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Analysis of Naqada Predynastic crania: a brief report

This paper examines the affinity of southern Predynastic crania from earlier Naqada levels, in the context of Nile Valley human variability. Naqada I (3900 B.C.) and II (3600 B.C.) cultures succeeded Badari (4400-4000 B.C.) in southern Egypt, and preceded the Dynasty O and I periods (Williams 1986; Hassan 1988). Some earlier workers (e.g. Petrie 1920) viewed a portion of the Naqada I-II culture continuum as having been fundamentally an import from the Middle East or delta as noted in Hoffman (1988) and Holmes (1989), but there is little to support this view. Naqada culture primarily derived from Badari which was firmly rooted and integrated in the ecology of the southern Nile and its native fauna and flora, as reflected in hieroglyphs, symbolism, religion and funerary architecture; all of these items have their origins in the southern Proto- and Predynastic cultures which in turn derive from a Saharo-Sudano Nilotic African base (Williams 1986; Hassan 1988; Hoffman 1988). Indirect Near Eastern influence is seen in some of the domesticates (Hassan 1988), which are also found in Neolithic Europe. Archaeology does not suggest major migration or population replacement from the Near East.

Currently, major continuity between Badari, Naqada I, Naqada II, and Dynastic cultures is stressed (Hoffman 1988; Hassan 1988), although there was an increase in trade with the Middle East in later periods (Hassan 1988). Internal exogamy is postulated (Hassan 1988). Given the cultural continuity in a fundamental sense, the crania of earlier Naqada periods are examined against the variability of Badari skulls for evidence of biological change.

Previous studies

Previous work was often concerned with the "race" of the creators of Naqada cultures and ancient Egyptian in general. Either the homogeneity of remains was under question or Naqada membership in a particular "race" was at issue. This literature cannot be avoided in any representative review. Modern workers usually work from an inductive perspective utilizing real populations or their equivalent, instead of a deductive reductionist racial identity approach. This

theoretical perspective acknowledges primarily the validity of the local population. Consequently efforts are directed towards establishing population affinity and not racial identities as conceived by earlier workers. It is curious, misleading and unfortunate that the old racial terms are still (mis) used, although the race concept has fallen into disrepute. The "no-race" school has failed to develop new terminology. Serious workers also utilize archaeological and linguistic data to place their results into a context of the most likely probabilities, since all similarity does not mean close relatedness in a genealogical sense. The interest is in real relationships. Morphological or morphotypological studies and comments on the morphology of Naqada crania are not consistent in their conclusions. They have been described as "Negroid-Caucasoid" hybrids and/or a composite "Caucasoid" and "Negroid" population (Fawcett & Lee 1902; Myers 1902; Morant 1925; Falkenburger 1947; Nutter 1958), or as "Mediterranean", ultimately not of "Black" or "White" origin in close reading of Sergi's (1901) views. Smith (1909) with Derry (1910) noted that late Predynastic (Naqada) crania morphologically resembled A-group Nubian remains, and that earlier Predynastic (Naqada) crania resembled those of "Middle" (C-group) Nubians. The Naqada crania have been interpreted as non-"Caucasian" indigenous tropical Africans, but non-"Negro" (Giuffrida-Ruggeri 1915; 1916; 1922) and designated Ethiopian or Erythraean (Giuffrida-Ruggeri 1922); however descriptions in Giuffrida-Ruggeri's work would generally be designated "Negroid", although not as extreme as forest belt groups. It should be understood that there is a range of indigenous Saharo-tropical African or just biological African variation, fully predicted at molecular and morphological levels by an evolutionary perspective. Narrow noses and faces do not usually indicate a migration of, or admixture with Europeans or "Euripides" (see Hiernaux 1975). The Late Pleistocene subfossil record clearly suggest that these characteristics or trends (called Elongated African by Hiernaux, 1975) arose as independent microevolutionary adaptations. The basic concept of "real African" cannot be restricted to the "Negro" (here called Broad trend) phenotype any more than "real European" is or can be restricted to "Nordic" or "East Baltic" phenotypes or that of the Caucasus mountains. That this is done is a product of recent social history, not scientific considerations. African biohistory has produced a range of phenotypes, and while there has been admixture there is no theoretical reason why the major portion of continent wide variation is not due to *in situ* differentiation.

