



## Racial History and Bio-Cultural Adaptation of Nubian Archaeological Populations

Dennis P. van Gerven; David S. Carlson; George J. Armelagos

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RACIAL HISTORY AND BIO-CULTURAL  
ADAPTATION OF  
NUBIAN ARCHAEOLOGICAL POPULATIONS

BY DENNIS P. VAN GERVEN, DAVID S. CARLSON,  
AND GEORGE J. ARMELAGOS

TRADITIONALLY a principal role of the physical anthropologist has been the analysis of human skeletal remains. Oftentimes, in order to stimulate interest in saving skeletal materials, physical anthropologists have incorrectly proposed that they could provide information toward the historical reconstruction of cultural traditions through the analysis and classification of skeletal material. Such analyses have consistently utilized similarities in skeletal morphology and hypothetical racial affinities to establish biological relationships between skeletal series. Such relationships, once established, have then been assumed to reflect the degree to which populations are culturally related.

The analysis of the skeletal remains of Nubian archaeological populations has played a major role in the development of this tradition. This has largely been due to Nubia's unique geographical and cultural relationship to both sub-Saharan Africa and the Mediterranean.

For all its innate poverty, Nubia has played a significant and at times decisive role in the culture history of East Africa, for the Nile Valley has provided, since the dawn of history, the only permanent connecting link between the ancient centres of Mediterranean civilization and the cultures of sub-Saharan Africa. As a result the peoples and cultures of Nubia are neither wholly Mediterranean nor wholly African: since earliest times they have presented a unique blend of the two.<sup>1</sup>

Elliot-Smith, Douglas Derry, and F. Wood Jones began the systematic analysis of Nubian skeletal material shortly after the beginning of the present century. Studying the material collected by the first Archaeological Survey of Nubia (1907-11), they believed that they had found important 'racial differences' in the Nubian populations at different times in history, most of which they expressed in terms of differing degrees of 'Negroid admixture'.<sup>2</sup> In keeping with the prevalent racial ideology of their times, these differences in turn were held to account for significant cultural changes in Nubian history. Periods of cultural advance or enrichment were attributed to Caucasian migrations; 'dark ages' were the result of Negroid migrations.

The intellectual commitment to biological determinism associated

<sup>1</sup> W. Y. Adams, 'Continuity and change in Nubian culture history', *Sudan Notes and Records*, XLVIII (1967), 1-32.

<sup>2</sup> G. Elliot-Smith and F. Wood Jones, 'Report of the human remains', *The Archaeological Survey of Nubia, Report for 1907-1908*, II (1910), Cairo.

with these early researches into the history of Egypt and Nubia did not go uncriticized. In 1905 Myers pointed out that there were significant statistical errors due to poor sampling and a lack of understanding of the biological processes relevant to human variation.<sup>3</sup> This criticism was expanded to include the entire concept of race as it was being applied to skeletal populations. However, in spite of these criticisms, anthropometric analyses of Egypt and Nubia continued to be a major focus for physical anthropologists as well as statisticians.

Ahmed Batrawi, who studied the collections from the second Archaeological Survey of Nubia (1929-34), initially endorsed the conclusions of Elliot-Smith and co-workers,<sup>4</sup> although at a later date he modified his position considerably. At that time he wisely observed that:

... failure to distinguish clearly between the achievements of populations and their inherent biological characteristics has caused much confusion in anthropological writing. The literature dealing with the racial history of Egypt [and Nubia] provides an outstanding example of the danger of assessing biological relationships from cultural evidence.<sup>5</sup>

While Batrawi's rejection of a causal link between race and cultural achievement is to be commended, his approach to biological variation remained tied to the traditional concepts of typology and their relevance to questions of racial and cultural history. The three most central features of this approach continued to be: (1) a basic orientation toward typological definition and description, (2) a dependence upon admixture (gene flow) as an explanatory model, and (3) a commitment to the objective reality of the racial type, and the utility of such concepts as hybrid and atavism in the reconstruction of racial history.

