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Clines and Clusters Versus "Race:" A Test in Ancient Egypt and the Case of a Death on the Nile

C. LORING BRACE, DAVID P. TRACER, LUCIA ALLEN YAROCH, JOHN ROBB, KARI BRANDT, AND A. RUSSELL NELSON
Museum of Anthropology, University Museums Building, Ann Arbor, Michigan 48109 (C.L.B., L.A.Y., J.R., K.B., A.R.N.) and Department of Anthropology, University of Washington, Seattle, Washington 98195 (D.P.T.)

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ABSTRACT The biological affinities of the ancient Egyptians were tested against their neighbors and selected prehistoric groups as well as against samples representing the major geographic population clusters of the world. Two dozen craniofacial measurements were taken on each individual used. The raw measurements were converted into C scores and used to produce Euclidean distance dendrograms. The measurements were principally of adaptively trivial traits that display patterns of regional similarities based solely on genetic relationships. The Predynastic of Upper Egypt and the Late Dynastic of Lower Egypt are more closely related to each other than to any other population. As a whole, they show ties with the European Neolithic, North Africa, modern Europe, and, more remotely, India, but not at all with sub-Saharan Africa, eastern Asia, Oceania, or the New World. Adjacent people in the Nile valley show similarities in trivial traits in an unbroken series from the delta in the north southward through Nubia and all the way to Somalia at the equator. At the same time, the gradient in skin color and body proportions suggests long-term adaptive response to selective forces appropriate to the latitude where they occur. An assessment of "race" is as useless as it is impossible. Neither clines nor clusters alone suffice to deal with the biological nature of a widely distributed population. Both must be used. We conclude that the Egyptians have been in place since back in the Pleistocene and have been largely unaffected by either invasions or migrations. As others have noted, Egyptians are Egyptians, and they were so in the past as well. © 1993 Wiley-Liss, Inc.

A sense of one's biological heritage can easily transcend the familial and spill over into feelings of "racial" identity. These in turn lead all too quickly to attempts to bolster feelings of individual worth by invoking the collective reinforcement of "racial" pride. This was a favorite ploy of advocates of differential "racial" rank in the recent past. One of the clearest statements attributing merit not to individual achievement but to group membership was made by the former chairman of the Department of Psychology at Columbia University, Professor Henry E. Garrett, who admonished that: "No matter how low (in a socioeconomic sense) an American white may be, his ancestors built the civilizations of Europe; and no matter how high (again in a socioeconomic sense) a Negro may be, his ancestors were (and his kinsmen still are) savages in an African jungle" (Garrett, 1962:984).

He was wrong on both accounts. Most American "whites" are descendants of European farmers—peasants—and most American "blacks" are descendants of African farmers. The main differences in the nature of the selective forces that influenced their chances for survival were related to the different conditions associated with farming in the tropics as opposed to farming in the temperate zone. Actually, in spite of claims that populations are adapted to the "civilizations" with which they are associated (Jensen 1969), none of the world's cultures has endured unchanged for as much as 10,000 years, and that is not sufficient time to have allowed for the accumulation of enough biological change to be distinguishable from measurement error (Brace et al., 1987; Brace et al., 1991; Brace, 1993a).

The denigration of people of African or any other ancestry by tying individual worth to collective accomplishment is just as indefensible as the assumption that "civilization" has anything whatsoever to do with the biological differences of its creators. On the other hand, it is no more justifiable, however understandable it might be, for the positions to be reversed and for people of African origins to lay claims to status by virtue of a putative relationship with the creators of the ancient cultural achievements in the valley of the Nile (Asante, 1990; Barringer, 1990; Diop, 1955, 1981; Finch, 1985). In spite of his explicit denial, the most outspoken supporter of the claim that "ancient Egypt was a part of the Negro world" (Diop, 1968:24) cannot allay the suspicion that this stance may well be a case of "inverted racism" (1968:23; and see Ortiz de Montellano, 1991, 1992).

The question of who the ancient Egyptians were and who was related to them to what degree is an interesting issue in and of itself, but it has absolutely no relevance to the matter of the generation and flourishing of the phenomenon of Egyptian civilization. Our concern here is with the completely unrelated question of the biological relationships of the inhabitants of the Nile valley who, just incidentally, created that remarkable civilization. Even more important, it is our intent to show how the treatment of this issue demonstrates that a successful resolution can only be accomplished by dispensing with the concept of race altogether.

The most enduring symbols of ancient Egypt are the great pyramids built for the Old Kingdom rulers along the west bank of the Nile from Giza south for over 100 km. Those gigantic monuments to the dead were tombs marking the last resting places of people who were buried well over 4,000 years ago. From written records, we know who some of those people were said to be. This applies to the pharaohs, their consorts ("great wives"), and other high officials, but, in addition to them, there were thousands of other associated burials (Leca, 1981; Spencer, 1982). Indeed, who were these people, not just in name, but in terms of their relationships to their contemporaries and successors there and in other parts of the world?

The ancient Egyptian quest for eternal life led them to develop elaborate practices for the preservation of the dead. The deciphering of Egyptian hieroglyphic writing with the help of the Rosetta stone (Andrews, 1981) and subsequent intensive archaeological investigations in the later 19th century produced an impressive volume of evidence concerning the practical mortuary techniques designed to prepare the mortal remains of the recently deceased for continuation in an afterlife (Adams, 1984; Andrews, 1984; Budge, 1925; James, 1988; Smith and Dawson, 1924; Spencer, 1982).

A major part of the documentation of those beliefs and practices is the quantity of human skeletons unearthed in the course of that archaeological work. One of the most tireless of those excavators was Sir W. M. Flinders Petrie (1853–1942), who began his work in 1880 at Giza across the Nile, opposite Cairo (Drower, 1985). The human remains that were recovered as a result of his efforts have served as the basis for measurement and analysis by several succeeding generations of physical anthropologists (cf. Berry et al., 1967; Castillos, 1981; Crewdson-Benington, 1911; Crichton, 1966; Fawcett and Lee, 1901; Keita, 1990; Morant, 1925, 1935; Myers, 1905; Pearson, 1896; Pearson and Davin, 1924; Petrie, 1901; Warren, 1898). A goodly number of these specimens now repose in the collections of the Duckworth Laboratory of Physical Anthropology at Cambridge University.

In spite of a century of such research efforts, there is little in the way of memorable results that come to mind in retrospect. This is clearly reflected in Colin Renfrew's reproof that "Craniometry, the study and measurement of human skulls, has in recent years enjoyed about as much prestige in scientific circles as phrenology" (Renfrew, 1987:4). Renfrew goes on, however, to blame this failure on methodological flaws, saying "It would be wrong . . . to place much weight upon conclusions drawn from physical anthropology until the methodology is better developed" (Renfrew, 1987:93).

The failures of physical anthropology are very real (Brace, 1981, 1982, 1988, 1993b), but, contra Renfrew, a better case can be made that they have been the result of flaws in theoretical expectations rather than methodological inadequacies (Brace, 1989; Brace and Hunt, 1990). It was an item of faith in the physical anthropology of yesteryear that the conformation of each individual human being was an approximation to an underlying "racial" essence that constituted true reality. In wondrously Platonic fashion (Plato, 1919), anthropological practitioners assumed that each individual specimen was an imperfect shadow of that "real but directly unattainable thing," the supposed underlying "racial" reality whose elucidation was the ultimate goal of their aspirations (attributed to Topinard by Ripley, 1899; Vallois, 1953).

This assumption sails on undisturbed in the convictions of those who, like the "modern" racialist, J. Philippe Rushton, claim that the intellectual capacity of an individual or a group can be directly determined by the crude expedient of running a tape measure around the skull and reading off the numbers (Rushton, 1989). Inevitably, individuals whose cranial circumference is below a group average by virtue of its association with smaller body size would necessarily be stigmatized as of lower than average intelligence. Such a stance ultimately leads to the conclusion that women are less intellectually endowed than men, and that large men are smarter than small men.

If this epitomizes the theoretical poverty of the old physical anthropology, it does not automatically follow that there is absolutely nothing to be learned from the measurement and study of crania in skeletal collections. It is simply a matter of adjusting our theoretical expectations, asking the right questions, and then applying the increasingly powerful arsenal of methods that are at our disposal.

We have taken the present opportunity to demonstrate how one can use the study of cranial material to deal with an issue that has recently been elevated to the realm of what could well be called "racial politics." The collections that are the focus of our attention include the Egyptian ones assembled by Sir W. M. Flinders Petrie as a result of his work at Naqada in Upper Egypt in 1895–96 (Petrie and Quibell, 1896) and Giza in Lower Egypt in 1906–07 (Petrie, 1907), which are now housed in the Duckworth Laboratory at Cambridge University. Unlike the classic mystery story of fiction where the main issue is to identify the agent of the death under investigation (Christie, 1937), our concern is mainly with the identity of the dead. Who in fact were the ancient Egyptians, and to whom were they most closely related? And what kind of data and what sort of theoretical framework do we need to use in order to deal with problems of this nature? We attempt to answer these questions in the sections that follow.

MATERIALS AND METHODS

The measurement battery

Representative samples of all the major population blocks of the world have been measured in a standardized fashion to serve as a background against which comparisons can be made. This information is stored in the data bank at the University of Michigan Museum of Anthropology, and it can be used to test the relationships of other populations, or even of individuals, to these and to each other as the occasion arises.

The measurements in our battery are listed in Table 1. They were originally chosen because of their utility in sorting out the relationships between the pre-

TABLE 1. Craniofacial measurements used in this study

Variable number	Measurement name
1.	Nasal height (Martin No. 55)[1]
2.	Nasal bone height (Martin No. 56[2])
3.	Piriform aperture Height (Martin No. 55[1])
4.	Nasion prosthion length (Martin No. 48)
5.	Nasion basion (Martin No. 5)
6.	Basion prosthion (Martin No. 40)
7.	Superior nasal bone width (Martin No. 57[2])
8.	Simotic width
9.	Inferior nasal bone width (Martin No. 57[3])
10.	Nasal breadth (Martin No. 54)
11.	Simotic subtense[2]
12.	Inferior simotic subtense
13.	FOW subtense at nasion
14.	MOW subtense at rhinion[3]
15.	Bizygomatic breadth (Martin No. 54)
16.	Glabella opisthocranion (Martin No. 1)
17.	Maximum cranial breadth (Martin No. 8)
18.	Basion bregma (Martin No. 17)
19.	Basion rhinion
20.	Width at 13 (fmt-fmt)
21.	Width at 14
22.	IOW subtense at nasion[3]
23.	Width at 22 (fmo-fmo)
24.	Minimum nasal tip elevation[4]

[1] Martin numbers are from Martin (1928).
[2] Howells (1973).
[3] Woo and Morant (1934).
[4] Brace and Hunt (1990).

historic and modern inhabitants of the Japanese archipelago (Brace et al., 1989, 1990). Subsequently, it became clear that they could also serve to elucidate the relationships of all the other populations in the world, although perhaps with somewhat less precision than is the case in the groups for which they were originally designed (Brace, unpublished manuscript; Brace and Hunt, 1990; Brace and Tracer, 1992; Brace et al., 1992; Li et al., 1991).

