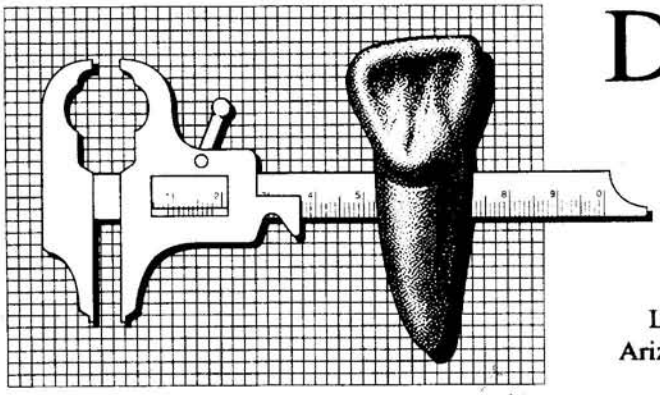

Dental Anthropology Newsletter

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THE DENTAL ANTHROPOLOGY ASSOCIATION

Laboratory of Dental Anthropology Department of Anthropology
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PRESIDENTIAL ADDRESS

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This is the tenth anniversary of the founding of the Dental Anthropology Association and a good time to reflect on the extent to which we have met the three goals stated in the association's by-laws: 1) promoting the exchange of educational, scientific, and scholarly knowledge in the field of dental anthropology, 2) stimulating interest in dental anthropology, and 3) publishing the *Dental Anthropology Newsletter.*

By any measure, the association has been a great success. We have grown over the years to more than three hundred members. We are a truly international organization with a third of our members living in countries other than the United States.

Our members have stimulated interest in dental anthropology by sponsoring several very successful symposia at the annual meetings of the American Association of Physical Anthropologists. Last year's DAA symposium in honor of Albert Dahlberg brought together dental anthropologists from around the world and the papers presented are currently being published as a festschrift.

At our annual business meeting we discussed the importance of these DAA symposia and president-elect, John Mayhall, and I volunteered to help organize them during the next few years. For next year we are planning a symposium on the dental health of Native Americans. Its goal is to provide a broad comparative perspective on caries rates, tooth wear, and antemortem tooth loss among ancient and modern people indigenous to the Western Hemisphere. For the following year, we are planning a comparable symposium focused on the oral health of indigenous people of the Eastern Hemisphere. Anyone who is interested in participating in either of these symposia should contact John Mayhall at the Faculty of Dentistry, University of Toronto, 124 Edward Street, Toronto, Ontario M5G 1G6 (john.mayhall@utoronto.ca).

Although the DAA symposia have been important in promoting the exchange of scientific information, the glue that holds the association together, and our main means of communication, is the *Dental Anthropology Newsletter.* Over the last decade the newsletter has evolved into an extremely valuable source of information on recent research and publications and a venue for first-rate articles on dental anthropology. Much of the newsletter's success is a result of the hard work of DAA members at Arizona State University and especially our current editors, Sue Haeussler and Shara Bailey.

How can our association continue to grow and increase its effectiveness in promoting communication among dental anthropologists? At the business meeting we agreed that establishing a DAA World Wide Web page would be a good way to increase the association' s visibility. I volunteered to work on this project and will be constructing our page over the next few months. It will contain basic information on the goals of the association and how to join it, along with instructions for submitting articles, news items, and other material for publication in the newsletter. It will also include links to other web sites of interest to dental anthropologists and perhaps an index of articles published in the newsletter. Please contact me at walker@sscf.ucsb.edu if you are interested in helping develop the content of our page. I am particularly interested in suggestions for links to other sites and ideas you have about the future content of the page. Concluded on page 19.

CRO-MAGNON AND QAFZEH — VIVE LA DIFFERENCE

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A*BSTRACT* The obligatory use of cooking by the Mousterian occupants of the north temperate zone relaxed the forces of selection maintaining archaic tooth size and led to the reductions that shaped modern human face form from the Middle East to the Atlantic coast. The delay in the spread of cooking techniques accounts for the later onset of dental reduction to the south. The development and use of projectiles in the African Middle Stone Age led to gracilization and the earlier appearance of "modern" post-cranial and reflected cranial form in Africa. The subsequent adoption of the use of projectiles elsewhere was followed by gracilization and the appearance of "modern" post-cranial morphology. The craniofacial form of Cro-Magnon allies it with the living populations of northwestern Europe, specifically with the fringes in Scandinavia and England, but not with the European continent. Qafzeh represents the pattern still found in sub-Saharan Africa, particularly West Africa. Although the craniofacial configuration in both is "modern," the dentition of Qafzeh is archaic in size and form. Qafzeh is a logical representative of the ancestral form for sub-Saharan Africans but not for Cro-Magnon and subsequent Europeans.

INTRODUCTION

Over the past decade or so, much attention has been paid to the question of the emergence of "modern" human form. The approach generally taken has been a plunge into the fossil record to consider nuances in the form and matters concerning the dating of this, that, or the other specimen in order to suggest its relevance or irrelevance for contributing to our understanding of the origins of "modern" morphology. One of the things that has been curiously neglected in this approach is any systematic attempt to come to grips with just what constitutes that "modern" condition so taken for granted by the majority of the profession that focuses on the course of human evolution as its particular subject for study. Instead, there is a wondrously Eurocentric set of assumptions that is based more on the course of post-Renaissance political history than on anything remotely like actual morphological analysis. This has been linked together with the traditions of rejecting the principles of evolutionary biology by those who purport to be students of human evolution. For a critical assessment of these traditions, see Brace, 1981, 1982, 1988, 1992, and 1995b.

For more than a century, the archetype of early modern human form has been assumed to be embodied in the specimens found in 1868 at Cro-Magnon in southwestern France (Broca, 1868). According to the accepted folklore of the field, Cro-Magnon illustrated the earliest manifestation of modern human appearance. This dated from the Aurignacian maybe more than 30,000 years ago in western Europe (Mellars et al., 1987; White, 1989), although new techniques have pushed that date back another ten-thousand years in Bulgaria and northern Spain (Bischoff et al., 1989; Cabrera Valdez and Bischoff, 1989). Starting at that time, human evolution presumably came to a halt and there has been no further change in human form. In the words of Stephen Jay Gould, "The Cro-Magnons, why they are us!" No predecessors are contemplated, and all subsequent change is assumed to have been in the realm of culture (Gould, public presentation in Ann Arbor, Michigan, October 30, 1982; Gleick, 1983; Diamond, 1989, 1990; Klein, 1992).

The claim that there has been no subsequent anatomical change is manifestly untrue. A quick look at the most abundant evidence available, the teeth, shows that gross dimensions alone in the early Upper Paleolithic were closer to "classic" Neanderthal figures

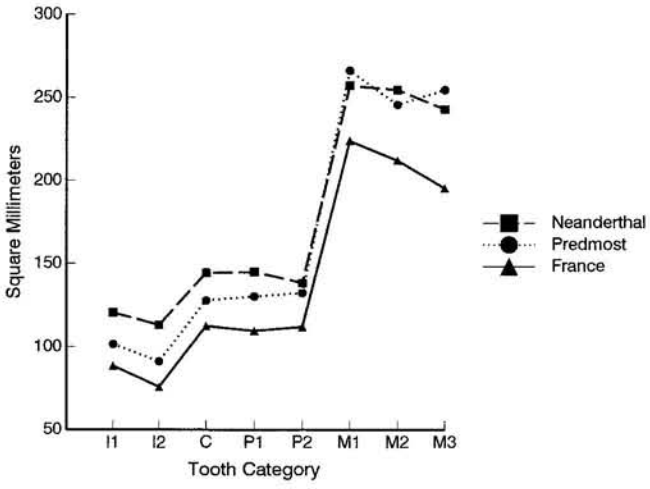

Fig. 1. Profiles of cross-sectional areas of the summed maxillary and mandibular tooth categories of European Neanderthal, Early Upper Paleolithic, and living French samples. Data are given in Table 2.

than to living Europeans (Brace et al., 1987; Brace, 1995b,c) (Fig. 1). The stance represented in the words of Gould can be taken for the feelings of the vast majority of those who write about the emergence of "modern" human form, and it is rooted more in transcendental faith than in anything approaching science. Rarely if ever is it supported by anything approaching statistically testable collections of data. And, who is this "us" that the Cro-Magnon specimens presumably exemplify?