Although the limitations inherent in this approach are well known, they continue to demand our consideration. While physical anthropology has advanced greatly in scope and technique, typological description has remained central to much of the theoretical outlook and problem orientation of physical anthropology in Nubia. This has resulted principally from a continuing concern for the history of racial admixture and its relationship to cultural development in Egypt and Nubia. As a consequence, the development of alternative approaches has been extremely limited.

In arguing for a post-paleolithic Negroid admixture in Nubia, Strouhal stated that 'modern genetically orientated studies, e.g. of the blood groups, show the penetration of the Egyptian population by Negro genes.'<sup>6</sup> Such a statement is no less limiting than Batrawi's earlier morpho-

<sup>3</sup> C. S. Myers, 'Contributions to Egyptian Anthropology: II. The comparative anthropometry of the most ancient and modern inhabitants', *J.R.A.I.*, xxxv (1905), 80-91.

<sup>4</sup> A. M. Batrawi, 'Report on the human remains, mission archéologique de Nubie', *Cairo: Government Press* (1935).

<sup>5</sup> A. M. Batrawi, 'The racial history of Egypt and Nubia: II', *J.R.A.I.*, LXXVI (1946), 131-56.

<sup>6</sup> E. Strouhal, 'Evidence of the early penetration of Negroes into prehistoric Egypt', *J. Afr. Hist.*, xii (1971), 1-9.

logical typology. Once a feature, morphological or genetic, is defined as representing a specific racial type, the only possible explanation for its occurrence in additional populations is admixture resulting from migration. Such a view improperly portrays human populations as internally static units changing only as a function of external forces, i.e. genetic flow.

In attempting to determine the time at which Negroid admixture occurred in Nubia, Strouhal analysed 177 Badarian crania. The crania were suggested to represent the oldest known culture of settled farmers and pastoralists of Upper Egypt (about 4000 B.C.). While temporally separated from Batrawi's analysis by thirty-six years, the approach of Strouhal is still essentially typological.

The majority of 94 skulls showed mixed Europoid-Negroid features. . . . In one third of them the Europoid, in the other third the Negroid, features were dominant. The last third showed both components, either well-balanced or with characters of the neutral range common to both racial groups.<sup>7</sup>

Such an assumption of the atavistic reappearance of racial types has no acceptable basis today.

The hybridization of unlike human groups has still other genetic implications which bear on problems of historical reconstruction. An investigator is easily trapped into circular reasoning if he surmises that types can usefully be defined as polar, that they once predominated in the ancestors of a living group, and that their occurrence today constitutes the atavistic reappearance of such ancestors.<sup>8</sup>

Even if the constellation of traits defining a racial type were demonstrably linked, which they are not, the type would only persist through generations to the extent selective mechanisms acted to favour it.

Unless selection favors the persistence of ancestral combinations of genes, carriers of these complexes should appear among the hybrids no more often than one might expect by chance. In other words, panmixia should scatter the ancestral alleles separately and randomly throughout the membership of a hybrid population.<sup>9</sup>

Burnor and Harris, while suggesting Negroid-Caucasoid admixture at a much earlier Pleistocene date, approach the problem of Nubian racial history in a manner similar to Strouhal.<sup>10</sup> The authors hypothesize that in Pleistocene times, Capoid populations (that is, physically similar to the peoples speaking Khoisan languages in present-day southern Africa) inhabited the shores of the Mediterranean. About 14,000 years ago these peoples:

. . . moved to South Africa via the East African highlands due to pressure

<sup>7</sup> Ibid.

<sup>8</sup> E. E. Hunt, 'Anthropometry, genetics, and racial history', *American Anthropologist*, LXI (1959), 64-87.

<sup>9</sup> Ibid.

<sup>10</sup> D. R. Burnor and J. E. Harris, 'Racial continuity in Lower Nubia: 12,000 B.C. to the present', *Proc. Indiana Acad. Sci. for 1967*, LXXVII (1968), 113-21.

exerted upon them by the invading Caucasoids, and in so doing, they displaced or absorbed various Congoid populations that were more primitive than themselves.<sup>11</sup>

Although the authors view the Nubian population as having remained stable over the last several thousand years, they propose that the living Nubians are the result of the massive penetration of Negroid Africa by Caucasoid genes during the last 14,000 years. In support of this hypothesis, the skeletal remains of a Nubian Mesolithic population are described as possessing bun-shaped occiputs, massive browridges, sloping foreheads, extreme facial flattening, large teeth and deep mandibles. This and other evidence is proposed to indicate that Africa, north of the Sahara, was originally inhabited by non-Caucasoid populations that can in general be termed Negroid.