If we could start all over again and expand the list to include again as many measurements of adaptively insignificant features, we suspect that we could provide an even better test of relationships. Those who have pioneered the use of larger batteries of variables that are relatively meaningless in and of themselves have been notably successful (Howells, 1973, 1989; Pietrusewsky, 1984, 1990; Pietrusewsky et al., 1992). The reasons why this works are related to the reasons why DNA sequence comparisons can sort out such relationships. That is, measurable divergence in the details of inherited but adaptively trivial features between populations that ultimately stem from the same source will be strictly proportional to the time that has elapsed since they shared a common ancestor (Brace and Hunt, 1990). The one advantage that the use of craniofacial measurements has over nucleic acids is that the former can be used on prehistoric and other specimens in which no unmodified cellular residue is preserved. For this reason amongst others, we suggest that the late Allan Wilson overstated things when he said "you can dispense with the bones" (Marshall, 1990:800).

Samples used

Whether our assessments are based on biochemical (Cann, 1988; Cann et al., 1987; Wilson and Cann, 1992) or fossil evidence (Brace, 1967, 1991, 1993c), it is clear that all "modern" human populations can trace their ultimate roots to Africa. There is considerable disagreement on just how long ago they may have diverged from that common African source (Spuhler, 1988, 1989; Stringer and Andrews, 1988; Templeton, 1992, 1993), but that need not concern us here. Although our data do present a quantitative picture of the diversity visible in modern human

TABLE 2. Samples used in constructing Figure 2

Population	Range of *n* for mean *z* scores		*n* for dendrogram	
	Female *n*	Male *n*	Female	Male
Africa[1,2,3,4]	58–59	59	57	59
Amerind[1,3,5,6,7]	83–95	108–121	83	100
Asia[2,8,9,10,11,12,13,14,15,16,17]	282–456	384–807	218	321
Australo-Melanesia[1,3,5,18]	69–89	97–121	62	86
Eskimo[1,19]	68–71	80–83	68	78
Europe[1,2,3,19,20,21,22,23,24]	121–135	214–251	108	196
Central	64–70	120–136	56	113
Northwest	39–49	61–91	38	60
India[1,25,26]	45	68	45	68
Jōmon-Pacific[1,3,12,15,16,27]	104–170	119–185	76	82
Late Dynastic Egypt[2]	25	27	25	27
Predynastic Egypt[2]	26	27	26	27
North Africa[3]	24	40	24	40
Nubia[28]	31–32	34	31	34
Somali[2]	4	25	4	25
Wadi Halfa[28,29]	3–4	2–4	3	2

The ranges of *n* used to generate the *z* scores and the N used for the dendrograms are indicated (Brace and Hunt, 1990).

[1] American Museum of Natural History, New York.

[2] Duckworth Laboratory of Physical Anthropology, Cambridge University.

[3] Musée de l'Homme, Paris.

[4] Instituto di Antropologia, Universidade do Porto.

[5] Lowie Museum, University of California, Berkeley.

[6] Museum of Anthropology, University of Michigan.

[7] U.S. National Museum of Natural History, Smithsonian Institution, Washington, D.C.

[8] Institute of Vertebrate Paleontology and Paleoanthropology, Beijing.

[9] Department of Anatomy, Chengdu College of Traditional Chinese Medicine.

[10] Institute of Anthropology, Fudan University, Shanghai.

[11] Prince Philip Dental Hospital, Hong Kong.

[12] Laboratory of Physical Anthropology, Kyoto University.

[13] Department of Anatomy, Kyushu University Medical School.

[14] Department of Anatomy, Nagasaki University Medical School.

[15] Department of Anatomy II, Sapporo Medical College.

[16] University Museum, University of Tokyo.

[17] Department of Anatomy, Sriraj Hospital, Bangkok.

[18] Department of Anatomy, Edinburgh University Medical School.

[19] Department of Anthropology, University of Zürich Irchel.

[20] Département d'Anthropologie, Université de Genève.

[21] Antropologisk Laboratorium, Panum Instituttet, Copenhagen.

[22] Institute of Anatomy, University of Oslo.

[23] British Museum (Natural History), London.

[24] Peabody Museum, Harvard University, Cambridge, Massachusetts.

[25] Naturhistorisches Museum, Basel.

[26] Département d'Anthropologie, Université de Montréal.

[27] B. P. Bishop Museum, Honolulu.

[28] Department of Anthropology, University of Colorado, Boulder.

[29] Department of Anthropology, Southern Methodist University, Dallas.

populations, and those differences had to have arisen since their departure from Africa at whatever date back in the Pleistocene, we do not yet have a scale of calibration that will allow us to say how long it took for such a picture of diversity to have arisen (Brace and Tracer, 1992; Brace, 1993a,d).

Samples representing the human inhabitants from all the major regions of the world have been shown to assort themselves into eight major regionally identifiable clusters: African, Amerind, Asian-Mainland, Australo-Melanesian, Eskimo-Siberian, European, Jōmon-Pacific, and South Asian (Brace, 1990; Brace and Hunt, 1990; Brace and Tracer, 1992; Li et al., 1991). These regional clusters are not simply an attempt to resuscitate the old-fashioned "race" concept under another name (Brace, 1993a). Later (see Discussion), we treat the fundamental differences between a reflection of the shared trivial traits by which our cluster diagrams are produced and the idea of approximation to an underlying "essence" assumed by any concept of "race."

These major clusters and the summed numbers from their constituent samples are listed in Table 2. Also noted in Table 2 are two samples of Egyptians: a Predynastic group excavated by Petrie in 1894–95 at Naqada on the west bank of the

Nile 30 miles downstream from Luxor (Thebes) in Upper Egypt, and a Late Dynastic collection from Giza in Lower Egypt also excavated by Petrie in 1906–07; a lumped group of prehistoric and recent Nubians; a sample of modern Somalis; an amalgamated assortment of North Africans; and a Mesolithic sample from Wadi Halfa in the Sudan. When the various Nubian and North African subgroups were treated as separate twigs, the Nubians invariably clustered with each other and the North Africans clustered with North Africans before they showed roots with any other group. This was why they were lumped in the fashion displayed in Table 2. The locations of the Nile valley sources for these samples are shown in Figure 1.

The Wadi Halfa material was the result of two research expeditions to the Sudan 30 years ago by teams from the University of Colorado at Boulder and Southern Methodist University in Dallas, Texas (Anderson, 1968; Greene and Armelagos, 1972). The Predynastic Egyptian sample was collected by Petrie at the specific request of his London colleague Karl Pearson (Fawcett and Lee, 1901:411), and it dates from before 3,000 BC, before the pyramids were built, and prior to a knowledge of writing (Petrie and Quibell, 1896). The Predynastic skeletons, then, can be regarded as belonging to the final stages of the Egyptian Neolithic and just after (cf. the treatment in Wenke, 1989). The Late Dynastic specimens date from between 664 and 341 BC, when first Persia and then Greece asserted military and political control as the glories of the long era of Egyptian cultural achievement were beginning to fade into oblivion (Bowman, 1986; James, 1988). In effect, these people were well into the early Iron Age.

In order to test the relationships between the ancient Egyptians and their nearest neighbors in greater detail, we have broken down the adjacent major clusters—Africa, Europe, and India—into the constituent samples for which we have metric data. These along with indications of sample size are recorded in Table 3. The representatives of Africa and India are from the extant populations only, but, as is further shown in Table 4, we were able to add prehistoric samples from Europe, North Africa, and Israel that were the approximate contemporaries of the Predynastic burials from Naqada in Egypt. Furthermore, we have used data on samples from North Africa, Nubia from the upper reaches of the Nile to the south of Egypt, and the Horn of East Africa. These, like the Egyptians themselves, are not core members of our major regional clusters. As indicated in Tables 3 and 4, they include Epipaleolithic, Bronze Age, and Medieval Nubians and modern Somalis. The locations of the groups on which our attention is focused are shown in Figure 1.

Actually, we defend the position that Medieval samples make as good a basis for assessing the "modern" form of populations in continuously settled areas as do more recent samples. While there were population movements of considerable significance in Medieval times, these, for all the historically recorded social disruptions they created, had a barely discernible effect on the picture of in situ genetical continuity when compared with the changes that occurred at both the eastern and western edges of the Old World as a result of the post-Pleistocene Neolithic spread (Brace and Tracer, 1992). If the maximum recorded rate of metric change in human populations is 1% per 1,000 years (Brace et al., 1987), then the changes that have occurred in any group that has continuously inhabited a given area will not be distinguishable from measuring error for a span of 2,000 years at the very least.

In addition to the major impetus that led us to undertake this work, an interesting tangent emerged. This derives from the striking impression made by the morphology of one particular specimen in the "Egyptian E Series" of 26th–30th Dynasty (664–341 BC) crania. When the senior author encountered specimen E 597 during the course of working through material in the Duckworth Laboratory in the autumn of 1988, he was immediately suspicious that a mistake had been made and a patently non-Egyptian skull had been inadvertently incorporated into the collection. So strong was the impression that it did not belong that he wrote at the