PROTO-CRO-MAGNON?

We have been told that Qafzeh is a proto-Cro-Magnon specimen (Howell, 1959; Valladas et al., 1988; Vandermeersch, 1989). Clearly Qafzeh does not display archaic cranial features even if it has an archaic dentition (Brace et al., 1991). At nearly 100,000 years (Valladas et al., 1988), it is one of the oldest representatives of "modern" human cranial form, but, once again, that specter of what constitutes the "modern" condition comes back to haunt us. Given the various "modern" manifestations present in the half-dozen or more regional clusters that can be identified (Brace and Hunt, 1990; Brace, 1996a), which "us" does Qafzeh represent? And can it really stand for the ancestors of the population to which Cro-Magnon belonged?

I have collected craniofacial measurements on representative samples of all the major modern human clusters, and it is an easy enough thing to use discriminant function statistics to test the placement of individual specimens such as Qafzeh and Cro-Magnon against them (Brace, 199la) (Table 1). It is in the nature of the statistic that you cannot determine the population to which an individual specimen belongs, but it is an easy enough matter to determine the groups from which it is excluded. The pattern of features found in Qafzeh 6, for example — the only specimen with enough variables to be treated in this fashion — can be excluded from all modern human samples except those from sub-Saharan Africa, most particularly West Africa (Table 1). It would appear that the sub-Saharan craniofacial configuration has retained a statistical coherence for nearly 100,000 years.

Cro-Magnon, on its part, is clearly excluded from every "modern" human craniofacial configuration except that characteristic of Europe (Table 1). And if the European configuration is broken down into its constituents, Cro-Magnon could not occur within those groups that run from eastern Europe to the Atlantic coast, although it cannot be excluded from England, the Faeroe Islands and Norway. It is a curious little irony to contemplate the thought that the most famous fossil "modern" in France could not be ancestral to the "modern" French, but cannot be excluded from the ancestry of the recent English.

There is another curious irony in all of this. In 1839, it was the American anatomist and anthropologist, Samuel George Morton, who realized that the difference between the craniofacial configurations of Africans and Europeans was so marked that it could not have come about by natural means in the time he assumed was available, a time calculated since Noah's ark was presumed to have landed on Mount Ararat in the western Caucasus — Turkish Armenia — at the end of the Biblical flood. Morton's views were subsequently adopted by Paul Broca as the basis for an outlook that still prevails in French anthropology (Brace, 1982). The irony now is that the French point of view, which has never been comfortable with the perspective of Darwinian mechanism, evidently feels that 100,000 years is quite enough time to convert an African into a European, while the constituency that I represent — thoroughly Darwinian in its outlook, is quite happy in seeing a European "classic" Neanderthal become transformed by gradual means into a modern European but yet has trouble seeing how the transformation of an African craniofacial pattern into a European one could take place within the same period of time.

TABLE 1. Probability levels by Fisher's linear discriminant function that Qafzeh 6 and Cro-Magnon 1 can be excluded from membership in the group named in the row heading.

	Number	Qafzeh 6	Cro-Magnon
Africa	118	0.986	0.000
Amerind	487	0.009	0.002
Asia	763	0.004	0.000
Austro-Melanesia	237	0.007	0.000
European Continent	142	0.000	0.041
Europe NW Edge	98	0.000	0.955
Eskimo	155	0.000	0.000
South Asia	96	0.000	0.002
Jomon-Pacific	448	0.000	0.002

Data were extracted from Table 2 of Brace (1996b).

TABLE 1. Dental Agenesis in Old World Primates

	Number of Individuals	Incisors	Premolars	Molars	Total
Cercopithecoidea					
Colobus	140	---	5(3.6)	6(4.3)	11(7.9)
Presbytis	100	1(1.0)	---	---	1(1.0)
Cercopithecus	350	---	1(0.3)	3(0.9)	4(1.0)
Macaca	350	---	---	---	---
Papio	38	2(5.3)	---	---	2(5.3)
Total	978	3(0.3)	6(0.6)	9(0.9)	18(1.8)
Ponginae					
Gorilla	190	---	1(0.5)	---	1(0.5)
Pan	100	---	1(1.0)	2(2.0)	3(3.0)
Pongo	100	---	---	---	---
Total	390	---	2(0.5)	2(0.5)	4(1.0)
Hominidae					
Europeans	4000	12(0.3)	5(0.1)	259(6.5)	276(6.9)
Africans	1000	25(2.5)	10(1.0)	247(24.7)	282(28.2)
Total	5000	37(0.7)	15(0.3)	506(10.1)	558(11.1)

Values = number with percentage incidence in brackets. No agenesis was found in the canines. (After Lavelle and Moore, 1973)

premolar region (Lavelle and Moore, 1973). Premolar agenesis is generally more common in the mandibular region for all three groups although Brekhus et al. (1944) found the frequencies to be slightly higher in the maxillary region for humans.

Dental agenesis in modern humans is commonly correlated with the reduction of the maxillomandibular region due to the high incidence of agenesis of M3 at the distal end of the dental arch and I^2 at the mesial aspect (Schultz, 1932; Butler, 1963; Lavelle and Moore, 1973). However, this does not adequately explain the absence of P4 (Brekhus et al., 1944).

In a comparison of the cercopithecoid, pongid, and human data cited in Lavelle and Moore's study on dental agenesis, large-sample z-tests of the population proportion exhibiting tooth agenesis were calculated both for molar and premolar frequencies between the primate groups (no comparison could be made for incisor agenesis due to a lack of comparative data for the great apes). A significant difference was not found between the monkeys and apes in the frequencies of molar agenesis, but significant differences were detected between both the monkeys and humans and the apes and humans ($p<.001$). No significant differences were found between any of the groups in regards to premolar agenesis frequencies, suggesting that while molar agenesis may be related to a reduction in the jaw, premolar agenesis is not.

The suggestion that agenesis is related to dental arch reduction in modern humans is not borne out by other lines of evidence. Eskimo populations with large dental arches (Pedersen, 1949) and more prognathous African populations (Lavelle and Moore, 1973) often exhibit a reduction in the third molar region. Brekhus et al. (1944) found little correlation between dental arch size and the number of teeth, citing evidence of agenesis and the retention of large spaces between the teeth in small jaws, agenesis and crowded teeth in small jaws, and crowded teeth in large jaws in individuals within the same families. Reduction in M3 was observed to be accompanied by a reduction in other teeth in 94.7% of the cases of molar agenesis that Brekhus et al. examined, and multiple deficiencies were seen in nearly half of all cases of agenesis.

Suggestions that tooth size reduction and agenesis are correlated (Butler, 1939; Garn et al., 1963) are not supported by a study that revealed a lack of correlation between the mesiodistal and buccolingual diameters of teeth (Baum and Cohen, 1971). Calcagno and Gibson (1988) suggest that if the maxillomandibular region is undergoing reduction or fewer teeth are needed in modern humans, then positive selection for a reduction in tooth number would be more economical than a reduction in tooth size whereby teeth would wear more quickly. In a clinical study by Brekhus et al. (1944), observed frequencies of various combinations of I^2, P4, and M3 agenesis far exceeded the expected frequencies, and it was suggested that directional evolution is indeed occurring and reduction in tooth size is merely coexistent.