There are several points at which this analysis remains essentially typological. Specifically, Greene pointed out in his discussion of racial reconstructions:

If indeed there were adequate models for the presumed Negro race of Africa that existed thousands of years ago, then this approach has validity. However, it can be contended that such models are at present not valid since there is little evidence for reconstructing what the then contemporary African Negroes were like skeletally. One can only extrapolate from modern Negroes who may not at all be like their ancestry since racial groups are not static, but evolve.<sup>12</sup>

In addition, many of the skeletal features listed separately by Burnor and Harris may, in fact, be related functionally and/or epigenetically. Greene and co-workers have suggested that features such as large complex tooth form, glabellar protrusion, gonial eversion and massive mandible are all indicative of heavy masticatory musculature.<sup>13</sup> Such features in the Nubian Mesolithic population are similar to those represented by the Neanderthal remains at the Skuhl site in Israel and also by contemporary aboriginal Australian populations. Such commonality suggests similar adaptation rather than common racial origin and migration.

Once again, the explanation of morphological similarity between two populations in terms of racial origins and affinities is totally inadequate unless the role played by natural selection and possible parallel evolution has been determined and incorporated into the analysis.

Berry and co-workers have reviewed arguments concerning racial affinities and admixture of prehistoric groups in Nubia, and have been critical of the racial approach which has been so characteristic of studies of Nubian and Egyptian prehistory.<sup>14</sup> They suggest that research should

<sup>11</sup> Ibid.

<sup>12</sup> D. L. Greene, 'Dental anthropology of early Egypt and Nubia', *J. Human Evolution*, 1 (1972), 315-24.

<sup>13</sup> D. L. Greene, G. H. Ewing and G. J. Armelagos, 'Dentition of a Mesolithic population from Wadi Halfa, Sudan', *Am. J. Phys. Anthrop.*, xxvii (1967), 41-55.

<sup>14</sup> A. C. Berry, R. J. Berry and P. J. Ucko, 'Genetical change in ancient Egypt', *Man*, 11 (1967), 551-68.

be directed away from morphological studies toward the analysis of discrete cranial traits in establishing population relationships through time.

Although there has been considerable criticism of the use of discrete traits in measuring biological distance between groups, there remains little question that the use of non-continuous variables represents a more solid approach to the study of genetic relationships between populations. This is not to suggest that discrete traits will, without question, determine genetic affinities, but merely that such traits are less likely to be functionally significant and therefore more likely to appear as a result of genetic structure than analogy. The influence of development upon the appearance of discrete traits, however, remains to be determined. There is some evidence that the asymmetry of these traits is a result of a breakdown in homeostatic (physiological regulatory) mechanisms, which implies that the appearance of discrete traits may be intimately related to non-genetically determined (canalized) development.<sup>15</sup> Thus, the appearance of discrete skeletal traits may be as much a function of non-genetic factors as genetic factors. For this reason, the use of discrete traits to obtain genetic differences or similarities may not be as useful as many researchers believe, and should be approached with caution.

MacGaffey has recently provided an interesting interpretation of why students of Nubian physical anthropology have continued to maintain a racial approach in spite of the apparent biological inconsistencies involved. MacGaffey suggests that such studies have their roots deep within the structure and philosophy of Western civilization, and 'call for an ideology which sanctions as natural and necessary a polarization of rulers and the ruled, the bearers and receivers of culture'.<sup>16</sup> In Nubia, these studies begin with the *a priori* assumption that there were two basic groups, or types, which occupied Africa early in its prehistory, and that any biological and/or cultural deviations from these idealized types represent a mixture, or a hybridization, of the two. Thus MacGaffey suggests the culture history of Nubia has been explained in terms of type, hybridization, and atavism rather than the more biologically and culturally meaningful units of variation, evolution and development.