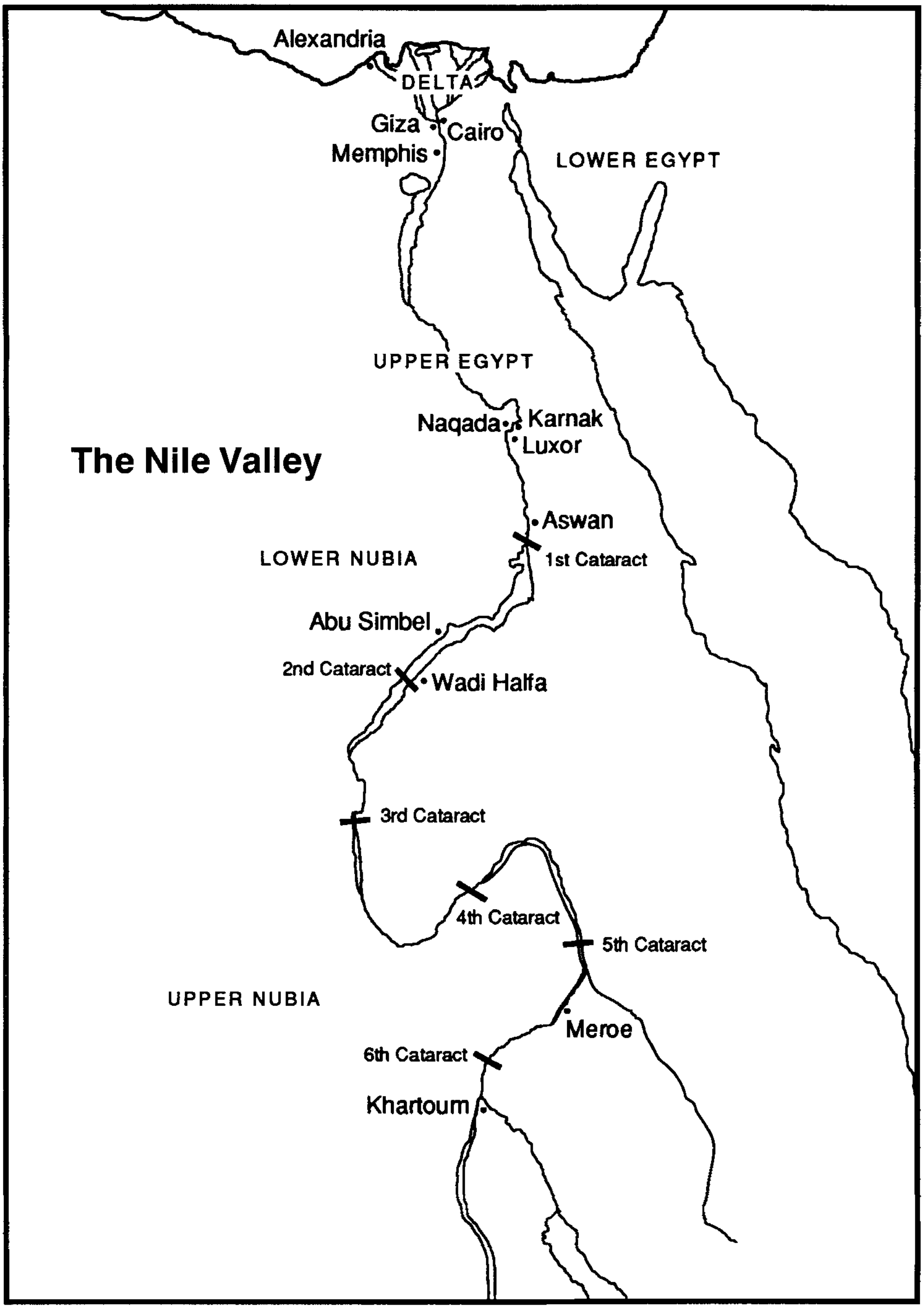

Fig. 1. Distribution and location of the sites that have yielded the Nile valley skeletal material providing the focus of the present study.

TABLE 3. Numbers for the samples used to generate Figure 3

	Range for mean *z* scores		*n* for dendrogram	
Population	Female *n*	Male *n*	Female	Male
Algeria	9	16	9	16
Bengal	10	18	10	18
Berber	4	11	4	11
Calcutta	10	12	10	12
Dahomey	16	17	16	17
Late Dynastic Egypt	25	28	25	28
Predynastic Egypt	26	27	26	27
Europe	121–135	214–251	108	196
Gabon	18–19	19	17	19
Haya, Tanzania	18	18	18	18
Jericho Bronze	1–2	3–5	1	3
Morocco	11	13	11	13
Nubia Bronze	5	10	5	10
Nubia Christian Era	31–32	33	31	33
Singhalese	5	12	5	12
Somali	4	25	4	25
Tamil	7	10	7	10
Vedda	13	15	13	15
Wadi Halfa	3–4	2–4	3	2
Zanzibar	2	2	2	2

These are subdivisions of the groups listed in Table 2.

TABLE 4. Numbers for the added samples used in constructing Figure 4

	Range of *n* for mean *z* scores		*n* for dendrogram	
Population	Female *n*	Male *n*	Female	Male
England Neolithic[1,2]	4–7	8–13	4	8
Denmark Neolithic[3]	11–15	15–17	8	9
France Neolithic[4,5]	19–22	25–28	19	25
Germany Neolithic[6]	6	3–4	6	3
Portugal Neolithic[7]	9–10	9–11	9	9
Russia (Caucasus) Neolithic[5]	14–15	17–18	14	16
Switzerland Neolithic[8]	13	12	12	12

[1] Duckworth Laboratory of Physical Anthropology, Cambridge University.
[2] British Museum (Natural History), London.
[3] Antropologisk Laboratorium, Panum Instituttet, Copenhagen.
[4] Institut de Paléontologie Humaine, Paris.
[5] Musée de l'Homme, Paris.
[6] Landesdenkmalamt Baden Würtemberg, Tübingen.
[7] Instituto di Antropologia, Universidade do Porto.
[8] Département d'Anthropologie, Université de Genève.

bottom of the data sheet, "But this one walked straight out of the German Neolithic!"

The heavy, double-arched brow ridges, the shelf-like horizontal ridge at inion, and the massive mastoid processes flaring laterally at the bottom were utterly unlike anything else in that 664–341 BC series or in the earlier Predynastic Egyptian material. And yet, there was clear evidence that the brain had been extracted via the nasal aperture after death in the manner described by Herodotus, and the individual had been embalmed with the full mortuary treatment usually reserved for socially prominent and wealthy Egyptians (Herodotus, 1924; R. V. McCleary, personal communication; Smith and Dawson, 1924). What was such an obvious intruder doing in a collection of Late Dynastic Egyptians?

It occurred to us that this situation provided the opportunity to engage in an interesting methodological exercise. Since craniofacial measurements for a battery of two dozen variables on samples representing all the major geographic provinces of the world were available to us, it was a simple matter to test E 597 against that spectrum to see who he could or could not be. Actually this is jumping the gun just a bit since it first required that we be able to place the Egyptians themselves in the perspective of that worldwide context. This was the initial reason for the project, and the issue of who E 597 actually could have been was only a minor if interesting side line, although, as we shall see, he does cast light on the larger issues involved.

Analytical procedure

In the physical anthropology of the past, there was an attempt to compensate for the manifestly subjective judgments as to how much of this, that, or another "racial element" was to be found in a particular population by the use of measurements that allowed comparisons of a more objective nature to be made. Unidimensional treatment, however, did not provide a very satisfactory appraisal of what are clearly multifaceted objects. Even the combination of two such dimensions into a proportion or index led to simplistic abuses—the cephalic index and its associated racist nonsense being a classic example (Brigham, 1923; Grant, 1918).

Computer-assisted multivariate analysis gave the promise of solving the impasse of performing a simultaneous treatment of multiple dimensions from which a simple solution would emerge. The favorite such multivariate technique of many practitioners has been the assessment of common variance produced by the generation of principal components or canonical variates (cf. Howells, 1966, 1973, 1986, 1989; Keita, 1990), but the solutions that it has provided are less than unanimously acclaimed (Birdsell, 1966; Sternberg, 1985). The problem is that this technique is particularly appropriate for use in assessing the loadings of separate variables on an assumed underlying dimension. But if there is no such underlying entity to which the objects measured are an approximation, then the factor loadings may be hard to interpret at best and idiosyncratic-to-meaningless at worst. If human beings really were approximations to one or another underlying "race," this should have been demonstrated by factor analysis long ago. From a purely methodological viewpoint, that this has not even come close to happening is a fine demonstration that there simply are no "races" out there waiting to be discovered.

This does not mean, however, that multivariate approaches to the analysis of population relationships are futile. It simply means that we need to choose the kind of multivariate technique that is appropriate to answer the questions we really should be asking. One of these is the question of the morphological proximity of a given individual or population to a series of others, and, for this, the statistics of clustering and discrimination work quite well. To produce a picture of the relationships and distinctions between populations for whom we have measurements on the same set of variables, there are several cluster generating techniques that can produce quite satisfying results. The one we have followed here is the calculation of Euclidean Distances that are then used in the unweighted mean pair-group method to produce branching diagrams—dendrograms—where the named twigs provide a graphic display of how near and how far each group is with respect to every other group entered (Romesburg, 1984).

At the moment, we have no theoretical reason to favor the use of this procedure over other possible cluster-producing algorithms beyond the fact that this avoids the problem of covariance generated by size alone, and the results it has produced are compatible with analyses that have used different algorithms (Pardoe, 1991; Pietrusewsky et al., 1992). The quantification of group differences is based on the information from the nonoverlapping contributions of the measurements used which can be considered to have "counterbalanced" the extent of "redundancy" from the correlated portions (Sneath and Sokal, 1973). We did make trial dendrograms based on $\mathbf{D}^2$ values. The patterns were very similar to the ones based on Euclidean distance values, but the twigs generally showed a much greater degree of separation. From the perspective of pragmatic simplicity, the Euclidean distance dendrograms are easier to interpret.

CLUSTERS AND RELATIONSHIPS

For each of the samples to be compared, we converted the raw measurements (see Table 1) into sex-specific C scores in the fashion pioneered by Howells (1986). We then used mid-sex C scores as the data for generating Euclidean distance

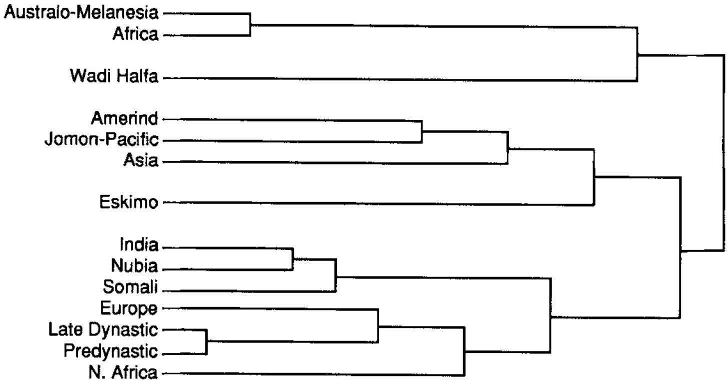

Fig. 2. A Euclidean Distance dendrogram based on C scores providing a picture of the relationships between samples ranging from the Nile delta up through Nubia to Somalia and samples representing the eight major regional clusters of the world. The storage location and *n* for each sample is listed in Table 2.

dendrograms (see Brace et al., 1989, 1992; Brace and Hunt, 1990; Brace and Tracer, 1992; Li et al., 1991). In order to test our various samples, we tried a maneuver that had been successful in sorting out population relationships in eastern Asia (Brace, 1993a; Brace and Tracer, 1992; Brace et al., 1992; Li et al., 1991). We used transformations involving the C scores of nine of the variables: numbers 6, 13, 16, 17, 18, 19, 21, 22, and 23. These transformations created the six new variables: 6/19, 13/21, 16/17, 16/18, 17/18, and 22/23. The nine untransformed variables were dropped from the battery to avoid redundancy, and this left us with a set of 21 variables. The intent was to test for relative cranial height, relative nasal projection, and Woo and Morant's assessment of "facial flatness" (Woo and Morant, 1934). Figure 2 shows the results when the samples listed in Table 2 are compared with each other in this manner. It is obvious that both the Predynastic and the Late Dynastic Egyptians are more closely related to the European cluster than they are to any of the other major regional clusters in the world. If South Asia—India—is discounted for the moment, the Somalis at the southernmost extent of this series show that there is a continuum of related groups which, given the Norwegians and Lapps in our European sample, runs all the way from the equator to the arctic circle. When South Asia is separated into its available constituents as is done in Figure 3, the Somalis change to show a tie with the Egypt-Europe spectrum.