CONCLUSIONS

The present system of numbering teeth in mammals based on their position, relation to other teeth, and mode of succession in the paleontological literature dates back to the mid-nineteenth century (Owen, 1840-45). Premolars are counted from the molar region forwards in most veterinary literature due to the stability of the fourth premolar in most mammals (Peyer, 1968). It would appear logical to number the premolars in sequence from the most posterior premolar forwards based on the typical order of their development in mammals. However, this system would present problems with the reversed developmental sequences seen in the tree shrew and extant primates.

processes have never been convincingly associated with different functional capabilities. Even the size of the area of neck muscle attachments has no clear relationship with the size and strength of those muscles themselves. The total surface area to which the neck muscles of a cow or a horse are attached is no greater than that allotted to the neck muscles of a human being. Yet, in the bovine and equine examples, the vastly heavier head is not balanced on top of the spinal column but held throughout life thrust forward in a nearly horizontal position by the continuous tension of a muscle mass that absolutely dwarfs the human condition.

On the other hand, in the course of 50,000 years of human evolution, occipital morphology has undergone far less alteration. Everything from the details of mastoid process form and nuchal muscle attachments to fully "bun-shaped" occiputs demonstrates a continuity from Neanderthal morphology to that visible in the inhabitants of the fringes of western Europe today in Norway, the Faeroe Islands, and England (Brace, 1991a, 1995a, 1996b). Given those aspects of occipital morphology in living northwest Europeans, one would have to predict fossil ancestors with a similar configuration. Fossil predecessors exist with the right occipital characteristics (Hublin, 1978), and they are called Neanderthals.

There are only three non-dental aspects of craniofacial form that are clearly associated with the forces of selection: relative size of the brain box itself, the thickness of its walls, and the size of the nasal skeleton. The first of these, the relative size of the portion of the cranium devoted to enclosing the brain, does not differ between representatives of contemporary hominids over the span of the last one-and-one-half million years. The same thing is also true for the second of those three key cranial features, the thickness of the skull bones themselves (Kennedy, 1991). However, both relative brain size and the thickness of the cranial vault walls have changed significantly over time, but they have never displayed significant regional differences at any given point. For more than 80% of the time that the genus *Homo* has been in existence, there is also no evidence for discernible differences in the size of the nasal skeleton between contemporary hominids.

In a manner similar to the emergence of tooth size distinctions, regionally recognizable differences in nasal size have only arisen within the last 200,000 years (Franciscus and Trinkaus, 1988; Franciscus and Long, 1991). The contrast in the manifestation of that feature is vividly displayed when Qafzeh is compared with the "classic" Neanderthals. That degree of adaptively related nasal difference, however, is scarcely sufficient reason to warrant separate specific recognition. When matters are considered using this perspective, there is no more reason to separate Qafzeh and the "classic" Neanderthals at the specific level than there is to grant specific distinction to the difference in nasofacial features displayed when living sub-Saharan Africans are compared with northwest Europeans — or at least some northwest Europeans.

From the perspective of evolutionary biology, this simply portrays the same stance as the one articulated by Franz Weidenreich nearly half a century ago, namely, that, since the beginning of the genus *Homo,* there has been only one human species in existence at any one time (Weidenreich, 1943a,b, 1946, 1947, 1949). However, it was the addition of an adaptive perspective to Weidenreich's conception of gene flow that suggested how the mechanics could work that would both maintain specific unity at any given point in time and also produce the kind of coordinated change by which "modern" form emerged simultaneously over the whole range inhabited by the genus *Homo* (Brace, 1964, 1967, 1979, 199lb, 1992, 1995b, 1996a,b).

The mechanics of the model I offered nearly thirty years ago have been alluded to piecemeal (e.g. Brose and Wolpoff, 1971; Wolpoff, 1980; Wolpoff et al., 1984), but the model as a whole has never been given any consideration at all. The measure of the extent to which it has been overlooked can be seen in the off-hand claim that simultaneous evolutionary change towards a modern configuration from various regional Neanderthal

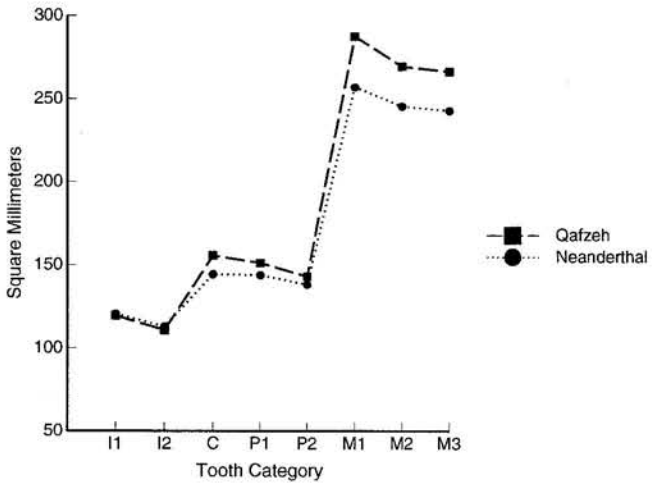

Fig. 3. Tooth-size profiles comparing dental dimensions of Qafzeh and European "classic" Neanderthals. Data are given in Table 2.

manifestations "can hardly be considered likely" (Bräuer, 1984). Even the recent formulations most obviously derived from it, the so-called "multiregional" continuity model — said to have been "first outlined in a broad theoretical context by Wolpoff et al. in 1984" (Smith et al., 1989) — only added the two syllable "multi" to the original version of regional continuity and removed a consideration of the mechanism by which the whole process is driven (Brace, 1992, 1995a,b). This being the case, it is time that the essential parts of that model were recapitulated in summary form.

CONCLUSIONS

"Modern" human form is a typological abstraction uneasily grafted onto the fact that all living human beings belong to the same species despite manifest differences in appearance. The emergence of "modern" human morphology would appear to have been produced in somewhat different fashion in different parts of the world. The essential precursor was the world-wide achievement of the intellectual and linguistic capacities that we now recognize as being uniquely human. This was the consequence of responding to the selective pressures engendered by survival within the milieu of the Cultural Ecological Niche (Brace, 1995b, Chapter 9). The only anatomical evidence we have for this is the achievement of proportionately modern levels of brain size somewhere between 200,000 and 100,000 years ago in people who otherwise had the skeletal and dental robustness of Middle Pleistocene *Homo erectus.*

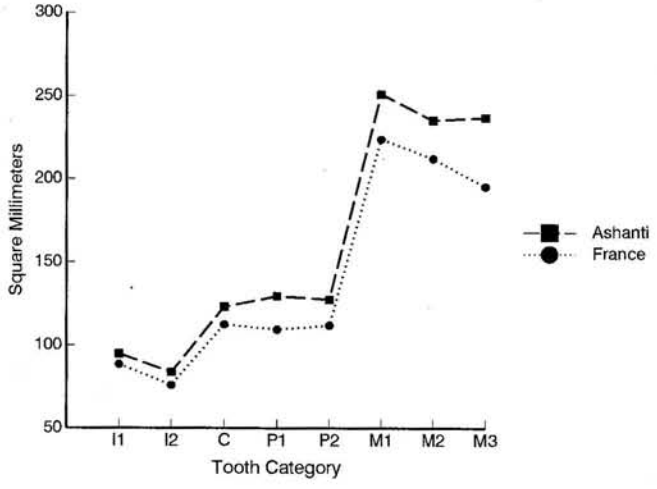

Fig. 4. Tooth size profiles comparing recent French dental dimensions with those of recent West Africans (Ashanti). Data are given in Table 2.

What led to the appearance of "modern" form was the reduction in that *erectus* level of robustness that followed when those sapient intellectual capabilities interposed barriers between the forces of selection and specific aspects of the human physique. These barriers were developed at different times in different places, and the result was that "modern" human form emerged in mosaic fashion. The early appearance of obligatory cooking in the north led to the beginnings of dental reduction and the subsequent shrinking of the associated parts of the face. To this day, the people in the north temperate zone have the smallest teeth in the world.

