stereotyped associations of specific behavior with age, sex, race or type, as manifest in colloquialisms like

²¹ Crawford, M. P., "The Social Psychology of the Vertebrates," *Psych. Bull.*, Vol. 36 (1939), pp. 407-446.

²² Murchison, C., "The Experimental Measurement of a Social Hierarchy in *Gallus domesticus*," *J. General Psych.*, Vol. 12 (1939), pp. 3-39.

decline and rise. The birth-rate is commonly regarded as representing the fertility of a group, but this is only partly true and it is desirable that the layman understand this fact. In the United States, the Negro birth-rate has been consistently higher than the white, and differentials in birth-rate between groups differing in economic status, education and religion have been demonstrated. Careful investigation has shown that all of these differences are due not to variation in natural fertility but to "the relative prevalence and effectiveness of the efforts made to prevent conception, correlatively aided by the relative frequency and postponement of marriage and the practice of criminal abortion and to practically nothing else."²⁷ This approach presents a realistic aspect of birth control which is not yet but certainly should be appreciated by the general public.

12. *Population Trends*.—The end results of human multiplication as reflected in population size are a matter of fundamental importance and a subject of much speculation by people in all walks of life. Past predictions from both learned and unlettered sources have so often proved wrong, as witness dire forecasts of the Negro's early extinction from various causes and the deteriorative consequences anticipated from the high fecundity of immigrant groups, that it would certainly be of advantage for the public to be correctly informed as to the light science can throw upon the subject.

Population trends are most obviously indicated by periodic counts such as the census represents. In the United States these counts have been very useful in this connection. The decennial record has shown in respect to the white and Negro groups that both have increased regularly in absolute size, both now show declining rates of increase and that the Negro has steadily declined as a percentage of the total population.²⁸

Between 1930 and 1940, however, the Negro rose from 9.7 to 9.8 per cent of the population. What is the meaning of this

²⁷ Pearl, R., *op. cit.*, p. 250.

²⁸ Hall, C. F., "Negroes in the United States, 1930-1932," U. S. Govt. Printing Off., Wash., D. C., 1935, p. 1.

one tenth per cent change? Myriad factors possibly contributory to the result spring at once to mind—increased accuracy of count, reduced immigration, age and sex distribution in Negro and white populations, speed of succession of generations in the two groups, effect of increase in average duration of life, etc. It is clearly apparent that it is a very complex and difficult matter to make a scientific prediction of the future numbers of any population group. Yet not only can the probable weight of all the factors just mentioned and many more be evaluated and made clear to the layman but long term over-all predictions can be made, the principle of which can be understood by any intelligent person and the implications of which are of greatest interest to anyone. No effort could be held wasted which attempted to convey such information to the general public, especially as the subject of population growth and density has such world wide importance now and for the future.

One method by which comprehensive predictions of population growth can be made is a mathematical device called the logistic curve. If one alter the capital letter S by holding its horizontal lower limb fixed and pulling its horizontal upper limb straight to one's right until the oblique part of the letter leans forward instead of backward, he will have a good idea of what this curve is and means. If the reader will draw on a piece of scratch paper a logistic by these directions, we can now represent the growth of a population of any living thing, be it flies or human beings, as points along this curve. Starting from the bottom and left hand side, movement along the curve upward in the vertical direction will mean increase in numbers of our organism and movement lateralward to one's right will represent lapse of time. We see that any growing population will increase at a rising rate for a certain length of time and then the growth will gradually slow until a plateau is reached when the organism is able to maintain the numbers it has reached but cannot increase further. This means that the checks on population increase mount proportionately to population growth until they finally equal the reproductive

powers of the group. This very significant principle was first propounded by Verhulst in 1838 but was forgotten until rediscovered independently by Pearl and Reed in 1920.²⁹

The latter authors have made most interesting applications of this curve in predicting the future population of the United States and the method has been used by other investigators.^{30, 31, 32} The results of different calculators approximate the same figures for the white and Negro groups in the United States. They indicate that the total population of this country will stabilize near the year 2100 at about 194 million people of whom 180 million, 92.5 per cent, will be white and about 14 and a half million, 7.5 per cent, will be Negro.

Students of population frankly admit that all such predictions are speculative and may be invalidated by cataclysmic conditions affecting a population such as war or pestilence, but any impartial examination of the evidence indicates that they supply a very valuable approximation of reality. The estimates above certainly constitute food for thought.

