# ANTHROPOLOGY

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## The Sacrum of the American Indian

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### Introduction

This paper represents an interim report on research in progress on the variability of the human sacrum, with regard to phylogenetic history, racial, developmental, age, sexual and constitutional characteristics. I would like to confine myself to a few general remarks and a brief discussion of the interrelationship of various aspects of the sacrum, with special reference to be placed upon the expected findings concerning a series of prehistoric American Indians of the Middle Mississippi culture of the Middle West. Since the study has only been recently initiated, most of the conclusions drawn at this time will be tentative and remain to be substantiated quantitatively in a future paper. Nevertheless, a number of conclusions which seem to reflect obvious trends are offered here.

### Evolutionary and Phylogenetic Interest

Of all the bones of the vertebral column, it is especially the sacrum that evokes continued interest because of its evolutionary role in the functional changes of the pelvis; changes exemplified by the primitive mammals becoming viviparous, and the assumption of upright gait in the early hominids.

The phylogenetic interest in the sacrum centers around a study of morphological variability in prehistoric and present varieties, or biological populations, of man. The interest therein being the determination of the qualitative and quantitative significance of the retention of ancient characteristics that reflect the history of various evolutionary lines. Thus, variations in the number of sacral vertebrae represent problems in segmentation that extend back to primitive vertebrates. Sacral segments, for example, are normally five in number. They may, however, vary from four to six. Transitional forms also exist wherein there is a lumbarization of the first sacral vertebra. Other characteristics that reflect the history of various evolutionary lines are the following: development of the pelvic girdle, which extends back to the early amphibians who emerged from the sea; stabilization of the pelvic girdle for terrestrial locomotion and support, extends back to the primitive reptiles; the changes from oviparous to viviparous repro-

duction, which involved a widening of the pelvic inlet to allow for the passage of the foetal head, extend back to the early mammals; the adaptations from a terrestial to arboreal locomotion, extend back to the early primates; and finally, with the shift back to the ground and upright gait, we reach the early hominids.

### Sexual Differences

It is obvious that a complex structure with multiple functions, such as the entire pelvic girdle, reflects the interplay of many mutational, adaptive and functional factors. Thus, with an increase in the gestation period in higher mammals, and the assumption of a bipedal form of locomotion, a number of adjustments had to be made. With a widening of the pelvic inlet, in which a transverse broadening of the sacrum is involved, there is a weakening of the sacro-iliac joint in the female. In order to compensate for the lesser involvement of fewer sacral elements in the joint, some of the ligaments become heavier. This is so in the case of the inferior sacro-iliac ligament, which found a firmer attachment through the development of a pre-auricular sulcus, in the female. In the male, the facet of the sacro-iliac articulation may

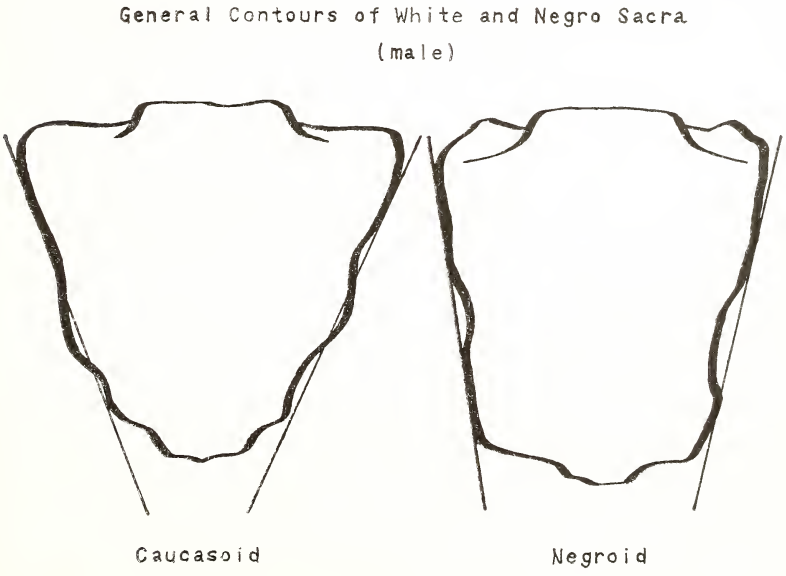


Figure 1. White and negro sacra.

involve from three to three-and-a-half sacral vertebrae in length, as contrasted with the two-and-a-half to three which are usually involved in the female. This particular trait, however, may exhibit significant or non-significant differences per population. Trotter, for example, found no sexual differentiation in the extent of the articular surface in a

sample of Ancient Egyptian sacra. Further sexual differences include a shorter and more proportionately broader sacrum, with a more marked sacro-vertebral angle in the female. The female sacrum is more obliquely set than in the male. Generally, the sacral curve is more uniform in the male throughout its entire length, whereas the female sacrum tends to be flatter above, and more accentuated below.

### Racial Differences

Racial differences also exist, to a greater or lesser degree, as may be demonstrated by the following generalizations made between the Caucasoid and Negroid sacrum, (Fig. 1). The sides of the Negroid sacrum are noticeably more parallel than the more slanted Caucasoid sacrum. Thus, if lines were to be drawn along the lateral aspects of the sacra, a lesser angle would be obtained for the Negroid specimens as compared to the Caucasoid samples. In addition, the Negroid sacrum is longer in proportion to breadth, with less promontory, and narrower alae than the Caucasoid sacrum. There also appears to be a greater downward slant of the alae in the Negroid sacrum.

As per Radlauer, racial differences were found for a series of twenty characteristics, consisting of indices and angles. By drawing a horizontal axis which represents the mean value, and with fluctuations on each side of the horizontal, Radlauer graphically indicates the position of Mongoloid groups to other, non-Mongoloid groups, and the position of South American Indian groups to other Mongoloid varieties. In this way, a number of continuous variations may be assessed at a glance. Of the fourteen indices, (six of the twenty characteristics had no data for Asiatics), in five cases the means of the South American Indian series are closer to those of Asiatic series such as Malays, Burmese, Chinese, Japanese, than they are to the means of Europeans. In six cases, the reverse is true, whereas in three indices, the values for South American Indians, Asiatics, and Europeans are nearly identical.

The above data, in which only a number of South American Indians and Asiatic series are lumped, can therefore only at best serve as a rough indication of the intermediate position of South American Indians between Europeans and Asiatics. Additional data in which a number of biological populations on a varietal level are compared, may reveal more historically meaningful results. This may especially be so in the contrasting of North American Paleo-Amerind with Paleo-Asiatic, and North American Ceno-Amerind with later Mongoloid varieties. A comparison of this sort takes into account the populating of the New World as being a continuous series, or waves, of migrations, as opposed to one single movement.

### Conclusions

At present, all indications point to the facts that (1) different American Indian varieties exhibit little differentiation, (2) that the sacrum of the American Indian is essentially the same as that of other Mongoloid varieties, (3) that the sacrum of the Mongoloids most closely

resembles that of the Caucasoid varieties, (4) that the greatest dimorphism is to be found between certain Negroid and Caucasoid varieties, and (5) that the sacrum of Paleo-Amerinds, or earliest varieties, will closely resemble that of Paleo-Asiatics and Causoids, whereas that of Ceno-Amerinds, or recent varieties, will be most closely related to the later Asiatics.

## Literature Cited

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