At the same time, the use of projectiles for hunting purposes in Africa (Yellen et al., 1995) relaxed the selective pressures that elsewhere had maintained those aspects of robustness characteristic of post-cranial human form throughout the Middle Pleistocene. The consequence was that the gracilization which we think of as being "modern" developed first in the south long before there was any hint of the "modern" state of dental reduction (Shea 1988). Eventually, projectiles spread out of Africa via Israel and were adopted elsewhere (Shea, 1992), and the process of gracilization was the predictable consequence (Brace, 1995b). In similar fashion, cooking eventually spread south (Brace, 1995a, 1996b). It was not needed to thaw food, but it was eventually discovered that cooking could retard spoilage and thus prolong the period over which food-stuffs could be used. Again, the subsequent reduction in tooth size was the predictable result (Brace, 1995b).

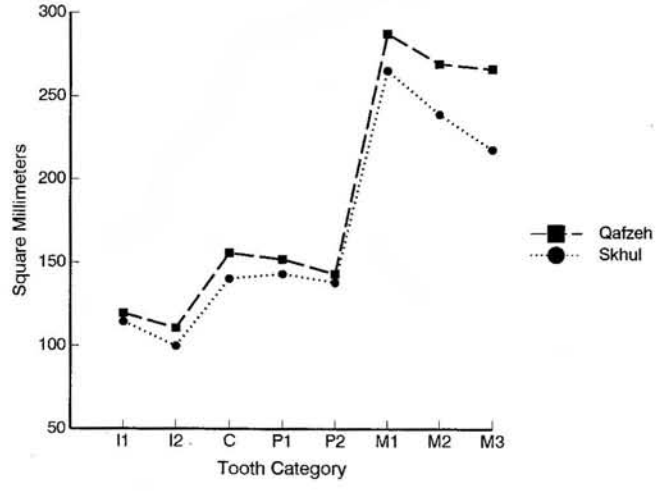

Fig. 5. Tooth size profiles comparing Qafzeh and Skhul. The pattern is exactly the same as that shown when West Africans and French are compared — just shifted a bit. Data are given in Table 2.

Reduction in tooth size between Qafzeh and modern West Africans is 17% which is exactly the same as the percentage reduction between "classic" Neanderthal tooth size and the Late Upper Paleolithic in Europe (Brace, 1995c). Furthermore, the pattern of larger molar-to-incisor proportions of Qafzeh vis-A-vis Neanderthal (Fig. 4) is preserved when modern sub-Saharan Africans are compared with modern Europeans (Fig. 4). A striking similarity to the African-European comparison emerges when Qafzeh and Skhul are plotted on the same graph (Fig. 5). When the pattern of dental reduction is shown from Qafzeh to the modern Africans from whom they cannot be distinguished on craniometric features, the profiles of cross-sectional areas reduce in perfectly parallel fashion (Fig. 6), just as the tooth-size profiles of the Neanderthals and the modern French show a comparably parallel pattern (Fig. 7). This is treated in greater detail elsewhere (Brace, 1995c).

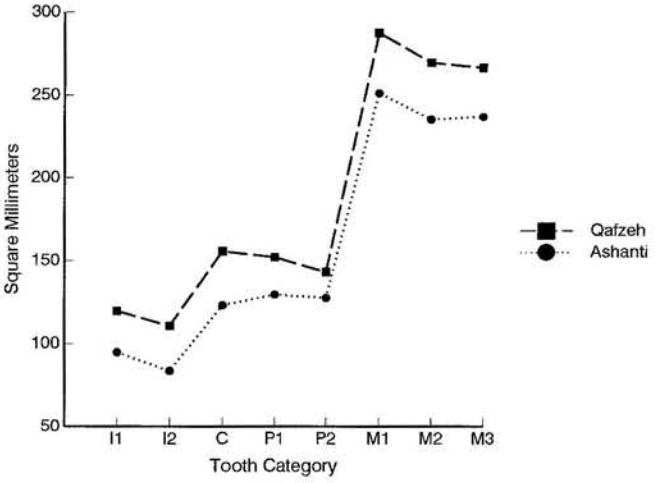

Fig. 6. Tooth size profiles comparing the dental dimensions of Qafzeh and a recent West Africa sample (Ashanti). Data are given in Table 2.

In both the details of its dental and craniofacial size and form, Qafzeh is an unlikely proto-Cro-Magnon, but it makes a fine model for the ancestors of modern sub-Saharan Africans. Along with the microfauna at the Qafzeh site (Tchernov, 1988, 1991, 1992), the human remains are best regarded as evidence for a temporary intrusion of African elements into the Middle East that had no direct long-term consequences. Indirectly, however, the adoption of projectiles by their Neanderthal contemporaries — whether at that time, or earlier — led to those selective force changes that produced the transformation of Neanderthal to "modern" post-cranial form. After another 50,000 years, Cro-Magnon was just what one would expect to see, but as the result of a transformation from a Neanderthal ancestor and not one that looked like Qafzeh.

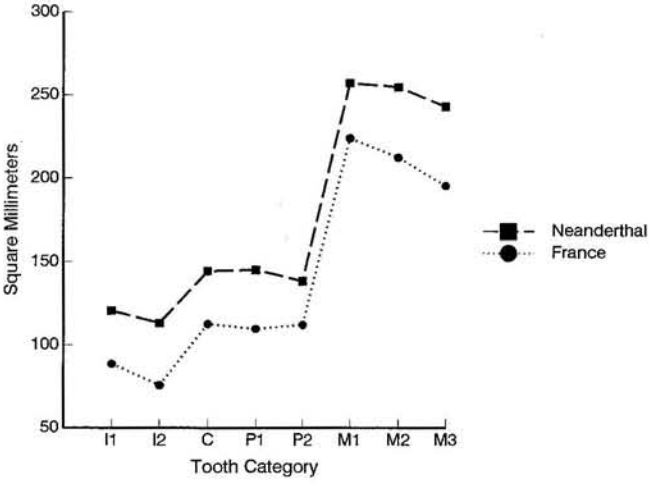

Fig. 7. Tooth size profiles comparing European "classic" Neanderthals with recent French. Data are given in Table 2.

Qafzeh and Cro-Magnon, then, represent earlier manifestations of African and European configurations respectively. Those patterns are alive and well in Europe and Africa today. Neither one is better nor worse than the other, they are simply different. On this note, we can celebrate that fact with the words, 'vive la difference'!

TABLE 2. Cross-sectional tooth size figures for the summed maxillary and mandibular teeth in the named categories for each of the populations indicated.

Population	Number	I1	I2	C	P1	P2	M1	M2	M3
Neanderthal	13(5-20)	120.5	113.0	144.3	144.9	138.2	257.0	254.5	242.8
Qafzeh	5(3-9)	119.5	110.6	155.5	151.0	142.9	287.5	269.5	266.4
Skhul	4(3-7)	114.6	99.9	140.3	143.1	137.9	265.4	239.2	217.9
Předmost	7(4-10)	101.6	91.2	127.7	130.1	132.2	266.2	245.7	254.5
Ashanti	20(10-31)	94.8	83.7	123.0	129.5	124.4	251.0	235.2	236.9
France	45(14-81)	88.5	75.8	112.5	109.5	111.9	223.9	212.2	195.3

Data are abstracted from Table 1 in Brace (1995c). Neanderthal data are from Wolpoff (1971:171-185), Qafzeh from Vandermeersch (1981:176-177), Skhul from McCown and Keith (1939:212-213), and Předmost from Matiegka (1934:142-143). Ashanti were studied at the American Museum of Natural History in New York. Specimens labeled "France" are from Brittany and Nièvre and curated at the Musée de l' Homme, Paris. Cross-sectional tooth size figures are the sum of the mesio-distal times the bucco lingual measurements for the means of the right and left maxillary and mandibular I1...M3.

ACKNOWLEDGMENTS

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AN UNUSUAL ETRUSCAN GOLD DENTAL APPLIANCE FROM POGGIO GAIELLA, ITALY: FOURTH IN A SERIES

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ABSTRACT Among the 20 known ancient dental prostheses from Etruscan archaeological contexts is an unusual example that was recovered from Poggio Gaiella, Italy. The form and construction technique used in making the Poggio Gaiella piece suggests that it was used as a restraining band to hold loose teeth in place within a maxilla. The possibility that these appliances provide evidence for early cases of leprosy rather than tooth evulsion is discussed.