The prehistoric sample from Naqada is also closely related to the more recent Egyptians as the first systematic study of their crania demonstrated (Fawcett and Lee, 1901), and this tie remains when we break the various groups down into their constituents and test the possibilities of finer local relationships. This contradicts Petrie's initial impression that his Naqada burials represented a "New Race" of "invaders" who were "entirely different to any known among native Egyptians" (Petrie and Quibell, 1896:vii). At first, Petrie did not know that the site was Predynastic and his initial assessment was the result of his impression of the associated cultural material and not from an appraisal of the form of the skeletons themselves. Even his subsequent work, devoted to an appraisal of their "race," was based more on a perusal of the portraiture of ancient Egypt than on an examination of the actual crania (Petrie, 1901, 1911). This is a continuation of an old tradition in which the "race" of the ancient Egyptians is assessed not on any direct examination but on artistic depictions and repetitions of off-hand verbal accounts. The 18th century French traveler, the comte de Volney, is frequently cited as justification for identifying the ancient Egyptians as "black" (Diop, 1981; Smith, 1923 [1970]), although, as both Blumenbach (1794) and Lawrence (1819) noted, his

Fig. 3. Euclidean distance dendrogram based on C scores for the constituent subsamples of the African and Indian (South Asian) regional clusters compared with samples from Bronze Age Jericho and up the Nile valley to Somalia. The Nubian sample in Figure 2 is broken down into constituent Bronze Age, Early, and Medieval Christian subsamples. The *n* for each group used is recorded in Table 3.

basic "evidence" was his citation of a passage from Herodotus referring to black skin and "frizzy" hair (Herodotus, 1924) and his assertion that the head of the Sphinx was characteristically "*Negre* dans tous ses traits" (Volney, 1792:49 (original emphasis); 1823:33).

Returning to the assessment of relationships based on actual data as presented in Figure 2, it is interesting to see that the mainland of eastern Asia ties more closely with the derived clusters in Oceania and the western hemisphere than with any other clusters (and see Brace et al., 1990; Brace and Tracer, 1992). The tie between Africa and Australo-Melanesia, however, is more likely to be the result of what, in cladistic terms, would be the sharing of plesiomorphic—i.e., "primitive" or undifferentiated—features that go back to the original dispersion of the genus *Homo* early in the Pleistocene. The attainment of modern levels of cranial size, we would argue, could be an instance of parallel evolution (Brace, 1993c). The lack of subsequent significant nasofacial differentiation may well be because both the eastern (Australo-Melanesian) and western (African) representatives have continued to pursue similar subsistence strategies in similar tropical environments (Cavalli-Sforza et al., 1993, Li et al., 1991). Wadi Halfa ties to Africans and Australo-Melanesians only one step before the populations of the eastern and western edges of the temperate parts of the Old World are joined. Insofar as India has metric ties with any other populations, it combines with Nubia and then the Somalis to join Europe and the Egyptians as a last link before that set of branches ties in with the rest of the world.

Figure 3 shows what happens when we run the two Egyptian groups against two of the major adjacent regional clusters—Africa and India—broken down into their constituent samples. We also added a Neolithic sample from Algeria (Gambetta); a Bronze Age sample from Jericho; Bronze Age and Medieval Nubians; Berber, Algerian, and Moroccan samples from North Africa; the Somalis; and an undifferentiated European group. As can be seen, the samples from the Indian subcontinent—South Asia from Bangladesh down to Sri Lanka—all tie with each other before they make a common connection with any other group. Likewise, samples from Wadi Halfa and from West Africa southward also tie with each other before a connection is made with any other group. This remains true however much we

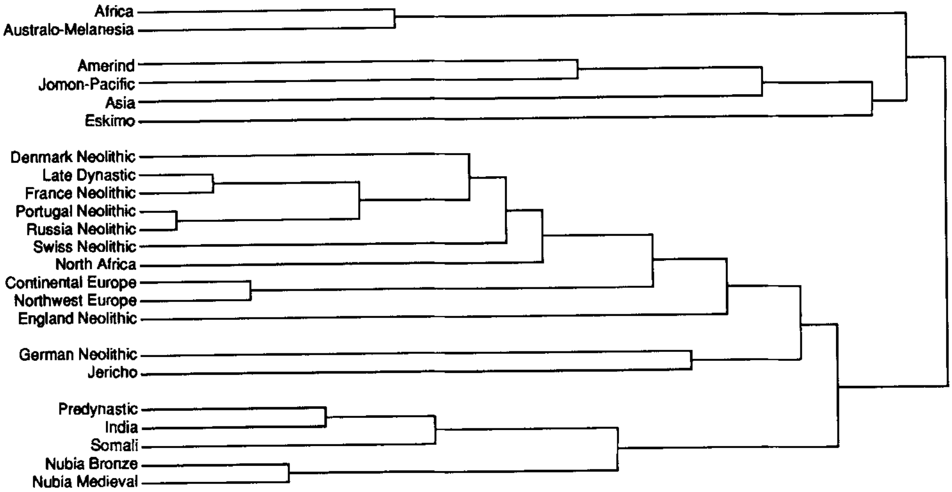

Fig. 4. Euclidean distance dendrogram based in C scores showing the relationships between seven of the undivided major regional clusters and a series of Neolithic and Bronze Age sites ranging from Nubia to Israel to western Europe. Recent Europe is divided into Northwest (England, the Faeroe Islands, and Norway) and Central (France, Germany, Switzerland, and Czechoslovakia) constituents. The *n* for each group used is recorded in Table 4.

expand the numbers of populations tested and however much we adjust and transform the variables used. We have tried dozens of combinations, and, small sample sizes notwithstanding, the African and South Asian clusters invariably retain their cohesion.

The Wadi Halfa connection with the rest of sub-Saharan Africa on the other hand is always very weak and occurs as a last possible step. The Somalis, for their part, never tie in with any of the other populations of sub-Saharan Africa. In Figure 3 they align themselves with Egyptians and modern Northwest Europeans one step before a common rooting with Bronze Age Jericho. The Bronze Age and Medieval Nubians cluster together and show a more remote tie with South Asia.

When we ran the major continental clusters as single branches but divided Europe into a continental and a northwest fringe and tested a whole series of European Neolithic samples, we generated the pattern seen in Figure 4. What this did was to separate the Egyptian samples from each other. The Predynastic sample from Naqada then fell into a tie with South Asia, the Somalis, and, at another remove, the Nubian groups while the Late Dynastic sample from Giza clustered with a series of European Neolithic groups and with North Africa. Northwest Europe (England, the Faeroe Islands, and Norway), which had been separated from central and eastern Europe (France, Germany, Switzerland, and Czechoslovakia) in previous studies (Brace and Hunt, 1990; Brace and Tracer, 1992), was brought back to form a loose tie with the rest of modern Europe. At this point, however, their connections with the European Neolithic and Egypt become more remote.

Discriminant function—who was *that masked man?*

Before we turn to a discussion of the relationships displayed in Figures 2–4, we would like to return to our little subproblem and find out just where specimen E 597 in the Late Dynastic Giza series fits when tested against the rest of the samples at our disposal. Since he is just one individual, we could not create C scores and run him in our cluster program. We could, however, use a Discriminatory Analysis procedure (Rao, 1973) and see whether that combination of measurements could occur in any of the populations used. This uses the linear discriminant function of Fisher (Rao, 1973:575). The probability figures for these were generated using the Michigan Interactive Data Analysis System (Fox and Guire, 1976) and are recorded in Table 5.

When we did this, we discovered that the configuration of measurements found in E 597 was significantly different from that observable in almost all of the samples against which we tested it except for one: the Neolithic specimens from Mühlhausen between Stuttgart and Tübingen in southwestern Germany. It cannot be distinguished from the Mühlhausen sample ($P = 0.743$), whereas the probability of such an individual being a member of the Late Dynastic Giza population in which it was found is 0.065, which is tenuous at best. It is most unlikely that E 597 was a native Egyptian, and it is similarly distinct from most of the other groups against which it was tested. The only other groups from which its separation could not be conclusively demonstrated were the Predynastic Naqada (0.053) and the modern European (0.116) groups, but these figures do not approach the level found when comparison is made with the German Neolithic.

We have used a version of this same discriminant function procedure as another test of relationships. By generating a single set of mid-sex C scores for a given population—in effect, converting a whole population into a single androgynous individual—we can compare it with any of the other populations of the world and examine the probability of excluding it from each. Table 5 contains the Discriminant Score probabilities indicating that the groups in the column headings cannot be distinguished from the groups named in each row.

Actually, the discriminant function technique we have used is better at showing how likely it is that the group being tested can be excluded from the group to which it is compared (and see the discussion in Brace and Tracer, 1992). The algorithm demands that the probability figures add up to a sum of 1.00. This means we can believe it when the P value says that there is no chance of membership in a given group, but when it says that membership cannot be excluded, we have to be somewhat more careful. For example, we could enter the measurements from the cranium of a chimpanzee or a sea lion, and the program would generate figures indicating the degree of discrimination, but their sum would have to add up to 1.0. If we compare these or others with any two modern human cranial series and they are equally unlikely to be included, the P value in each cell will be 0.5, which is not sufficient to exclude the possibility of membership. Yet obviously we know that a chimpanzee or a sea lion cranial configuration will never be found in a modern human series.

The groups compared in Table 5 are all Late or post-Pleistocene *Homo sapiens* from adjacent parts of the Old World, and these include the Late Paleolithic Afalou and Taforalt specimens from Algeria and the Wadi Halfa material from the Sudan; the Neolithic at Naqada, Algeria, England, and Germany; the Bronze Age of Nubia and Jericho; Somalis, and Late Dynastic Egyptians; and modern lumped clusters from Africa, North Africa, Europe, and South Asia. There is no chance, then, of creating the absurdity of the example we have just mentioned, but there is just the possibility that we have more reason to trust loadings indicating exclusion from the group in question—i.e., who a given androgynous "pseudo-individual" is *not*—than we can have confidence in figures showing that it cannot be eliminated from consideration for membership in the group in question. The latter point may in part be a product of the nature of the algorithm rather than a reliable indicator of group membership.