The very qualities of preservation and cultural context which excited traditional interests in Nubian skeletal remains provide an almost unique potential for developing the alternatives suggested by MacGaffey. This has resulted principally from recent growth in the archaeological record such that it is no longer necessary to rely upon hypothetical racial constructs to aid in the analysis of culture history.

The International Campaign to Save the Monuments of Nubia, begun in 1960, provided not only new insight into the history of the Nubian

<sup>15</sup> W. L. Howe and P. A. Parsons, 'Morphogenetic homeostasis in man', *Acta Gen. Stat. Med.*, XVIII (1968), 341-8.

<sup>16</sup> W. MacGaffey, 'Concepts of race in the historiography of Northeast Africa', *J. Afr. Hist.*, VII (1966), 1-17.

corridor and its relationship to sub-Saharan Africa and the Mediterranean, but re-established a productive relationship between the archaeology and physical anthropology of the area. Analyses resulting from the campaign failed to support earlier interpretations of Nubian history as a series of disconnected episodes each resulting from the arrival of new populations.

Thus we know, or should know, today that we must consider and explore separately the changes in culture, language, and population which have taken place in the course of Nubian history. So far as population is concerned, we have, notwithstanding earlier theories, no reliable evidence of any major or complete changes during the whole historic period. In the absence of such evidence, and in view of the obvious social and cultural continuity between most of the Nubian cultural phases, we must now adopt as a working hypothesis the idea that the Nubian population has remained basically the same since Neolithic times.<sup>17</sup>

Adams has proposed further that we regard the course of Nubian culture history from Neolithic to Islamic as a continuum of cultural and social development involving three basic stages.

These may, for the time being, be designated as Archaic, Dynastic, and Medieval. The first includes the Shaheinab, A-Group, and C-Group phases, the second the Pharaonic, Napatan, Meroitic and X-Group, and the third the Christian and Islamic periods.<sup>18</sup>

This basic reorientation has provided the necessary context for a bio-cultural approach to the skeletal biology of Nubian populations. Such an approach views the variation in human populations as dependent upon the action of environmental agencies both mediated by and resulting from patterns of cultural adaptation. The role of the physical anthropologist should, therefore, be to determine the impact of Nubian cultural development on the biology of the populations involved. Such an approach broadens the scope of anthropological inquiry rather than perpetuating the limitations inherent in racial history as an adjunct to archaeological investigation.

Armelagos and co-workers have recently analysed skeletal remains excavated from cemeteries associated with Meroitic, X-Group and Christian cultural horizons in the Wadi Halfa area of Lower Nubia. By focusing on patterns of mortality, bone growth and development, and pathology, the results of their analyses have contributed substantially to our understanding of Nubian history from a bio-cultural perspective.

The analysis of mortality profiles based on a large series of skeletons from a Christian cemetery at the site of Meinarti, provided an independent source of information relevant to the culture history of the area. According to Adams, occupation of the site could be divided into two periods on

<sup>17</sup> W. Y. Adams, 'Continuity and change in Nubia'.

<sup>18</sup> *Ibid.*

archaeological grounds.<sup>19, 20</sup> Based on architectural expansion of the village, the earlier period (A.D. 1050–1150) was one of growth, while the later period (A.D. 1150–1300) was one of decline, with abandonment of the village by A.D. 1300.

The results obtained from calculating life tables for each of the two periods provided a concise summary of the mortality characteristics of the Meinarti population. The results directly support Adams's interpretation based on archaeological investigation. When life tables were compared for the two periods, a definite trend was noted. During the period of village decline, life expectancy was consistently lower and the probability of dying was greater in every age interval.<sup>21</sup>

A more general analysis of mortality patterns based on survival curves from Meroitic, X-Group and Christian samples revealed, according to Armelagos:

... both general and specific survival patterns comparable to those of other populations. For example, the Meroitic, X-Group and Christian samples all demonstrated the classic survival curve characteristics of an agricultural society. Mortality was high among infants, levelled off slightly among young adults, and increased sharply among older adults.<sup>22</sup>