INTRODUCTION

Johnstone's (1932a,b) observation that the Etruscans were the first to construct true dental bridges has been supported by all subsequent research. Various examples suggest that these appliances were first made over 2,600 years ago by a few talented individuals who may have carried their craft to unusual heights. These achievements were not continued after the decline of ancient Rome, being re-invented and elaborated upon only by modern practitioners. While most of the ancient appliances appear to have been cosmetic, some may have had therapeutic value as well. A significant discovery is that these Etruscan appliances were worn only by females (Becker Ms. A), suggesting that cosmetics and vanity were important dental concerns.

The history of the origin of Etruscan dental appliances (Becker, 1992) has been outlined in the first three parts of this series (Becker, 1994b,c, 1995). The extensive literature relating to ancient dental prostheses invariably focuses on the actual examples found in the southern third of ancient Etruria and in areas, generally nearby, in which these Etruscans were to be found. These data enable us to conclude that these appliances only were worn by South Etruscans, who inhabited one of the three zones of the Etruscan realm that appears to have had its own cultural integrity. Attempts to discuss construction techniques and possible applications of these appliances are infrequent, and often entirely speculative.

Precise archaeological data relating to any of the known prostheses is surprisingly limited (Becker, in press). The Valsiarosa appliance (Becker, 1994a) is the only example of a dental appliance for which a specific tomb context has been published (Cozza and Pasqui, 1981; Waarsenburg, 1990; Becker 1994a, Ms. B). Some archaeological contexts from which dental appliances were recovered now are being inferred through modern studies of the excavation records and artifact assemblages that have long been stored in museum basements (Waarsenburg, 1994; Becker 1994d). These gaps in the archaeological record may be, to a limited extent, compensated for only by detailed studies of each of the appliances. An outstanding descriptive example is Clawson's (1934) contribution for Eastern Mediterranean wire appliances of a later date. Careful studies of the dental and skeletal materials found in association with these prostheses became a major focus of a recent program to record the entire corpus of these ancient appliances and the information related to them (Becker, Ms. A).

FUNCTIONS

The Poggio Gaiella band (Fig. 1) is one of the few examples that may have served to stabilize loose teeth. Most probably the Etruscan examples, like the later wire appliances known from theEastern Mediterranean, served to prevent or retard the loss of teeth loosened by periodontal disease or by a blow. Simple gold bands were used by the Etruscans in constructing these functional appliances, but decorative aspects of these Etruscan types cannot be ignored.

The simplicity of this type of prosthesis need not reflect chronological aspects of ancient dentistry, although this particular appliance is one of the more sophisticated examples of this functional category of retention bands. The fourth century date suggested for this appliance (Menconi and Fornaciari, 1985), if accurate, indicates that this piece was made during the first half of the approximately six centuries during which gold appliances are known to have been made by the Etruscans.

THE POGGIO GAIELLA APPLIANCE

The Poggio Gaiella appliance is presently curated in the Museo Archeologico Etrusco, Florence (Inv. no. 11782). It is a single, complex band now broken into two pieces. It originated in Poggio Gaiella in Citta della Pieve, which is 7 km south of Chiusi and 43 km southwest of Perugia.

The appliance was originally in the maxilla, and surrounded eight teeth from the left first premolar to the right first premolar. This appliance is not original to the mandible in which it is now located (Becker Ms. B). This appliance now is located around the left first premolar to the right second premolar (nine tooth spaces) of a mandible from which the left lateral incisor was lost in restoring the jaw (Fig. 1).

According to Menconi and Fornaciari (1985), the appliance dates to the fourth century BC. The original wearer of the appliance was female (derived from the size of the appliance, not the display skull)(Becker Ms. B). Previously published references are: Dunn (1894:4, Fig.), Platschick (1904:239, Fig. 2 from "Giojella"), Frassetto (1906:156), Cassoti (1927:627, copies only; 1947:671-2; 1957:105, Fig. 5), Ghinst (1930:407, after Dunn 1894), Bobbio (1958:Fig. 14, after Cassoti 1957), Hoffmann- Axthelm (1985:78, Fig. 65, not in 1981 edition), Penso (1984:possibly shown in Figs. 143-145), Menconi and Fornaciari (1985:94), Capasso (1986:52-55, with 3 Figs.), Emptoz (1987:557, 558, Fig. 20, no. XXIV), Corruccini and Pacciani (1989:61-2, Figs.1,2), Laviosa, Capasso and Baggieri (1993:131, Figs. V4, V5; these two color plates from the Soprintendenza Archeologica della Toscana in Firenze are the best now available), Becker (1995:Fig. 2), and Bliquez (1996:2646-2648, 2652-2653; Figs. 5-11).

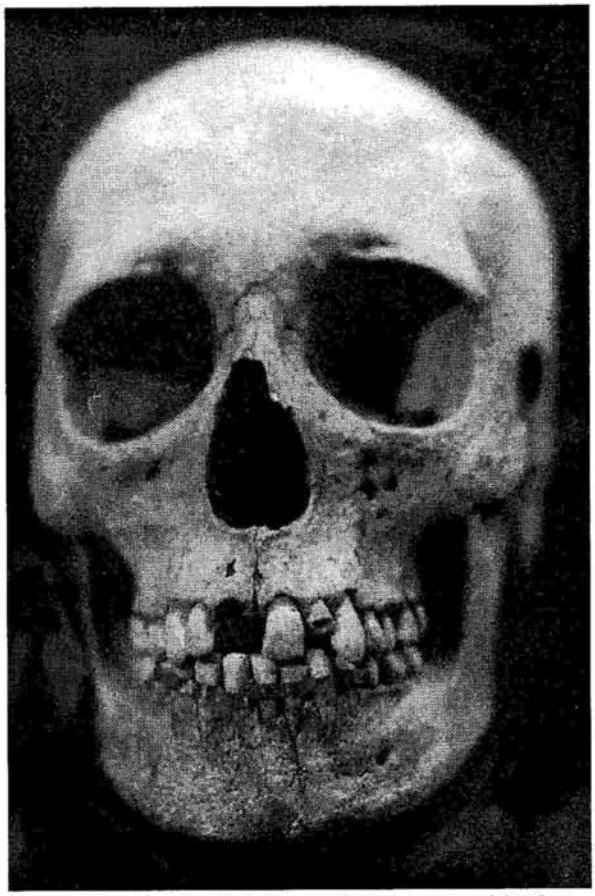

Fig. 1. The Poggio Gaiella appliance mounted in the mandible of a skull, now at the Museo Nazionale di Archeologia in Florence, Italy.

HISTORY OF THE POGGIO GAIELLA APPLIANCE

The commonly cited location for the tomb that yielded this prosthesis is Poggio Gaiella, a hill in Cittá della Pieve, near Chiusi. The earliest known account of the Poggio Gaiella appliance, written by its owner (Dunn 1894:4), notes that *"A Firenze pure, in possesso di chi scrive, vi è un cranio etrusco portate sulle mascella inferiore un nastro d'oro, che collega tutti gli incisivi, i canini ed i bicuspidati."* [In Florence, in the writer's possession, one sees an Etruscan skull, in the mandible of which is a gold ribbon that binds all the incisors, canines, and premolars]. Platschick (1904) says that Dunn's skull and mandible were found *"a Giojella, presso Chiusi"* [at Gaiella, near Chiusi], but does not indicate that the appliance was found with it.

Dunn, at some time after 1894, donated this skull to the National Archaeological Museum in Florence (Corruccini and Pacciani 1989:61), as indicated by a catalogue card. Pacciani (oral communication March 1994) says that the card reads "dono di Dunn." I have not verified this information, and the exact date of this transfer remains unknown. Although Casotti (1927:627) states that the skull was owned by Dunn (presumably about 1927), Casotti simply may have been copying Platschick's (1904) text. The Poggio Gaiella appliance and associated skull were in Florence by 1957, where Casotti (1957:105, Fig. 5) saw them in Sala XLIII of the Archaeological Museum. Therefore, we remain uncertain as to when this skull and/or the appliance were transferred to the Museum.