Having said that, we can look at the exclusions indicated in Table 5. First we should note that the averaged figure represented in each column heading was run separately against the groups represented in the labels for the rows, so the results are not comparable to a picture of common variance and this is not a symmetrical matrix. For example, when the Late Dynastic sample from Giza is treated as a single individual and tested against the roster named, it was significantly different from nine of the 12 other groups represented. The groups from which membership

TABLE 5. Probability that the name in the column heading can not be accommodated in the groups named in the row designations

Group	Giza	Predy.	Nubia	X Grp.	Wadi	Som.	Jer.	Afal.	Alg. N.	Eng. N.	Ger. N.	E597
Africa	.000	.001	**.069**	.009	**.784**	.002	.000	.000	.001	.000	.000	.000
Europe	**.837**	**.390**	**.109**	**.163**	.011	**.452**	**.603**	**.627**	**.406**	**.686**	**.168**	**.116**
India	.011	**.145**	**.514**	**.210**	.001	**.096**	.018	.012	.043	.004	.032	.004
Giza	–	**.218**	.028	.027	.001	**.167**	**.177**	.034	.021	**.089**	**.065**	**.065**
Predyn.	**.110**	–	**.229**	**.168**	.018	**.172**	**.151**	**.080**	**.110**	**.172**	**.381**	**.053**
Nubia	.009	**.162**	–	**.406**	**.164**	**.087**	.009	**.112**	**.184**	.009	**.077**	.002
Wadi Halfa	.000	.000	.000	.000	–	.000	.000	.000	.000	.000	.000	.000
Somali	.026	**.069**	.048	.014	.000	–	.036	.005	.023	.012	**.246**	.004
Jericho	.007	.010	.003	.002	.000	.009	–	.019	.015	.017	.021	.011
Afal.-Taf.[1]	.000	.000	.000	.000	.010	.000	.000	–	**.055**	.000	.000	.000
Alg. Neo.[2]	.000	.000	.000	.000	.009	.000	.000	**.070**	–	.006	.001	.000
Eng. Neo.	.001	.002	.000	.000	.001	.002	.002	.037	**.133**	–	.009	.001
Ger. Neo.	.000	.003	.001	.000	.000	.012	.003	.003	.011	.005	–	**.743**

[1] Institut de Paléontologie Humaine, n = 10.

[2] Institut de Paléontologie Humaine, n = 3.

was least likely to be excluded were the lumped Europeans and the Predynastic population from Upper Egypt, with *P* values of 0.837 and 0.110 respectively. When the Predynastic group was tested against the other 12, the probability that it could be excluded from modern Europeans was 0.390, and from the Late Dynastic sample it was 0.218, neither of which is significant. This is not quite the same thing as saying that the Late Dynastic people of Lower Egypt had an 84% chance of being Europeans or that the Naqada sample had a 39% chance of being Europeans or a 22% chance of being from Giza.

The indications of exclusion, however, are much easier to interpret. For example, the likelihood that either the Giza or Naqada configuration could occur in West Africa, the Congo, or points south is vanishingly small—0.000 and 0.001. Whatever else one can or cannot say about the Egyptians, it is clear that their craniofacial morphology has nothing whatsoever in common with sub-Saharan Africans. Our data, then, provide no support for the claim that there was a "strong negroid element" in Predynastic Egypt (Asante, 1990; Morant, 1937; Randall-Mac Iver and Woolley, 1909; Strouhal, 1971).

Nubia, for its part, is significantly different from six of the 12 groups with which it is compared. It comes close to being excluded from the Late Dynastic sample from Giza in Lower Egypt, and it comes within few percentage points of being excluded from sub-Saharan Africa as well. Nubians cannot be excluded from modern Europeans or from their northern neighbors at Predynastic Naqada, and barely from modern Somalis. Perhaps somewhat more surprisingly, they also cannot be excluded from South Asia—the Indian subcontinent. This simply reaffirms what can be seen in Figures 2–4.

The discriminant function procedure allows us to test single specimens against whatever groups we choose. In Table 5, we include the results of comparisons of a series of Epipaleolithic, Neolithic, Bronze Age, and more recent specimens and groups with the three major adjacent geographic areas—Africa, Europe, and South Asia—and our samples from the Nile delta south to the equator. The terminal Pleistocene material from Afalou and Taforalt in Algeria (Arambourg et al., 1934; Vallois and Movius, 1953:200) and Wadi Halfa in Nubia (Greene and Armelagos, 1972) are roughly contemporary (Wendorf, 1968), but obviously very different.

Of all the groups and specimens tested, Wadi Halfa differed at a high level of significance in more of the comparisons than any other. There were only two groups from which it could not be convincingly excluded: the recent Nubians and the roster of sub-Saharan Africans. Remembering our cautions about the nature of the discriminant function algorithm, it still seems reasonable to suspect that there was something of a mixture of sub-Saharan Africa as well as Nubia in that prehistoric group at Wadi Halfa.

The Late Pleistocene material from Afalou and Taforalt in North Africa, on the other hand, had no similarity with sub-Saharan Africa. Instead, the groups from which it cannot be distinguished range from the Neolithic of Algeria and Egypt, modern Nubia, and especially modern Europe. The pattern of affiliations of the Algerian Neolithic is remarkably similar to that of the Algerian Late Pleistocene at Afalou and Taforalt and suggests long-term in situ population continuity.

We collected measurements for a single specimen from what was called the Nubian X Group in Reisner's terminology (Reisner, 1909). This was a population that immediately preceded the early Christian Nubians of AD 550 (Carlson and Van Gerven, 1979), and, in the subjective treatment of a generation gone by, had been regarded as evidence for a "Negroid incursion" (Batrawi, 1935; Smith, 1909; Seligman, 1915). As our figures show, the probability of finding our representative specimen in a sub-Saharan population is 0.009, which is highly unlikely. Its column loadings are generally similar to the loadings in the column for the Predynastic Naqada sample, and, except for the fact that it is only marginally unlikely that it can be excluded from the Giza sample, it cannot be denied membership in the Naqada, European, or South Asian samples. In all, however, it is least likely to differ from its successors right there in Nubia (0.406) than from any of the other groups against which it is compared.

DISCUSSION

The recently published tour de force, *Black Athena* (Bernal, 1985, 1987), has generated a great deal of interest and publicity (Barringer, 1990; Levine, 1989). The main theme is the demonstration that rising currents of racism and anti-Semitism starting in the late 18th century led to the denigration of the contributions made by the Phoenicians and Egyptians to the genesis of classical civilization in Greece (Bernal, 1987). With this we are in complete sympathy, but some have taken its message to mean that the Egyptian strain of that unappreciated or even denigrated contribution was derived from "Black Africa" (Barringer, 1990). Bernal has defended his claims that traditional classical scholarship has been dominated by the "Aryan Model" and that Egyptian culture is "African" (Bernal, 1987). In his first exposition, he said nothing whatsoever about "race" beyond his obviously suggestive title (Bernal, 1985). Later, in his major presentation, he does record his conviction in the presence of "African, South-West Asian and Mediterranean types" in Egypt for the last 7,000 years and that a number of the most powerful dynasties "were made up of pharaohs whom one can usefully call black" (Bernal, 1987:242). Subsequently he has been cautiously noncommittal about the "racial" nature of the ancient Egyptians themselves (Bernal, 1989). Others have taken the symbolic import of the words "Black Athena" and the designation of Egyptian civilization as "African" to mean that the ancient Egyptians must have looked like West Africans and their modern "black" descendants in America and elsewhere (Associated Press, 1989; Barringer, 1990). Our data and treatment obviously have a bearing on these matters, and we use them here to take issue with the provocative implications in Bernal's title. None of this is dealt with in the material presented in his book, nor does it even have much bearing on his principal thesis, and we want to make it clear that we have no quarrel with the substance of the major issues he has raised in his actual text.

As many have noted, there is a gradient of skin color in the Nile valley from north to south. Pigmentation becomes more intense upstream as one goes south into Nubia and toward the equator (Bernal, 1987, 1989; Prichard, 1851; Seligman, 1957; Trigger, 1978; Yurco, 1989), as was recognized in the descriptions and portrayals of ancient Egypt (James, 1988; Vercoutter, 1976). The standard explanation has attributed this to a mixing of "black" equatorial African elements into the lighter Mediterranean population of the Nile delta in the north (Mokhtar and Vercoutter, 1981; Morton, 1844; Smith and Derry, 1910; Snowden, 1989; Yurco, 1989).

The "Egypt-as-a-zone-of-mixture" hypothesis, however, assumes the prior existence of discrete parent populations of different appearance—in this case, a light-skinned one in the north and a dark-skinned one in the south (Batrawi, 1935; Burnor and Harris, 1968; Lawrence, 1819; Morant, 1925, 1935; Morton, 1844; Smith, 1909; Strouhal, 1971). Whether that hypothetical southern dark-skinned population is called "Ethiopian" (Blumenbach, 1794; Prichard, 1851; Snowden, 1970, 1976, 1983, 1989), "nègre" (Diop, 1955, 1981), "Bantu," "Black," "Kaffir," "Negro," or whatever, the universal assumption is that the increase in skin pigmentation is accompanied by everted lips, low-bridged noses, projecting jaws and teeth, attenuated lower legs, and a variety of other physical attributes. All recent assessments of ancient Egyptian art invariably focus on the portrayal of this configuration (Breasted, 1909; Diop, 1955; James, 1988; Van Sertima, 1985; Vercoutter, 1976). Whatever name is used, the underlying mind-set is the same, and it is the old-fashioned typological essentialism of the "race" concept.

The category in the minds of the users of those various names is the same as the "true Negro" of traditional "racial" anthropology (Morton, 1844; Seligman, 1930, 1957). We do not deny that such a configuration exists and is identifiable, and that people who illustrate it can be found in known areas of sub-Saharan Africa. The problem lies in the assumption that those separate elements are invariably linked together so that the presence of one can inevitably be taken to indicate the presence of the others.

Traits under selective force control

The most immediately obvious and visible of that set of traits is skin color, and it is the one that classically has been used as a designation of "race." The very term "Negro," for example—the Spanish word for black—was intended to indicate a person with a visible concentration of the pigment melanin in the skin. Melanin, however, serves as protection against the potentially damaging effects of solar radiation (Parrish et al., 1978; Robins, 1991; and see the papers in Urbach, 1969), and selection can lead to similar degrees of its concentration in the skin of people in different parts of the world who, because of geographic separation, do not share the quantity of adaptively trivial genetic features usually held in common by relatives and neighbors.

The elongation of the distal segments of the limbs is also clearly related to the dissipation of metabolically generated heat. Since heat stress and latitude are clearly related, one would expect to find a correlation between the two sets of traits that are associated with adaptation to survival in areas of great ambient temperature—namely skin color and limb proportions. This is clearly the case in such areas as equatorial Africa, the tropical portions of South Asia, and northern Australia, although there is little covariation with other sets of inherited traits. In this regard, it is interesting to note that the limb proportions of the Predynastic Naqada people in Upper Egypt are reported to be "super-negroid," meaning that the distal segments are elongated in the fashion of tropical Africans (Robins and Shute, 1986). It would be just as accurate to call them "super-Veddoid" or "super-Carpentarian" since skin color intensification and distal limb elongation is apparent wherever people have been long-term residents of the tropics. The term "super-tropical" would be better since it implies the results of selection associated with a given latitude rather than the more "racially loaded" term "negroid."