Coon (1939) described Naqada crania as "Caucasoid" and less "Negroid" than the earlier Badari group. Stoessiger (1927) thought Naqada period crania to be more homogeneous than the Badari. Naqada crania have been interpreted by a rigid typological analysis to be trihybrid in origin, of the "Black", "Yellow" and "White" varieties, with the latter predominating (Wiercinski 1966, 1973). Strouhal (1971) questions the "Yellow" element. The morphology which may have prompted this conclusion may be related to the transverse flatness of the face (strictly across the malars). This is seen in many African peoples, but especially

stereotyped Khoisan speakers. Coon (1965) noted that some earlier workers believed that populations with Khoisan-like morphology were the original inhabitants of northern Africa. Taken as a whole, morphological descriptions suggest variability, and essentially Elongated African trend characteristics. Criticisms of morphological work include its frequent use of rigid typologies rooted in nineteenth and early twentieth century ideas and perceptions, which limited understanding and acceptance of the range of natural variation in given geographical areas. A tautological positivism is usually at work in these approaches.

Metric analyses of Naqada crania also have a long history. The first major study found that Naqada I, II and III crania, lumped together, formed a homogeneous series, a "race", by metric analyses (Fawcett & Lee 1902). This homogeneity was questioned by Myers (1902) who initially used a morphological approach. There is no necessary contradiction since aspects of morphology are not always easily described by metric variables. Myers saw the series as primarily a mixture (composite) of two "races" ("Mediterranean" and "Negroid"). Pearson (1905) denied this on statistical grounds (based on metrics), but stated that the series may have been a *Blumischung*, a population of hybrid origin (versus a mixture of distinct "races").

Studies using the discredited Coefficient of Racial Likeness (C.R.L.), placed all of the Naqada crania with the "Upper Egyptian type" (Morant 1925; Batrawi 1946). The D^2 values of Mahalanobis showed a combined series (Naqada I/II and other non-specific Naqada period remains) to be more similar to Tigrayan and Nubian groups than to those from northern late dynastic Egypt (Mukherjee et al. 1955). A multiple discriminant function analysis designed to ascertain African "Negro" influence found Naqada crania to have a greater similarity to the dynastic northern (Gizeh) and a southern, artificially constructed, Abydos series when compared to a Kenyan series, although Naqada crania show definite "Negroid" tendencies (Crichton 1966). Crichton suggested that he may have used the wrong "Negro" group, and that a "Nubian" series would have been more appropriate, thus disavowing a typological notion of African. The race paradigm is non-evolutionary and comes from a biased anthropology. A Naqada I cranial series, called "Negroid", was found to be nearly identical to one from Badari, using the Penrose statistic (Nutter 1958). Group mean values for the combined Naqada series in recent work suggest that its greatest affinities collectively are with southern Egyptians and Nubians, and other more southerly Africans (Hillson 1978). Hillson discovered that Egyptian series divide into northern and southern trends using more acceptable methods. Criticisms of these studies include use of the C.R.L. (Morant 1925; Batrawi 1946), inadequate or inappropriate comparison groups (Crichton 1966) and the use of too many variables (Crichton 1966). Multiple cluster analyses using the Penrose distance statistic show a combined Naqada series to group with Nubians and more southerly Africans before linking with the late dynastic northern Gizeh series (see Brauer 1976). No separate "Egyptian" cluster is seen in Brauer's (1976) work, which is what would be pre-

dicted by a grouping paradigm which viewed the Egyptians as totally unsimilar and unrelated to more southerly Africans; nor is there a "geographical" cluster consisting of only northern Nile Valley series. The metric pattern mapped by distinct Naqada crania is clearly different from that of the distinct core of late Gizeh and Near Eastern crania (see the territorial map in Keita 1988).

Distal/proximal limb ratios are known to have climatic correlations, which reflect adaptation in accordance with Allen's rule. Naqada values broadly place them with people of tropical African origin or descent (Warren 1897; Trinkaus 1981; Robins & Shute 1986). This is significant given that the northern Nile Valley is not in "tropical Africa" or southern India. They were not cold adapted immigrants.

Non-metric studies (Berry et al. 1967; Berry & Berry 1972) have shown the Naqada of all periods to usually be more related to other Egyptian series, although inexplicable inconsistencies in their data are present. For example, greatest relationships are often not between known geographically and diachronically successive series. This could suggest gene flow in intervening periods, other population processes or problems with the method. Early Naqada crania were found to be more similar to various temporally and geographically removed dynastic Egyptian groups than to late Naqada! The early Naqada series was also more similar to a Kerma (Kushite) and central Sudanese series than to the late Naqada series, although these were not the closest relationships. In another study a greater similarity for several Egyptian periods was noted to central Nile Valley Sudanese (upper Nubians) than to Palestinian or Byzantine groups (Berry & Berry 1972), though greatest similarity was to North Indians; this latter relationship can be discounted as being spurious since there is little supporting data in language, archaeology or history unless a radical diffusionist perspective is entertained. (A West African series was also suggested to have the same genetic origin as the Indian series! West Africans and Indians probably do not have a recent common ancestry). In summary, data from physical anthropology, archaeology and linguistics do not suggest a primary origin external to Africa for the early Nile Valley peoples.