Capasso (1986) provides illustrations which indicate that the Poggio Gaiella example has been in two pieces for some time. Also showing that this band is in two pieces is a reverse print of the view shown by

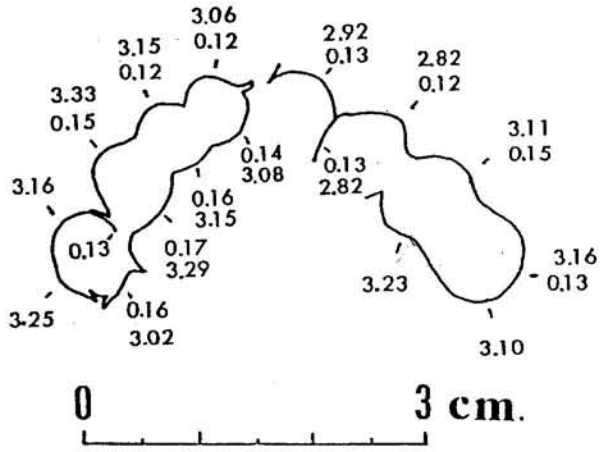

Fig. 2. Precise drawing of the Poggio Gaiella appliance from above, as the two pieces were seen by the author in the display mandible. The paired measurements are given in mm, and include the thickness of the gold bands (placed near the appliance), as well as the breadth (or height) of the band at the same point.

Corruccini and Pacciani (1989:Fig. 2), and possibly a reversed print of this mandible in Capasso's (1986:53) figure. Note should be made that Capasso's illustration of the Poggio Gaiella appliance (Capasso 1986:54) derives from the same negative as that used by Corruccini and Pacciani (1989:Fig. 2). However, one of the two is printed in reverse. Further note should be made of the drawings used by Capasso and Di Tota (1993:Figs. 2, 3), which are exactly those used by Capasso (1986:55) in his publication except that one is the reverse of the other. These and other problems are reviewed by Bliquez (1996).

The Poggio Gaiella appliance, now in two pieces, clearly was not actually original to the skull and jaw with which it now is found. Discussion of the skulls associated respectively with the Poggio Gaiella and the Valsiarosa appliances will be the subject of a future report (Becker Ms. B). In January of 1994 the Poggio Gaiella and Valsiarosa appliances were on display at an exhibition in Rome that had been developed by Prof. Luigi Capasso of the Ministerio di Bene Culturale (Capasso 1993). The exhibition, entitled "Storia della Chirugia Italiana", was then at San Michele in Trastevere, Rome, where Prof. Capasso kindly arranged for me to make a provisional review of this appliance. Subsequently the Poggio Gaiella appliance and the skull were returned to the storage area of the Museo Archeologico Etrusco in Firenze, where I made this study in March of 1994.

From my examination of the configuration and sizes of the extremely distorted pieces of the Poggio Gaiella appliance (Fig. 2) I believe that it originally surrounded eight teeth, from a maxillary left first premolar to the right first premolar. Not only is this suggestion supported by the relative sizes of the curves in this clearly distorted appliance, but this interpretation would include spanning two premolars as suggested by Dunn. Thus Dunn may have been evaluating this appliance correctly. The problems of the present placement of this appliance may have arisen only after Dunn had donated the Poggio Gaiella appliance to the museum, probably mounted in the same skull in which it now is found.

With reference to Dunn's (1894) belief that this is a prosthesis which would have been worn in the mandible, I suggest that the original skull did not survive and that Dunn made his evaluation either on the basis of the configuration of the appliance or perhaps the location in a mandible as he first saw it (Becker Ms. B). The distortions now evident in the appliance include extreme bending and folding and several breaks (Fig. 2). This damage suggests that the appliance was forced into the mandible of an intact skull derived from an unknown, even possibly relatively modern, source. The band appears to have been torn, and several cold welds have separated, with subsequent bending of long sections of the appliance. Among the breaks may be one at a point where these two parts had been joined. The reconstruction of the original configuration of this appliance is depicted in Figs. 3 and 4.

DESCRIPTION OF THE APPLIANCE

Detailed examination of the two parts which are identified as the Poggio Gaiella appliance has not confirmed that these two elements originally were joined, although this probably was the case. Both pieces of the appliance are so unrelated to the teeth in this display mandible, so ill-fitted, and so badly bent that there is no possibility that these elements match with the teeth of this restored mandible (Becker Ms. B gives details about the display mandible). Casotti (1947:672, 1957:105) offers a complex, but fanciful, description of how this piece was held in place. The probability that Casotti never examined this piece may be inferred from Casotti's conclusion that the two pieces of this appliance once had been wired together and otherwise manipulated to serve as an orthodontic

corrective device to close gaps between the teeth (Capasso 1986:54). Not only is this a fanciful observation, but the fictitious goals of such a devise would be counterproductive. Moving the teeth only would have disrupted their dental alignment.

As mounted in the mandible when I first studied the Poggio Gaiella appliance (Figs. 2, 3A), it bore only a partial resemblance to its original position and form. The right end of the right unit (Fig. 3A; Platschick 1904:Fig. 2), now widely sprung, had been behind both right premolars of the display mandible, with the curved end passing between the right second premolar and right first molar. By rotating this right element 180 degrees, as shown in Fig. 3B, the appliance assumes its correct position. By focusing on this drawing (Fig. 3B) a description can be made that enables us to reconstruct the original form of this appliance (Fig. 3D).

On the distal extreme of the buccal aspect, the right unit is broken off, after a sharp bend. The tiny tail-like extension (a), that measures under 2 mm in length, was not connected with the straight piece (b) that also is a loose end, 2.82 mm wide (Fig. 2), extending lingually from the buccal aspect of the right unit. I believe that a piece of this appliance, once connecting (a) with (b), has been broken off and lost. These ends originally had passed around the maxillary right first premolar (Fig. 3C). The portion of the band passing between this maxillary right first premolar and the right canine, serving as a divider or brace, attached to (c), where it was cold welded onto the larger band. My visual observation suggests that this divider was part of the right first premolar ring that had been cold welded to the larger band of the right unit, as is the case with the construction of the left unit.

Beginning at the most distal part of the left unit we find an extremely bent and folded ring. This ring originally embraced a left first premolar and was mounted around the corresponding tooth in the display skull. As we now see this ring it has a very peculiar double internal fold along the distal-lingual surface (d), an equally peculiar bump at the distal-mesial portion (e), and a very (0.13 mm) thin band (f) that that had been cold welded in place. The weld on the buccal aspect still holds, but the attachment on the lingual aspect has separated. Microscopic examination might determine where this weld on the lingual surface had attached at the distal end of the bump. I suspect that the connection was at point (g) (Figs. 3B and 3C). The remainder of the left unit appears to be a simple ring (band) that spanned the area from a left