Pearl has gone further and applied the logistic curve to the growth of the world population with the indication that the population of the earth will become relatively stable in about the year 2100 at about 2,645,500,000 people.³³ It is, of course, impossible to predict the effect of the lag in human reproduction incident to the casualties and separations of the present war and its aftermath. The important points are that the numbers of mankind on the earth may not be expected to increase indefinitely and that we have very useful tools for calculating what his limits may be under quite a range of circumstances, not only for the earth as a whole but for all manner

²⁹ Miner, J. R., "Pierre-Francois Verhulst, the Discoverer of the Logistic Curve," *Human Biol.*, Vol. 5 (1935), pp. 673-689.

³⁰ Reed, L. J., and R. Pearl, "On the Summation of Logistic Curves," *J. Royal Statist. Soc.*, Vol. 90 (1927), pp. 725-746.

³¹ Pearl, R., and L. J. Reed, "The Logistic Curve and the Census Count of 1930," *Science*, Vol. 72 (1930), pp. 399-401.

³² Gover, M., "Increase of the Negro Population in the United States," *Human Biol.*, Vol. 1 (1939), pp. 263-273.

³³ Pearl, R., *op. cit.*, p. 258.

of groups upon it. If these tools are well used they may help considerably in the adjustment of human population problems without the recurrence of crude and temporary placebos such as war and minority suppression or the degradation of individual opportunity attendant upon the reproductive wastage in overcrowded countries where practically no contraception is practiced.

13. *Population Distribution*.—In the study of the changes that must be made to ensure a secure, just and progressive society for the world after the war, two important facts which should be in the minds of all whose judgment may affect such changes are that the present land area of the earth of approximately 52 million square miles may be regarded as fixed and that the present population of the earth is very unequally distributed on this land surface, over half the world population living on 5 per cent of the land. Indeed, 81 per cent of the land area has a population density of only 9 persons per square mile, representing but $18\frac{1}{4}$ per cent of the world population.³⁴

There is no indication that this concentration of population in small areas has reached its limit. Two factors may be mentioned in this connection. One is the "stay-at-homeness" which many groups of modern human beings seem to manifest even in the face of serious overcrowding. This has been very striking in the case of India, where of a total of $350\frac{1}{2}$ million people enumerated in the census of 1931, less than a million were living away from their birthplaces.³⁵ In the United States the descendants of immigrants have been shown to tend to stay in the regions where the first arrivals settled.³⁶

The other factor is that the modern trend to city dwelling has not abated. Urbanization is in many ways a voluntary matter made possible by technological achievement. The

³⁴ Pearl, *op. cit.*, p. 268.

³⁵ Wattal, P. K., *The Population Problem of India*, Bennett, Coleman & Co., Bombay, 1934, p. 123.

³⁶ Carpenter, N., *Immigrants and Their Children, Census Monograph VII*, U. S. Govt. Print. Off., Wash., D. C., 1927.

enormous concentration of human beings in large cities is totally dependent upon the constant efficient functioning of such complex entities as their transportation systems and water supply. It is quite obvious that technical knowledge will permit much more urbanization than exists at present. It would seem to be entirely up to man to decide how he wants to live in the future.

14. *Resources of the Earth*.—This brings us to the realization that there are no obstacles but man himself to the achievement of a world in which every child would be born with a good hereditary endowment and a fair chance to develop his potentialities and to enjoy what are held the good things of life.

Man has many reasonably certain constants upon which to plan such a future.³⁷ Astronomy gives the relieving assurance that the possibilities of cosmic impact for our planet are extremely small, and that we may look forward to as long a prospect of future time as our geologic past of two billion years. Geology indicates that our total land mass will remain about the same though not necessarily distributed in the same way. One cannot foresee when our needed resources will be exhausted because there are now available processes for making substitutes for non-renewable resources, such as coal, from renewable ones, like corn. Bernal has estimated that the cultivation of two billion acres of land by modern methods, less than half the present cultivated area of four billion, two hundred million acres, could afford an optimal food supply for the entire population of the earth.³⁸ Two billion acres is less than 12 per cent of the present land area. Future increased yields from progress in agricultural research should dispel any fear that population increase would place an impossible burden upon available sources of food.

All that is necessary to effect such security of existence for the human species is that man organize himself so as to be

³⁷ Mather, K. F., "The Future of Man as an Inhabitant of the Earth," *Sigma Xi Quar.*, Vol. 28 (1940), pp. 1-14, 20.