Material

The Naqada group (from Naqada and Ballas) used here consists of 53 randomly chosen male, non-deformed, adult crania. The selection process was guided by the condition (completeness) of the crania, in order to avoid extensive estimation and modelled on the selection procedure described by Howells (1973). The crania were sexed morphologically using the standard criteria. The Naqada crania tend to fit the previous descriptions, in that they resemble "Middle Nubian" (C-group) crania more than those of later northern Egyptians. The Naqada crania grossly fit well into the range of variation observed in, and described for "neolithic" Saharan, Nubian, Kushite, Somali and other African crania. From a morphological perspective, Peloponesian and Byzantine (Aegean)

crania are notably less similar to the Naqada. Occasionally large and fairly rugged platyrrhine crania were observed, somewhat reminiscent of Epipaleolithic Nile Valley remains.

The crania are part of the collection of the Duckworth Laboratory at Cambridge University, Cambridge, England. They span the Naqada periods. This study follows the practice of using these crania as one series, as is usually done in metric studies (cf. Fawcett & Lee 1902; Mukherjee et al. 1955; Crichton 1966; Brauer 1976; Hillson 1978). This facilitates comparison, although theoretically problematic, since the time period is nearly 1000 years.

The comparative series of most importance are as follows: late dynastic northerners (Gizeh), Ninth Dynasty northerners (Sedment), Badari southern Predynastic crania, southern Dynasty I, and the Kerma (Sudanese) series. The discriminant space is given a broad analytical context by the additional use of series of equatorial Africans (Gaboon and Teita) and northwestern Europeans (Romano-British, Poundbury). A series from the Maghreb provides further comparative material. More complete descriptions are in Keita (1988).

Methods

The population affinity (not "racial" identity) is evaluated using a multivariate technique. Multiple canonical discriminant functions are used to evaluate the crania as series and unknowns as previously done (Keita 1988). An average value, the centroid score, allows for comparison of the series. The unknown analyses permit the study of the degree of overlap of the series under study with other series' patterns. The Badari series analyzed in this manner is presented for comparison. The crania from Badari are viewed as having the baseline morphometric pattern in upper Egypt, because of their temporal priority. Thus diachronic change, if any, in the Predynastic period is ascertainable. The comparison series are viewed as denoting southern and northern populational trends. There are always two southern Egyptian and northern Egyptian series with which crania can be classify.

Thirteen metric variables are used in the primary analysis. These are nasal height, nasal width, cheek height, upper facial height, bimaxillary breadth, bizygomatic breadth, maximum cranial length, biauricular breadth, basibregma height, basinasion length, horizontal circumference, minimum frontal breadth and maximum cranial length. They were taken by the investigator. An evaluation using the seven variables from Mukherjee et al. (1955) is carried out to achieve an independent comparison. The variables have been biologically justified in previous work (Keita 1988). The interest is in biologically legitimate discrimination in this modified phenetic approach to affinity. Discrimination for its own sake is not the goal. The goal is to examine trends, not establish a discriminant function to, in effect, create artificial "racial" types.

Results

The unknown analyses show a change from Badari to Naqada periods. The Badari crania classify into upper Egyptian-southern series at a rate 90-100%; the Naqada series distributes across the north-south boundary more evenly, with 61-64% classifying into southern series (Tables 1, 2).

Centroid scores suggest a Naqada similarity to Kerma Kushites (Sudanese) (Tables 3, 4). When an ancient Levantite series is included the Naqada value is little affected (Table 5) although this Middle Eastern series has some crania with affinities to early southern upper Egyptians and Nubians (Keita 1988), probably reflecting their real presence to some degree as attested to by archaeological and historical sources (see review in Keita 1988). When the crania with these and northern European affinities were eliminated the remaining Lachish crania as a group had a centroid value of 1.3 on Function I.

Discussion

The change observed from Badari to Naqada periods probably reflects increased migration or gene flow via exogamy in the Naqada periods as postulated by Hassan (1988). This probably represents exchange between local groups along the Nile corridor and not with the Near East, although trade increased with the latter at this time. However unknown selection pressures may be responsible for a trend towards a northern pattern.

The change from Badari to Naqada times probably reflects the breakdown of the isolation of southern Egypt from the north, and increasing social complexity before the First Dynasty. Increasing genetic variation is a corollary of increasing social complexity. Wildung (1984) presents evidence in support of some northern Delta groups participating in Naqada II, III, and Dynasty I culture; this suggests a socio-cultural basis for north-south migration or genetic exchange, given this early cultural and perhaps political unity. Perhaps there was no military conquest, as was traditionally taught, only the gradual incorporation of the north into southern culture. It is clear that Naqada material and "symbolic" culture replace the "Predynastic" culture of the north (Bard 1992). The Badari-Naqada continuum formed the cultural core of later Egyptian civilization.