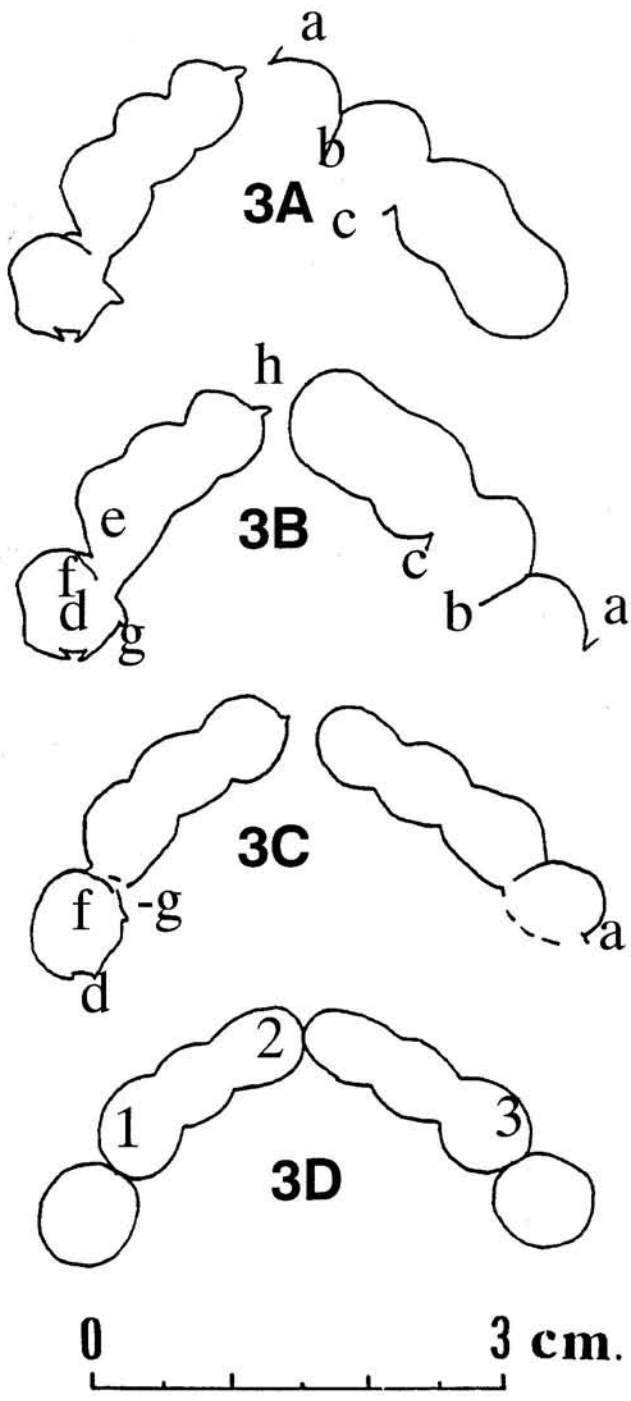

Fig. 3. The Poggio Gaiella dental appliance as seen from above as mounted in a display mandible (3A). The loose ends of the medial end of the right element are believed originally to have been part of the distal ring. Fig. 3B shows the right element rotated 180 degrees. Fig 3C indicates the process by which the original form of the appliance was reconstructed. Fig. 3D is a reconstruction of the four rings of the appliance showing the points at which three cold welds held it together.

canine to the left central incisor. The projection (h) on the left element may reflect its original point of attachment to the right element.

The Poggio Gaiella appliance is an interesting variation of a simple four ring prosthesis requiring only three simple cold welds to fasten the four pieces together (Fig. 3D). An effective means of securing the entire band would be to place braces (cross pieces) at either end to hold the band firmly to the anchor teeth. This appliance, therefore, is an unusual long band with braces between the teeth formed by welding the rings together.

Braced band appliances are designed to have their end rings looped over sound anchor teeth in order to support loose teeth. With an unusually long appliance such as this, assuming that the two existing units were part of a single prosthesis, braces at either end would be essential, but possibly not enough to prevent the center of the band from shifting. Stability could have been achieved by making two units, each carefully fitted with a braced area to loop a sound tooth (first premolars in this case) at the distal ends, and cold welding these two units together at the center. The center weld would reduce the flexibility inherent in an extremely long band and would increase its stability as well as help to hold it in place.

Two other techniques of manufacturing an appliance of this configuration, using long bands, are possible (Fig. 4, Nos. 1-3). In either of these two cases only two long bands would be needed, rather than four separate rings, to form the Poggio Gaiella appliance. By bending two long bands in a clever topological design, as shown in Fig. 4 (Nos. 1-3), only three cold welds would be needed. However, in either of these possible designs two of these three welds would be complex. That is to say that a complex weld would have to join three surfaces together at the same time. The simple four-ring appliance would need only three simple cold welds to unite the four pieces, and would have a much greater possibility of precisely fitting the individual rings closely to the teeth to be encircled before welding. Close fitting is very difficult when long bands are used. Considering all these possible variations I conclude that the Poggio Gaiella appliance is an interesting variation of a simple four-ring prosthesis.

MEASUREMENTS OF THE POGGIO GAIELLA APPLIANCE

Measurements suggest that the two elements considered to be parts of the Poggio Gaiella appliance are in fact part of a single dental prosthesis. Through the kindness of Dr. Jacopo Moggi-Cecchi (Universitá di Firenze) an extremely accurate, illuminated sliding dial caliper was used in this study (Mitutoyo Digimatic 500-110 electric), allowing measurements to be made to the hundredth of a millimeter (0.00).

The two pieces of this appliance, as they are mounted in the display mandible, had a maximum length of 41.76 mm. Drawing a straight line tangent to the curves of the two most distal parts, a line perpendicular from the most anterior aspect measures 20.41 mm long. The two elements may be considered individually as the right and left, with reference to their present position in the mandible (Fig. 1). The width of the right band varies along its length from 2.82 mm to 3.23 mm. The thicknesses vary from 0.12 to 0.15 mm. The left unit has widths that vary between 3.02 and 3.33 mm, while the thicknesses of the gold strip vary from 0.12 to 0.17 mm. The narrow aspects of the right unit are under 3 mm in width and are found at the mesial part of the appliance. The narrow aspects of the left unit, while wider than those of the right, also appear toward the mesial aspect. These variations do not provide evidence which can clearly be used to indicate that these are two pieces of a single appliance, nor can this be negated by these findings. Evidence from the Ghent appliance (Becker Ms. A) suggests that Poggio Gaiella may have been constructed in a similar fashion. However, the two pieces of the Poggio Gaiella appliance were parts of a complex band somewhat more elaborate than the Ghent appliance.

The measurements of the Poggio Gaiella prosthesis indicate that Ghinst (1930) was the most accurate in his estimation of the width of this appliance, suggesting that he may actually have made measurements of this piece (see also Casotti 1947, 1957). Tabanelli (1963:92, Tav. 49) provides only vague estimates of these dimensions, while Emptoz (1987) provides the least accurate guess regarding the width of the band (at 4.5 mm).

The length of this appliance would suggest that the teeth of the real Poggio Gaiella skull actually had been loosened by periodontal disease or a blow, and were being held in place by this band. The very length of this

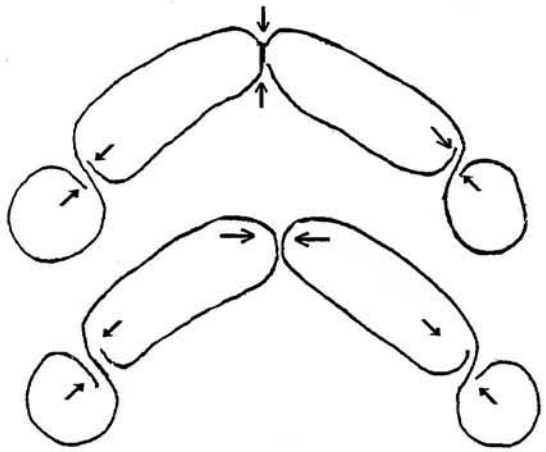

Fig. 4. Two alternate techniques by which the Poggio Gaiella band may have been constructed from two long gold strips. Both of these differ from the possible technique of simply welding four separate rings together.

long band suggests that this appliance was not purely decorative. The uniform width of the band all along its length clearly reinforces the conclusion that this was a functional, and not purely decorative appliance. If we are correct in inferring that this appliance was designed to hold teeth in place which had been loosened by a blow, a mandibular placement also would be possible. This appliance provides our best evidence from the Etruscan area to suggest that dental appliances were used as a therapy for teeth loosened by accidental trauma, as well as for cosmetic purposes. Periodontal disease requiring the use of this type of appliance would be expected in a relatively mature person. Since the skull and mandible associated with this individual do not derive from the person for whom the appliance was made we are unable to determine the actual periodontal condition of the user.