Nasal bridge elevation and elongation is also a trait influenced by the forces of selection. These are related to the relative lack of moisture in inspired air (Glanville, 1969). That in turn is only very tenuously determined by the intensity of solar radiation. Air in tropical deserts, of course, is obviously arid, but cold air in the less insolated parts of the world also has a notably reduced moisture carrying capacity, and one would expect to find a discernible development of the anatomical features associated with the moistening of inspired air in those people whose ancestors were long-time residents in the colder parts of the world. This is indeed the case as is shown by the examples of the members of the European and Amerind clusters (Brace and Hunt, 1990). We would not expect this kind of adaptation to be selected for in the moist tropics such as West Africa and the Congo basin, and there, as anticipated, we can note the absence of nasal elevation and elongation.

The East Horn of Africa, however, is another situation entirely. Like much of the Arabian peninsula and the Sahara itself, it is very dry. Solar radiation is intense, and we would expect to find an increased amount of melanin in the skin of the long-term residents of the equatorial portion of that area. We would also expect them to display a degree of nasal elevation and elongation unlike that of the long-term residents at the same latitude but in the moist tropics to the west. This in fact is the case, as we can demonstrate with our own measurements. When the non-adaptive aspects of of craniofacial configuration are the basis for assessment, the Somalis cluster with Europeans before showing a tie with the people of West Africa or the Congo basin.

An earlier generation of anthropologists tried to explain face form in the Horn of Africa as the result of admixture from hypothetical "wandering Caucasoids," (Adams, 1967, 1979; MacGaffey, 1966; Seligman, 1913, 1915, 1934), but that explanation founders on the paradox of why that supposedly potent "Caucasoid" people contributed a dominant quantity of genes for nose and face form but none for skin color or limb proportions. It makes far better sense to regard the adaptively significant features seen in the Horn of Africa as solely an in situ response on the part of separate adaptive traits to the selective forces present in the hot dry tropics of eastern Africa. From the observation that 12,000 years was not a long enough period of time to produce any noticeable variation in pigment by latitude in the New World and that 50,000 years has been barely long enough to produce the beginnings of a gradation in Australia (Brace, 1993a), one would have to argue that the inhabitants of the Upper Nile and the East Horn of Africa have been equatorial for many tens of thousands of years. On the other hand, the residual similarity between the craniofacial configurations of the Somalis with people farther north suggests that genetic exchange has been more continuous than exchange with peoples farther west in sub-Saharan Africa.

Jaw and tooth size are also under selective force control and have a separate evolutionary trajectory that has nothing whatsoever to do with either solar radiation or ambient humidity. One would expect their distribution in the world to be independent of the distribution of skin color and nose form, and this is in fact the case (Brace, 1993a,d). Elsewhere it has been shown that dental reduction since the end of the Middle Pleistocene is proportional to the antiquity of the technology associated with the preparation of food (Brace, 1979; Brace et al., 1987) and that the time depth of this is different in different parts of the world, which is why there is a spectrum of tooth-size difference among modern human populations (Brace, 1993c; Brace et al., 1991). Most of our sub-Saharan African samples fall into the "megadont" category used by Flower to indicate relative tooth size (Brace and Hunt, 1990; Brace et al., 1991; Flower, 1885), but the Somalis from the Horn of East Africa sit right on the dividing line between "mesodont" and "microdont." Evidently the ancestors of the Somalis had long been associated with food preparation practices that reduced the selective force intensity maintaining tooth size. This is consistent with the possibility that the Ethiopian highlands were the locale of one of the ancient and semi-independent centers of plant domestication (Harlan, 1969, 1971; Harlan et al., 1976; Stemler, 1980; Vavilov, 1951).

Adaptively trivial traits and regional clusters

It is essential, at this point, to make the distinction between traits whose manifestation and distribution are principally determined by natural selection and those which are simply indicators of genes that are shared because of regional proximity (Brace, 1993a). Of the various traits assumed to be present in the "true Negro," skin color, lower limb attenuation, nose form, and tooth and jaw size are certainly under selective force control. The first two, skin color and limb elongation, are adaptations to the intensity of solar radiation—the first directly so and the second indirectly. Since this is so clearly the case, we should expect those two traits to covary, as indeed they tend to do, throughout the world.

Evidently, traits that are distributed in conjunction with the graded intensity of their controlling selective forces will be poor indicators of population relationships (Darwin, 1859). This is the logic behind Livingstone's classic phrase, "There are no races, there are only clines" (Livingstone, 1962:279). The use of a characterization of a single trait that is under selective force control to generalize about any particular human population can only create confusion. This then will be the inevitable consequence of the use of a description of skin color to say anything about the general nature of human biological variation. The use of the designation "black" in America today to specify a person of African ancestry is the most flagrant example. In the first place, although human skin color may be very dark, it is *never* black. Furthermore, "black" Americans almost always have a non-African genetic component and are rarely as dark as their African ancestors. Finally, skin color in such places as southern India, Melanesia, and the northern part of Australia is every bit as dark as it is in "darkest Africa," and yet the time depth of the separation of those various "black" populations may well be greater than the time of the divergence of the ancestors of Europeans from African forebears.

It can also be misleading to use an ethnic or linguistic designation to characterize human biological form. Elsewhere it has been shown that the Mongols proper are metrically peripheral to the mainland cluster in East Asia, and the use of their name to refer to the bulk of Asians would be just as misleading as the use of "Eskimoid" to encompass the bulk of the original inhabitants of the western hemisphere (Brace, 1993a; Li et al., 1991). The use of the term "Ethiopian" to stand for all the heavily pigmented people in Africa as was done in classical antiquity and from the Bible to Kipling is equally confusing (Blumenbach, 1794; Jeremiah, 13: 23; Kipling, 1912; Snowden, 1970, 1989). As our data show, the people of the Horn of Africa are craniofacially less distinct from a spectrum of samples marginally including South Asia and running all the way from the Middle East to northwest Europe than they are to any group in sub-Saharan Africa. Likewise, the use of a term such as "Hamitic" to indicate the biological relationships of the people who speak Afroasiatic languages (Seligman, 1913, 1915, 1934) runs into trouble when the tie can be shown between Somalis, Egyptians, and various other groups such as Bronze Age Jericho and Neolithic and modern Europe.

It has long been a matter of common observation, however, that people who come from the same part of the world bear a recognizable resemblance to each other. Traditionally, that resemblance was the basis for the assigning of "racial" labels. These in turn were thought to reflect differences in origin, and it was further assumed that the configuration of traits by which a "race" was recognized had some kind of rankable adaptive value. As we have seen, however, traits with adaptive value are clinally distributed according to the distribution of the relevant selective forces. What is not clinally distributed, then, must be what remains after the distribution of adaptive traits is accounted for (Brace, 1993a).

Traits that show associations with each other only within the context of a given region, then, inevitably have no adaptive significance. When a large number of features occur together in a given geographic area, the principal agent controlling their occurrence is the sharing of genes between neighboring groups that are by definition relatives. Traits that combine to produce a picture of delimited regional occurrence of necessity then will be nonadaptive or trivial traits. Because of their trivial nature, they will not easily suggest labels by which their possessors can be denoted.

The pragmatic solution to the problem of designation is best dealt with by the use of simple geographic terms. This is graphically demonstrated in Figure 2. Not only is there no invidious loading involved, but the focus can be expanded or contracted in simple and efficient fashion as, for example, by specifying directions such as Northwest Europe, Central Europe, West Africa, Southeast Asia, and the like.

A full-scale biological assessment of the ancient Egyptians, as of any other people, has to include both a consideration of their genetic relationships and an evaluation of the status of those traits that have responded to the forces of selection (Brace and Hunt, 1990). Our own battery of craniofacial measurements, however, deals with traits that, for the most part, have little demonstrable relationship to specific selective forces. For this reason, the similarities and differences that emerge from their use are largely indicators of the genetic relationships of the groups compared.

Figure 2 might be construed as providing support for the hoary folk belief that modern *Homo sapiens* can be sorted into three convenient "races": "caucasoid," "mongoloid," and "negroid." When the number of separate regional representatives is multiplied, however, it becomes clear that the ties between adjacent twigs on the dendrograms are simply indications of the extent to which geographically adjacent people are genetically related to each other rather than the extent to which they reflect anything that could be called a "racial" essence. Large geographic regions obviously will have many resident and related populations, and an assessment of their trivial traits will automatically produce adjacent twigs on a dendrogram which by definition constitute a cluster.

Since the traits by which these genetic relationships are demonstrated have little if any adaptive value, there is no way to assert that any given configuration is, in any determinably adaptive sense, "better" or "worse" than any other. The picture of regional clusters simply reflects the fact that genetic exchange between people in a given area is more frequent than genetic exchange between people of differing areas. What we get, in essence, is exactly the same as what we would get if we could compare the nucleotide sequences of either nuclear or mitochondrial DNA. Gene flow between adjacent areas does occur, however, and the characteristics of one region will grade insensibly into those of another where they adjoin. For that reason, people who live in between major geographical areas will share aspects of the trivial configurations of each.

The skin color cline in the Nile Valley

The control of traits that *are* determined by the forces of selection and *are* of adaptive value, however, is not simply a reflection of the frequency of genetic exchange. In these instances, the gene flow between one region and another is sufficient to make available the genetic potential for selection to operate and to produce the gradients in adaptive traits that pass from one geographic region to another without any break. The best studied example of this phenomenon is the distribution of hemoglobin S in conjunction with the distribution of *falciparum* malaria (Livingstone, 1958, 1989a,b). The covariation of skin color and the intensity of the ultraviolet component of solar radiation is another such example. The distribution of malaria, however, is not determined by the intensity of ultraviolet radiation. Consequently the distribution of hemoglobin S is completely unrelated to the distribution of melanin in the skin.

For these reasons, we agree with Bernal when he speaks of the "dubious" utility of the concept of "race" and that it is based more on human mental constructs than on biological reality (Bernal, 1987, 1989). However, we can use our data to take issue with his claim that "it is impossible to achieve any anatomical precision on the subject" of the biological relationships of the ancient Egyptians. Because we had too few Neolithic Greek specimens and no recent samples from Greece or the adjacent Balkan countries, we are not in a position to test Bernal's suggestion that the emergent Greek cultural phenomenon owed an important debt to the actual movement of people from Egypt to the Aegean (Bernal, 1987), although there is no reason why our procedures cannot be applied to provide a direct test of this question when the relevant samples are measured and assessed. Actually, the fact that so many European Neolithic groups in Figure 4 tie more closely to the Late Dynastic Egyptians near the Mediterranean coast than they do with modern Europeans provides suggestive support for an eastern Mediterranean source for the people of the European Neolithic at an even earlier time level than Bernal suggests for the Egyptian-Phoenician colonization and influence on Greece early in the second millennium BC (Ammerman and Cavalli-Sforza, 1973, 1979; Bernal, 1987:2; Cavalli-Sforza et al., 1993; Sokal et al. 1991).