³⁸ Bernal, J. D., *The Social Function of Science*, New York, 1939, p. 347.

able to take advantage, for the common weal, of his different necessities which are unevenly distributed over the earth's surface. He has not yet effected stable mechanisms for doing this. Imperfect appreciation of many of the fundamentals of human biology are one of the reasons why.

15. *Constitution and Ageing*.—The successful conquest of most of the infectious diseases, which as a lot have been the principal decimators of humanity in the past, together with the remarkable advances in knowledge of nutrition, have in recent years given an entirely new aspect to the national outlook on health and life. The average person's chances of surviving to advanced years are much better than a generation ago, hence there is great public interest in how the human machine should be built to run long and well, on the one hand, and on the other, in the pathology of later life when the machine as a whole or in parts begins to wear out. Thus the essential facts on these topics must be a part of a general educational program in human biology.

The durability or capacity for longevity of the human body appears related primarily to the quality of the initial materials which go into it. The studies of the Pearls³⁹ and others have shown that the best insurance for long life is to have had long-lived ancestors. This does not, of course, take into account interruption of life by external or controllable causes.

But there are gross plans of bodily organization represented by the lean, muscular and fat extremes, which have different physiological and survival capacities. The causes of these major differences in form, the details of their potentialities and the relationship of such matters to the endocrine glands, diet and other causes, constitute an absorbing current problem.⁴⁰

The importance of improving our knowledge of how the body is best maintained for long service and how and where it

³⁹ Pearl, R., and R. DeW. Pearl, *The Ancestry of the Long-Lived*, The Johns Hopkins Univ. Press, Balto., 1934, 168 pp.

⁴⁰ Tucker, W. B., and W. A. Lessa, "Man: A Constitutional Investigation," *Quar. Rev. Biol.*, Vol. 15 (1940), pp. 265-289, 411-455.

tends to wear out is best illustrated by certain census data. In 1900 but 17.8 per cent of the population of the United States were 45 or more years old. In 1940, 26.5 per cent were over 45 and the prediction is that by 1980, persons 45 and above will comprise 40.4 per cent of the total population. This aging of our population is even more strikingly shown by the fact that the number of individuals 65 or over rose from 6,633,805 in 1930 to 8,956,206 in 1940.⁴¹

Clearly then, the Townsend movement had a basis in biological fact deserving of the most careful attention. Regarded from another angle, the minority problems of the more than nine million sexagenarians affect nearly as many people as the minority problems of the thirteen million American Negroes. Wider general knowledge of the magnitude of the age classes in the total population should aid in securing for them the public attention they should have.

FINAL CONSIDERATIONS

Dewey⁴² has aptly pointed out that education, like food, is a biological necessity to man. The present discussion has endeavored to set forth the necessity of general public education in human biology as an aid to the rational and adequate solution of the problems affecting man's future on the earth. A partial list of topics which should be included in a program of biological education has been suggested, with limited factual treatment of the significance of each. It is held evident that all techniques known for the spread of information may be successfully used in such a project, so that the essential facts on every phase of human biology can be correctly adapted for the understanding of all classes of people.

Human biological phenomena have been presented as phases of the basic human variants of age, sex, race and body-type. This approach has been used because it is inclusive and shows in proper objective perspective the nature of the prob-

⁴¹ Stieglitz, E. J., *Report of a Survey of Active Studies in Gerontology*, Nat. Inst. Health, U. S. Pub. Health Serv., Wash., D. C., 1942, 62 pp.

⁴² Dewey, J., "The Influence of Education," in E. V. Cowdry, *op. cit.*, p. 469.

lems associated with these variants, some of which are viewed with emotional imbalance by the general public, particularly in the case of race.

The state of current knowledge in respect to each of these variants has been cited and it has been shown that both the perception of need and the execution of public educational measures concerning each of them have been quite irregular. Most conspicuous and paradoxical has been the almost total neglect of dispassionate factual exposition of the variant "race." Elementary considerations pertaining to this variant have been stated.

The orientation and content of the material suggested have been chosen with the aim of attaining scientific objectivity and accuracy and impartial appeal to both Negro and white citizens of the United States. The topics constitute merely a framework to which additions and revisions according to opportunity and indication could be made at any time.

It is believed that much good might be accomplished if provision for an educational course of the suggested general content were incorporated into the routine orientation instruction given members of all branches of the armed forces,⁴³ and into the future platforms of the political parties of the United States as an item to be attended for the country as a whole.

⁴³ Cf. Cobb, W. M., "Physical Anthropology and the Negro in the Present Crisis," *J. Nat. Med. Assn.*, Vol. 34 (1942), p. 187.

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