Beyond these general trends, a comparison of Meroitic, X-Group and Christian horizons revealed changes in survival patterns corresponding to changes in cultural stress associated with the rise and decline of the Meroitic empire and the later adoption of Christianity.<sup>23</sup>

In addition to the analysis of mortality, we have attempted to utilize the same materials to aid in elucidating processes of bone growth and development. In this way, we hoped to develop a basic understanding of the bone bio-dynamics of the population. Specifically, we have been concerned with long bone growth and degenerative changes which are the result of the ageing process. The degenerative changes studied include changes in cortical bone of the femur as well as changes in trabecular bone of the femur head.

While such analyses may seem far removed from the more direct questions of bio-cultural adaptation reflected in mortality studies, patterns of growth and development, including phenomena such as catch-up growth, aid in the assessment of the nutritional status and general health of the population. Age-related degenerative diseases, such as osteoporosis, are intimately related to patterns of mortality and physiological stress occurring within the population.

<sup>19</sup> W. Y. Adams, 'Sudan Antiquities Service excavations in Nubia: fourth season, 1962–63', *Kush*, XII (1964), 216–47.

<sup>20</sup> W. Y. Adams, 'Sudan Antiquities Service excavation at Meinarti, 1963–64', *Kush*, XIII (1965), 148–67.

<sup>21</sup> A. C. Swedlund and G. J. Armelagos, 'Une recherche en paléodémographie: la Nubie Soudanaise', *Annales (Economies, Sociétés, Civilisations)*, VI (1969), 1287–98.

<sup>22</sup> G. J. Armelagos, 'Disease in ancient Nubia', *Science*, CLXIII (1969), 255–9.

<sup>23</sup> G. J. Armelagos, 'Paleopathology of three archaeological populations from Sudanese Nubia' (Ph.D. Thesis, University of Colorado, 1968).



The growth patterns of the Nubian children showed no significant evidence of any general malnutrition or deficiency disease. At least, they were not severe enough to result in the marked stunting of long bone growth. However, Mahler's observation of adolescent catch-up growth may indicate a moderate nutritional inadequacy that obstructed normal growth to a minor degree throughout the earlier growth period.<sup>24</sup> Growth velocity, determined from long bones, was similar to, but more irregular than, the growth velocity in American boys studied longitudinally. Symmetry of long bone growth, on the other hand, showed a greater stability than that which occurs in modern American boys.<sup>25</sup>

As a part of the general analysis of bone growth and development, the age-related loss of skeletal tissue known as osteoporosis was also investigated. The rate of occurrence of osteoporosis as a function of age was determined in archaeological samples for the first time in a study undertaken by Dewey and co-workers utilizing the Meroitic, X-Group and Christian materials.<sup>26</sup> Dewey obtained quantitative measurements of bone involution through direct measurement of the thickness of femoral cortical bone. The results of this study indicated a sex difference with respect to the rate of skeletal involution comparable to that observed in modern populations. Nubian females showed a rapid and statistically significant loss of bone compared to the loss in males. In addition to demonstrating a statistically significant loss of bone in the Nubian females, techniques for data normalization to control for the effect of stature were developed in order to facilitate cross populational comparison. While normalization of data has not been done in previous analyses of modern populations, Dewey's results indicated that normalization may be methodologically necessary.

Further analysis of the data by age intervals demonstrated a steady decline in femoral cortical thickness among females beginning in early adulthood. This pattern differs from that observed among modern women where major bone loss does not commence until the age of menopause (*c.* 40 years). On the basis of this, Dewey has suggested that cortical bone involution among the Nubian females was not primarily a disorder of oestrogenic hormonal aetiology, as has been suggested for modern females.

The early age for the onset of osteoporosis in Nubian females might better be explained as a combination of inadequate calcium intake and extended lactation during the period of nubidity (*sic*).<sup>27</sup>

Changes in organ volume density and structural morphology of femoral head trabecular bone were similar to those observed for cortical bone. According to Owen, the density of femoral head trabecular bone organ

<sup>24</sup> P. E. Mahler, 'Growth of the long bones in a prehistoric population from Sudanese Nubia' (M.A. Thesis, University of Utah, 1968).