Since our data are exclusively measurements on skulls, we can say nothing about the evidence concerning the skin color of their owners when they were alive. Our information on that score comes from the reports of Herodotus and from the inscriptions and pictures of the ancient Egyptians themselves (Herodotus, 1924; Snowden, 1970, 1976, 1983; Vercoutter, 1976). From what we can learn from these various sources, and taking account of the shades assigned by the artistic conventions of the Egyptians to depict male and female appearance (Yurco, 1989), it would appear that skin color in ancient Egypt was essentially the same as it is today.

Dark skin color is an indicator of long-term residence in areas of intense solar radiation, but it cannot help distinguish one tropical population from another. There is the very real possibility, for example, that the darker skin pigmentation visible in the people of the Upper Nile is not caused by the mixing of a population that came from somewhere else. Instead, it could just be the result of selection operating on the people who were already there, as has been suggested by those who have argued for the continuity of human biological form through time in Nubia (Adams, 1979; Batrawi, 1946 [in marked contrast to 1935]; Berry et al., 1967; Carlson and Van Gerven, 1977, 1979; Greene, 1966, 1972; Van Gerven, 1982; Van Gerven et al., 1973). With the relatively tentative exception of the Epipaleolithic at Wadi Halfa, our own data are comfortably compatible with a picture of long-term local regional continuity. That would make the skin color gradient running from Cairo via Khartoum 1,600 km to the south and deep into the tropics an example of a true cline (Huxley, 1938). This would lead us to agree with Trigger that the attempt to assign the people of the Nile valley to "caucasoid" and "negroid" categories is "an act that is arbitrary and wholly devoid of historical or biological significance" (Trigger, 1978:27).

Who were the ancient Egyptians?

Since adaptive features are inadequate indicators of population relationships, the latter are best demonstrated by the use of dimensions that are not significantly related to the action of specific selective forces (Darwin, 1859). As we have already noted, most of the measurements that contribute to the construction of our dendrograms record dimensions that have little obvious adaptive value. Nasal elongation and elevation clearly do respond to selective force constraints, and, insofar as our measurements actually reflect this kind of variation, there may be some cases in which the picture of relationships derived from our analyses is blurred by similar adaptive responses in otherwise unrelated populations. The one instance where we suspect that this may have occurred is treated elsewhere (Brace and Hunt, 1990; Brace and Tracer 1992). In the present analysis, however, we have no reason to anticipate that this could have created a problem or produced a spurious picture of relationships. The dendrograms in Figures 2–4, then, depict degrees of proximity that are based more on actual kinship than on similarities in adaptive response.

By the use of the discriminant function procedure, we reinforce the conclusions drawn from an examination of our dendrograms. The Predynastic sample from Upper Egypt differs less from the Somalis to the south than do the Late Dynastic people from Lower Egypt. The latter in turn show ties with the inhabitants of the circum-Mediterranean basin past and present. Geographic proximity alone would lead us to expect such a result. Furthermore, it is fully consistent with what we know from Late Dynastic Egyptian history (MacIver, 1900). The very fact that Herodotus himself visited Egypt around 450 BC illustrates this contact (Sayce, 1896), as does the presence of E 597 in the Late Dynastic cemetery at Giza.

Assyrian political domination was followed by Persian control and, finally, Egyptian independence was ended with the invasion of Alexander the Great in 332 BC (Bowman, 1986). Before he set off on his career of conquest, however, Alexander made a foray up the Danube to enforce the domination of Greece over its neighbors to the north (Plutarch in Clough, 1875). In the course of this exercise, he accepted gifts from representatives of people still farther to the north and west, and he concluded alliances with a number of Germanic groups including some Swabians who came from the very area that has yielded our sample of the German Neolithic (Arrian in Chinnock, 1884; Curtius, 1971). Of course that Neolithic was several thousand years earlier, but it is just possible that their descendants were still living there in what is now southwestern Germany, and that their kinsmen were among those who concluded that alliance with Alexander. And, given his use of troop contingents from tributary states, it is just possible that one of them accompanied Alexander to the Nile Delta in 332 BC where he was left with the occupying forces while Alexander himself went back for his final confrontation with Darius and his foray into India (Budge, 1925; Malik, 1976; Curtius in M'Crindle, 1896).

A scenario such as this could account for E 597 in Egypt prior to 300 BC. Whether it was this exactly or another story, the presence of a palpable early German in a Late Dynastic Egyptian cemetery exemplifies the contact that the delta region had with the world to the north and west. The contribution that such individuals surely made to the Lower Egyptian gene pool (Bowman, 1986) could well explain why both our dendrograms and our discriminant function analysis suggest that the people of Lower Egypt at the end of Dynastic times had more in common with members of our European regional cluster than was true for the inhabitants of Upper Egypt 3,000 years earlier. In turn, the Nubians still farther up the Nile are more closely tied to their neighbors in Upper Egypt than they are to the Late Dynastic Egyptians farther off to the north, and they are even less close to the European cluster farther yet to the north and west.

The growing record of written history that has accumulated in an unbroken stream since Herodotus in the fifth century BC shows us that contact between one region and another was a continuous phenomenon in the form of military excursions and trading expeditions. However, there is every reason to believe that the same thing had been going on back in the Bronze Age and earlier. The three millennia of pictorial and written accounts during the Bronze Age in the Nile valley provide ample evidence of contact between the Egyptians and people of the Middle East as well as with people farther south into "Black Africa."

The very plants and animals whose tending constituted the agricultural basis for Egyptian civilization were imported from the Middle East where they had been domesticated in the first place (Wenke, 1989). The subsequent development of hieroglyphic writing may well have been influenced by the earlier Sumerian model (Gregersen, 1977). Anatomist-anthropologists from an earlier generation (e.g., Smith, 1923 [1970]), despite the blatant racism of interpretation, concluded from the study of Egyptian and Nubian burials that genetic contact with Africa to the south was also a continuing matter (Smith, 1910; Smith and Derry, 1910).

In spite of all this, however, the genetic continuity in situ maintained a predominately Egyptian configuration in those trivial biological features that have no differential survival value. Like China, which has managed to absorb its various Manchu and Mongol conquerors and yet remain recognizably Chinese since the Neolithic (Brace and Tracer, 1992; Li et al., 1991), Egypt, also from the Neolithic on, absorbed its various Assyrian, Persian, and Greek rulers with barely detectable effects on its basically Egyptian identity (Berry et al., 1967).

The argument over the "racial" identity of the ancient Egyptians appears to have been fueled more by "racial" pride than by any kind of objective assessment. Cuvier, early in the 19th century, declared that the Egyptians were "caucasiques" (Cuvier, 1817), and this was repeated with self-satisfied pride by others subsequently (Colfax, 1833; Morton, 1844; Nott, 1844). Recently there have been attempts to claim Egypt as a support for pride in a "black" heritage as, for example, in the statement that "Egyptians belong among the black races" (Diop, 1981:35) emphasized by the identification of "une origine nègre de la race et de la civilisation égyptienne" (Diop, 1955:161; and clearly followed in Asante, 1990). The pride in "racial" accomplishment evident in claims that the Egyptian "pyramid-builders" and even the "Harrappans" (sic) of the Indus valley in Pakistan were "Africoids" (Finch, 1985) received a boost in Bernal's use of the term "Black Athena" to promote his emphasis on the "Afroasiatic" background to the development of classical Greek language and culture (Bernal, 1985).

Consistent with the position we have developed above, we would have to argue that these statements are hopelessly simplistic, misleading, and basically wrong. Even the categorical labeling of the civilization of ancient Egypt as "fundamentally African" (Bernal, 1987, 1989) is misleadingly simplistic. To the classical world, there were several Africas: the "north face of Africa" along the Mediterranean coast, the "Black Africa" to the south, and especially the connection via the Nile through Nubia to the Sudan (Adams, 1977) that formed "almost a 'third Africa'" (Brilliant, 1979). When the debt of Greece and later Rome to that "third Africa" is stressed by the label "Black Athena," it is misrepresented. Even the use of the term Afroasiatic, however justified, should be accompanied by the note that this implies no more than the identification of the language family that includes ancient Egyptian and modern Arabic, Hebrew, and Somali (Greenberg, 1955; Gregersen, 1977).

Remarkably, Blumenbach's consideration of Egyptian form in the perspective of what he knew about the worldwide spectrum of human biological variation was more sophisticated than the crude, categorical "either/or" treatment of his 19th and 20th century successors. He identified three "varieties in the national physiognomy of the ancient Egyptians:" an "Æthiopian cast," "one approaching to the Hindoo" and a "*mixed*, partaking in a manner of both the former" (1794:191, original emphasis). His use of the term "mixed," however, did not refer to the actual mixing of separate populations. Instead, it was a purely descriptive expression. He concluded that "the Egyptians will find their place between the Caucasian and the Æthiopian," where he was using the term "Æthiopian" to refer to all of sub-Saharan Africa (1794:193).

All subsequent treatments in the 19th century dealing with the biological relationships of the ancient Egyptians made respectful reference to Blumenbach's observations and duly considered the possible tie with the people of the Indian subcontinent—South Asia. Lawrence (1819), Morton (1844), and Nott (1844) all echoed Blumenbach. In the same vein, Prichard remarked on the "resemblance between the Egyptians and the Hindoos" and wondered whether it derived from a "partial colonization of one country from another," or ensued from a "close relation in the first ages of the world" (1851:218). Pruner-Bey also picked up on Blumenbach's lead but, in spite of being impressed by the physical resemblances, rejected the idea of actual relationship because of the lack of any linguistic connection (Pruner-Bey, 1863). He concluded that the visible similarities were just a case of parallelism (1863).

The possibility of a connection between South Asia and Egypt emerged once again as a result of the metric exercises carried out by some of the protégés of Karl Pearson in London. While there was a continuing effort to see something "negroid" in the Predynastic Egyptians (Morant, 1935, 1937), the use of the Coefficient of Racial Likeness managed to provide a quantitative dimension to Blumenbach's assessment. Cranial similarities were shown between Predynastic Egyptians and "the primitive Indian, the Dravidian and the Veddah," at the same time that a clear-cut separation from the "Negro type" was noted (Stoessiger, 1927:147). The Predynastic Egyptians were also claimed to show some resemblance to the Sardinians west of the Italian peninsula (Morant, 1935).