Further research is suggested by this and previous work. Diachronic studies of contemporaneous early to late series from the south and north would be of interest to examine the issue of biological convergence. Affinity studies, using metric and non-metric traits, of Naqada, A-Group Nubian, northern Neolithic/Predynastic and insular early Near Eastern series would be of interest, since they overlap in time and perhaps space, especially in the case of late Naqada and A-Group cultures (Williams 1986; Hoffman 1988; Hassan 1988; Holmes 1989). There is no reason to automatically presume a lack of biogenetic similarity or totally separate biogenetic origin suggested by terms like "Nubian" and "Egyptian". Populations in these regions probably had complex interrelationships

Table 1. Unknown analyses of southern Predynastic series by period, in percent. 13 and 7 variables as indicated.

	Gabon Gaboon	Kenya Teita	Sudan Kerma	Southern Egypt Badari	Southern Egypt Naqada	Southern Egypt Abydos	Northern Egypt Sediment	Northern Egypt Giza	Algeria Carthage Maghreb	Roman Britain
Badari	13	9	32	--	36	4	0	0	9	0
4400-3900 BC	7	14	32	--	32	9	0	0	0	0
Naqada 3900-3300 BC	13	6	15	26	--	13	2	15	17	2
	7	6	19	21	--	9	11	15	13	0

Table 2. Summary values of unknown alalyes, in percent. 13 and 7 variables as indicated.

	overall Southern	distant Southern	Southern Egyptian	Northern Egyptian	Northern Egyptian	non-Egyptian Northerners	overall Northerners
					costal Maghreb	distant Northern	
BADARI	13	50			0	9	9
4400-3900 BC	7	60	40	41	0	0	0
NAQADA	13	25	39	17	17	2	36
3900-3300 BC	7	31	30	28	13	0	41

Table 3. Centroid scores. 13 variables.

	FUNCTION		
	I	II	III
Naqada	-.40	-.18	-.46
Kerma	-.52	-.40	-.14
Badari	-1.45	-.14	-.48
Abydos	.19	-.42	-.66
Maghreb	.58	.23	.004
"E" series (Gizeh)	.76	.06	.36
Teita	-1.63	-1.35	.96
Gaboon	-1.52	1.25	.86
Romano-British	2.15	-.18	.89
Sedment	.22	1.57	-.50

Table 4. Centroid scores. 7 variables.

	FUNCTION		
	I	II	III
Naqada	-.50	-.09	-.21
Kerma	-.60	-.27	.22
Badari	-1.33	-.19	-.33
Abydos	.07	-.40	-.30
Maghreb	.50	.08	-.42
"E" series (Gizeh)	.81	-.13	-.18
Teita	-1.64	-1.13	.38
Gaboon	-1.16	1.34	.61
Romano-British	2.04	-.17	.64
Sedment	.44	1.35	-.58

Table 5. Centroid scores when Lachish, an ancient Palestinian series, is included.

	FUNCTION		
	I	II	III
Naqada	-.44	-.12	-.49
Lachish	.53	.26	-.30
Kerma	-.60	-.39	-.18
Badari	-1.50	-.06	-.51
Gaboon	-1.56	1.14	1.01
Teita	-1.77	-1.46	.81
Maghreb	.53	.18	.12
"E" series (Gizeh)	.69	.04	-.29
Sedment	.22	1.59	-.24
Abydos	.11	-.37	-.67
Romano-British	2.05	-.40	.93

in the later Pleistocene/early Holocene. Ancient Saharo-Nilotic and other populations perhaps shared biological traits which reflect a shared biohistory in a hot dry environment.

Conclusions

The southern Egyptian population diversified from the Badari through Naqada periods. This parallels a well documented increase in social complexity in southern Egypt. The diversification is possibly secondary to northerners being integrated into the Naqada culture, being attracted to the locale of emerging centralization. Alternatively the diversification may be the result of unknown micro-evolutionary pressures.

Addendum

Naqada II, a combined Badari/Naqada I, and Naqada III cranial series have been studied as distinct groups using an appropriate number of variables in relation to sample size, cluster analysis, canonical variates and D^2 of Mahalanobis. This study is an improvement over those using crania from the whole of Naqada. The results confirm that there was diversification over time. However the Naqada III series was more similar to earlier and more southern material than to Dynasty I. The comparative material included Bronze Age Italian and recent Greek series, as well as Kerma Kushites and recent Somali. None of the southern Predynastic Egyptian series (or Dynasty I) were similar to the Italian or Greek series which always clustered together and apart from Egyptians, Kushites and Somali series. There is no suggestion that Naqada II or III was initiated by peoples with a craniometric pattern common to the southern European series used. This research was carried out at Oxford University in 1994 with the collaboration of A. J. Boyce.

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