<sup>25</sup> *Ibid.*

<sup>26</sup> J. R. Dewey, G. J. Armelagos and M. H. Bartley, 'Femoral cortical involution in three archaeological populations', *Human Biology*, XLI (1969), 13-28.

<sup>27</sup> *Ibid.*

volume decreased with age at similar rates among both Nubian males and females; however, females lost a larger percentage of density, since their initial density at adulthood was consistently less.<sup>28</sup>

Through metric analysis of trabecular thickness, Mielke was able to quantify the interaction between resorption in transverse trabeculae and accretion in vertical trabeculae observed, radiographically, among modern female osteoporotics.<sup>29</sup>

These analyses of bone growth and development within the Nubian populations demonstrate the value large homogeneous samples can have in providing an additional dimension to the comparative analysis of populations. Even beyond this, the discovery of such conditions as carcinoma, endochondromas, sarcomas, hyperostosis frontalis, Legg-Calve-Perthes disease, hydrocephaly, tattooing, and intentional scarification—all rare in archaeological populations—enhanced the value of the materials even further.<sup>30</sup>

Such physical remains are essential in delimiting the chronological and geographical distribution of these diseases. In addition, the patterns of such pathologies may reveal adaptive trends which are not apparent from the archaeological record. For example, Armelagos has interpreted the distribution of disease in conjunction with mortality patterns to indicate that the X-Group population may not have experienced the decline suggested archaeologically for the culture. Rather, the X-Group population may have experienced growth and well-being relative to the earlier Meroitic period in Lower Nubia.<sup>31</sup>

A possible explanation for this contrast may come from a reassessment of the assumption that the Wadi Halfa area enjoyed a degree of cultural development similar to that of the center of Meroitic development further to the south. During the X-Group period, political control shifted to local groups which were ruled independently. During this period of regional autonomy, it is possible that the Wadi Halfa population experienced less cultural stress than was experienced during Meroitic control.<sup>32</sup>

The success of these analyses, covering a broad spectrum of the skeletal biology of Nubian populations, has resulted from a continued orientation toward the interaction between changing bio-cultural patterns. Rather than seeking to reconstruct cultural and racial history from biological evidence, this approach utilizes independently established evidence of cultural adaptation as the principal environmental context within which the biological processes of human populations occur. From this conceptual framework it becomes possible to explain the relationship between biological and

<sup>28</sup> K. H. Owen, 'Ash and bone density determinations of trabecular bone of femur heads from a prehistoric Nubian population' (M.A. Thesis, University of Utah, 1969).

<sup>29</sup> J. H. Mielke, G. J. Armelagos and D. P. Van Gerven, 'Trabecular involution in femoral heads of a prehistoric (X-Group) population from Sudanese Nubia', *Am. J. Phys. Anthrop.*, xxxvi (1972), 39-44.

<sup>30</sup> G. J. Armelagos, 'Paleopathology of three archaeological populations'.

<sup>31</sup> *Ibid.*

<sup>32</sup> *Ibid.*

cultural phenomena and, from explanation, to come to statements of general process.

#### SUMMARY

A principal role of the physical anthropologist has been the analysis of the human skeleton. Such analysis has traditionally utilized similarities in skeletal morphology and, in some instances, hypothetical racial affinities, to establish the biological relationships between populations. Established biological relationships are then assumed to reflect cultural affinities. As a result of this approach to the skeletal remains of Nubian populations, the culture history of Nubia has been explained in terms of type, hybridization, and atavism, rather than the more biologically and culturally meaningful units of variation, evolution and development. Our analysis of skeletal remains associated with Meroitic, X-Group and Christian cultural horizons in Sudanese Nubia has emphasized a bio-cultural approach to detectable patterns of mortality, skeletal growth and pathology. Rather than seeking to reconstruct cultural history from such biological evidence, this approach utilizes independently established evidence of cultural adaptation as the principal environmental context within which these biological processes occur. From this conceptual framework, it becomes possible to gain new insight into the biological and cultural dynamics of variation, evolution and development within the Nubian corridor.

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