Although the Coefficient of Racial Likeness was abandoned after its statistical flaws were pointed out (Fisher, 1936a), it is interesting to note that, flaws or not, the patterns shown in our Figure 4 and Table 5 also indicate similarities between the Predynastic Egyptians and India. In separate tests that we removed from our already cluttered figures, we were able to show that Sardinians and, somewhat less obviously, Etruscans in the western Mediterranean are about equidistant between Late Dynastic Egyptians and modern Europeans.

Both discriminant function (Fisher, 1936b, 1938) and $\mathbf{D}^2$ (Mahalanobis, 1930, 1936, 1949) have been accepted as useful approaches to population comparisons that are not plagued by the problems of the Coefficient of Racial Likeness (Howells, 1973), and we have used discriminant functions to produce the values in Table 5. Just to make doubly sure, however, we also tried Mahalanobis' $\mathbf{D}^2$ statistic as well. Instead of the C scores for the individuals used to generate Figure 4, we used raw measurements to produce $\mathbf{D}^2$ values for all of the groups represented. These were then used to generate a dendrogram, and the results were strikingly similar to our Figure 4. The only difference is not one of pattern but rather the tendency for a greater degree of group separation to be displayed as a result of using $\mathbf{D}^2$ figures to produce our dendrograms. Because this dendrogram was so similar to Figure 4, we did not feel it necessary to include it here. However, we do list the $\mathbf{D}^2$ values in Table 6 in case any of our readers would be interested in using them to generate their own dendrograms and test our assertions.

The tie between the Nubians and South Asia is even more obvious than the

TABLE 6. Matrix of Mahalanobis' D^2 values for the 25 samples represented in Figure 4

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1	–																								
2	23.6	–																							
3	13.8	8.2	–																						
4	11.4	19.0	5.5	–																					
5	2.3	16.7	8.9	9.0	–																				
6	20.1	3.4	3.6	15.4	14.0	–																			
7	20.8	3.1	7.2	17.4	15.6	4.4	–																		
8	13.8	3.9	6.9	15.5	9.3	4.9	1.9	–																	
9	19.5	5.8	6.2	16.6	12.4	3.3	4.5	3.7	–																
10	22.9	24.6	9.2	7.3	16.1	18.0	25.1	22.5	16.3	–															
11	20.7	4.7	5.5	14.1	14.9	3.9	1.8	4.5	4.1	20.0	–														
12	26.2	6.0	5.6	14.5	20.4	4.7	3.4	7.9	7.5	21.7	1.7	–													
13	21.7	3.1	5.4	16.8	16.4	1.8	1.6	3.7	4.2	24.0	2.1	2.2	–												
14	21.3	3.8	6.6	15.2	15.0	4.7	6.1	4.3	6.3	18.5	9.2	9.9	6.3	–											
15	18.5	6.8	11.0	23.1	14.2	6.4	6.0	4.7	9.2	33.4	10.1	12.6	5.7	7.1	–										
16	12.6	4.4	9.6	18.6	8.2	6.4	4.5	1.9	5.9	26.2	6.3	10.7	6.0	8.0	6.6	–									
17	28.1	7.6	4.9	13.8	22.6	4.5	7.1	11.2	10.7	20.8	5.8	2.9	4.3	8.4	13.1	14.4	–								
18	23.3	5.8	7.4	17.2	16.6	5.4	2.8	3.5	4.6	21.2	4.8	5.6	4.3	4.3	8.7	7.4	8.1	–							
19	11.4	15.4	3.6	3.9	7.0	10.1	15.7	12.5	11.3	4.8	13.6	15.0	14.4	10.9	17.7	14.6	13.6	13.6	–						
20	5.0	9.7	8.0	10.2	3.7	9.9	8.3	5.1	9.1	21.0	8.8	12.9	9.5	10.6	9.5	4.9	15.3	11.7	10.2	–					
21	6.5	9.4	9.3	13.2	4.3	9.8	6.8	3.2	7.7	23.4	7.6	13.2	8.8	11.4	8.9	2.8	17.1	10.8	12.7	1.8	–				
22	15.5	2.6	4.6	14.2	10.3	2.1	2.2	1.5	2.2	19.3	3.5	5.4	1.9	3.1	4.5	3.4	7.6	3.3	10.8	5.7	5.7	–			
23	15.5	3.2	2.3	9.3	10.8	2.1	2.5	2.8	4.0	16.1	2.9	3.2	1.6	3.2	6.2	5.5	4.0	3.4	8.1	6.1	6.7	1.2	–		
24	9.6	5.8	7.2	11.6	6.8	7.1	3.9	2.1	5.2	18.9	5.0	9.0	6.2	7.1	7.9	2.8	12.9	6.1	9.8	3.0	2.9	3.1	3.8	–	
25	17.6	5.5	8.2	20.1	14.0	4.4	2.4	2.6	5.2	28.5	4.7	6.9	2.6	7.0	3.5	5.4	10.0	5.5	17.5	7.7	6.7	2.0	3.8	5.5	–

[1] Africa.
[2] Africa, Northern.
[3] Amerind.
[4] Asia.
[5] Australo-Melanesia.
[6] Denmark, Neolithic.
[7] Egypt, Late Dynastic.
[8] Egypt, Predynastic.
[9] England, Neolithic.
[10] Eskimo.
[11] Europe, Central.
[12] Europe, Northwest.
[13] France, Neolithic.
[14] Germany, Neolithic.
[15] Greece, Neolithic.
[16] India.
[17] Iran.
[18] Jericho, Bronze Age.
[19] Jōmon-Pacific.
[20] Nubia, Bronze Age.
[21] Nubia, Christian.
[22] Portugal, Neolithic.
[23] Russia, Neolithic.
[24] Somalia.
[25] Switzerland, Neolithic.

Predynastic Egypt-South Asia tie, but this just adds another dimension to what Blumenbach first recognized two centuries ago. On the map, the Nile valley is physically located between the main bulk of the African continent and South Asia to the east. That its population should show aspects of people both to the east and to the west was to be expected in the way that Blumenbach looked at the nature of human variation.

His successors (except Prichard) adopted an increasingly categorical and essentialist view of the nature of human biological variation where a population was either one thing or another—or a literal mixture between them. Blumenbach, however, saw human form as grading without break from one region to another (Blumenbach, 1865). The continuum could be cut however one might choose to suit one's convenience. The Egyptians who displayed a mixture of "Hindoo" and "Æthiopian" characteristics were not therefore a mixture of separate "primordial" elements but just what would be expected to occur between one region and another.

These expectations are precisely what we are defending in our present treatment, although we are not making an attempt to resuscitate his view that human origins are to be sought in the Caucasus (Blumenbach, 1865; Stoessiger, 1927). If this is at odds with the way that most physical anthropologists have dealt with the matter, this is because of the categorical and "polygenist" concept of "race" that grew and flourished in America and France during the 19th century and after, and which subsequently has been the model adopted by much of the rest of the world (Brace, 1982, 1990, 1993a).

CONCLUSIONS

The attempt to force the Egyptians into either a "black" or a "white" category has no biological justification. Our data show not only that Egypt clearly had biological ties to the north and to the south, but that it was intermediate between populations to the east and the west, and that Egypt was basically Egyptian from the Neolithic right on up to historic times. In this, our analysis simply reinforces the findings of other recent studies (Adams, 1967, 1977; Berry et al., 1967; Carlson and Van Gerven, 1977, 1979; Greene, 1966; Keita, 1990; Van Gerven, 1982). Although it was cast in a somewhat patronizingly "sociobiologistic" fashion, this was clearly the message of the English Egyptologist Sir E. A. Wallis Budge when he noted that, although the "physical and mental characteristics of the original Egyptians were modified temporarily as a result of intermarriage with their conquerors, . . . no amount of alien blood has so far succeeded in destroying the fundamental characteristics, both physical and mental, of the 'dweller of the Nile mud,' i.e. the fellâh, or tiller of the ground, who is today what he has ever been" (Budge, 1925: 11).

If this conclusion is close to the one that we have reached after wrestling with the available data and with nearly two centuries of scholarly pronouncements, it has been most directly stated recently by Abdel-Latif Aboul-Ela, the director of the cultural office in the Egyptian Embassy in Washington, D.C. In 1989, the Dallas Museum of Natural History sponsored an exhibit at the Texas State Fair Grounds depicting Egyptian culture at the time of Ramses the Great. When the Blacology Speaking Committee in Dallas threatened to boycott the exhibit unless Ramses II was represented as "black," Mr. Aboul-Ela justifiably complained that the point of the exhibit was being distorted by what we might call a peculiarly American form of "racial politics." As Mr. Aboul-Ela put it, "Ramses II was neither black nor white but Egyptian." When he referred to the scope of the exhibit, he stated, "This is an Egyptian heritage and an Egyptian civilization 100 percent." "Egypt of course is a country in Africa, but this doesn't mean it belongs to Africa at large." "We cannot say by any means we are black or white. We are Egyptians" (Associated Press, 1989).

The Associated Press release that carried these words was entitled, "Egypt Says Ramses II Wasn't Black." It could just as well have read "Egypt Says Ramses II Wasn't White," but either version misses the point. Egyptians are Egyptians, and in a society where the perception of human biological identity is distorted to the point where it can only be rendered in black and white, the denial that an Egyptian is one must also be accompanied by the denial that an Egyptian is the other—just as Mr. Aboul-Ela did.

Where human traits have adaptive significance, their distributions are determined by the distribution of the controlling selective forces and "there are no races, there are only clines." Where traits have no adaptive significance, neighbors will share traits with neighbors and the analysis of adjacent samples will show that they cluster together. Both situations occur in the Nile valley. The quantity of melanin in the skin increases from the delta in the north up the Nile into the tropics, reaching a maximum at the equator in the south. Neighboring populations share trivial traits with each other to the extent that they form clusters based on relationships and strictly in proportion to breeding distance.

The old-fashioned chimerical concept of "race" is hopelessly inadequate to deal with the human biological reality of Egypt, ancient or modern. But neither the use of clines nor clusters alone can present a complete account. An assessment of both is necessary before we can understand the biological nature of the people of the Nile valley. Because the ancient Egyptians lived with this knowledge of themselves, they "did not think in terms of race" (Yurco, 1989:24). For our own part, we should recognize how "presumptuous" it is "to assign our own primitive racial labels" (Yurco, 1989:58) to them or to anyone else. These not only prevent us from dealing with human biological variation in an adequate fashion, but they also lend themselves to the perpetuation of social injustice. The "race" concept did not exist in Egypt, and it is not mentioned in Herodotus, the Bible, or any of the other writings of classical antiquity (Brace, 1990). Since it has neither biological nor social justification, we should strive to see that it is eliminated from both public and private usage. Its absence will be missed by no one, and we shall all be better off without it. R.I.P.

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