The fact that many of the pontics related to this appliance provided replacement teeth for central incisors has been noted earlier, with the suggestion that tooth evulsion was probably the cause of incisor loss among the users (Becker 1995). Recently the possibility that some of these dental appliances may have been made to stabilize teeth loosened by alveolar deterioration associated with leprosy has been considered. Since bone loss at the anterior margin of the maxillary suture in the area of prosthion is part of the symptomology of leprosy, dental loss in this area occurs at a relatively early age. This bone loss is bilateral. While many Etruscan dental pontics provide replacements for both upper central incisors, the replacement of only one incisor is more common than replacement of both incisors. This argues for tooth evulsion rather than leprosy as a factor in tooth loss.

SUMMARY AND CONCLUSIONS

The construction of the Poggio Gaiella appliance involves a pair, or a series, of welded rings that were carefully fitted to the teeth that they surrounded. The possibility also exists that only two rings were employed, by bending long strips of gold into figure-8's (Fig. 4). The skilled application of this appliance would have provided increased stability to this simple retention band. The Poggio Gaiella band has been damaged to the extent that we cannot accurately determine the dimensions of the teeth it was meant to surround, and it certainly was not made for the skull of the person with which it is now associated.

ACKNOWLEDGEMENTS

Special thanks are due Prof. L. Bliquez for sharing important information relating to this subject and for his important insights into this field of study. Thanks also are due Dott.ssa Gabriella Barbieri, Dr. Anna Maria Bietti Sestieri, Dott.ssa M. Cataldi Dini, Dr. Lucos Cozza, Dr. Jacopo Moggi-Cecchi, Dr. Elsa Pacciani, Prof.ssa Adele Ré, the staff of the British School at Rome and of the Museo di Forte Sangallo in Civita Castellana for valuable aid in various aspects of this research. Dr. Luigi Capasso, Dr. Francesco Nicosia and Dott.sssa Anna Maria Esposito (National Archaeological Museum in Florence) kindly permitted study of the Poggio Gaiella appliance and associated skull. The kind co-operation of Bruno Michelucci and the entire staff of the National Archaeological Museum is gratefully acknowledged. This study was conducted in association with research funded by the Daniel and Jacqueline Colyer Foundation, supplemented in part, by a travel award from West Chester University of Pennsylvania (CASSDA, Dr. J. Skerl). The manuscript was produced while the author was a Fellow in Anthropology at the University of Pennsylvania (Dr. G. Possehl, Chair). Any errors of interpretation or presentation are, of course, the responsibility of the author alone.

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A NEW LOOK AT PREMOLAR TRAIT VARIATION: MAXILLARY PREMOLAR ACCESSORY RIDGES (MxPAR)

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Research on dental morphological variation has proven useful in a wide variety of genetic, forensic, and affinity assessment studies conducted during the past eighty years. Although many traits have been identified in incisor, canine, and molar teeth, relatively few premolar features have been systematically examined. Accessory ridges on the maxillary premolars are no exception.

Premolar accessory ridges are elevated crests on the occlusal crown surface which may be present both mesial and distal to the central or triangular ridge of the buccal cusp (Fig. 1). Ridges may also be present on the lingual cusp of the maxillary premolar or on the mandibular premolar, although less frequently. Accordingly, most of the little research these traits have attracted has been focused on the ridges on the buccal cusp of the upper premolars.

Although noted in several dental anatomy texts and early studies on tooth morphology (e.g., Black, 1902; Hrdlicka, 1921), few studies have systematically analyzed the occurrence of maxillary premolar accessory ridges. Instead, these ridges are often noted in the literature as "unusual features" (Taylor, 1978) though they occur in relatively high frequencies in many populations. In addition, accessory ridges have been identified in both fossil hominid (Robinson, 1956) and modern populations suggesting that the trait is an old premolar variant with a certain degree of stability.

In past studies researchers have identified this trait as lateral ridges (Hrdlicka, 1921), mid-mesial and mid-distal occlusal paracone ridges (Morris, 1965; Wasser, 1953), transverse ridges (Kraus et al., 1969), accessory occlusal ridges (Gilmore, 1968), and upper premolar accessory ridges (Scott, 1973). In following with the nomenclature used in the two most recent studies on the trait, those of Gilmore (1968) and Scott (1973), the designation "accessory ridges" will be utilized here, albeit modified by the prefix "maxillary premolar." In an attempt to standardize terminology it is suggested that the abbreviation MxPAR, for maxillary premolar accessory ridges, be adopted in future studies.

LITERATURE REVIEW

Wasser (1953) provided the first genetic analysis of the trait. Through use of twin analysis, Wasser found that dizygotic twins have ridge frequencies determined largely by chance while high concordance rates found between monozygotic twins suggest high genetic heritability. In another early study, Gilmore's (1968) population analysis of European-Americans suggested that ridges on the first premolar are related to ridges at the same loci on the second premolar.

Research by Morris (1965), using bilateral symmetry as an estimate of heritability, supported the previous indication of a significant genetic component to accessory ridge formation. Morris found that both first and second premolars were comparable in terms of overall asymmetry frequency, although distal ridges appeared to be more symmetrical in occurrence than mesial ridges. Furthermore, accessory ridges on the maxillary premolars had higher bilateral symmetry scores than ridges on mandibular premolars. This suggests that maxillary premolar accessory ridges may have less environmental influence, or more heritability, and thus may be more productive than mandibular premolars for analysis of this trait.

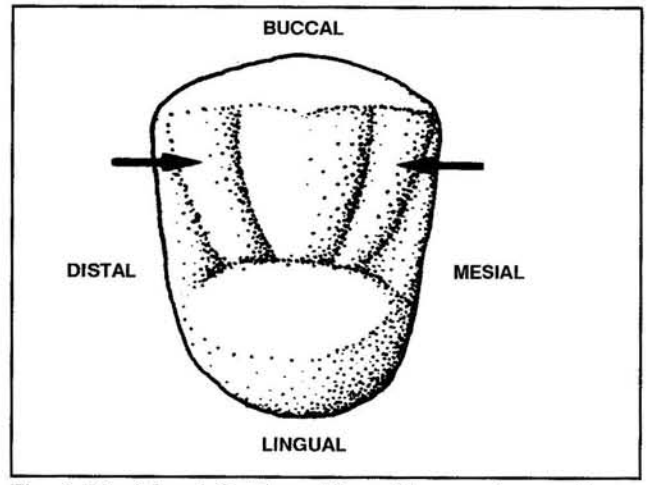

Fig. 1. Mesial and distal maxillary ridges on the maxillary right second premolar.

All prior researchers, other than Scott (1973), examined premolar accessory ridges in terms of trait

presence, but not variation in ridge size. While Scott was the first to create a scoring system based on ridge size, his system did not concentrate on the morphological variation present in the trait. His analysis did, however, provide important new data on ridge presence for historic Native American populations as well as a sample of living European-derived Americans. His results support the trait frequencies noted earlier by Gilmore for European-Americans. Scott's results illustrate higher frequencies for this trait in Native American populations, as the early results obtained by Morris (1965) suggested.

CURRENT RESEARCH

After Diane Hawkey's encouragement, I first began research on maxillary premolar accessory ridges in the fall of 1994. This initial study (Burnett, n.d.) addressed the development of an experimental three-point scoring scale. The data collected suggest that frequency of ridge occurrence, as well as the average degree of expression, increase distally in the dental arcade from P1 to P2. This combination of data may fit a model of the Butler field concept (Dahlberg, 1945) for premolar accessory ridges. The field may be considered directional in that both ridge occurrence and intensity appear to increase distally. Although Gilmore's (1968) data does not fit this model perfectly, the frequency differences in his study are not significant and cannot be considered conclusive evidence against directionality. Unfortunately, it became apparent during the analysis that a three-point scoring system, like other scales previously utilized, does not adequately reflect the morphological variation present in the trait.

As a result of more recent research by Burnett, Hawkey, and Turner (1996), we have developed a scoring system which more accurately reflects accessory ridge variation. In addition, we created a maxillary premolar accessory ridge (MxPAR) scoring plaque to improve both inter- and intra-observer error. New data support the previous indication of field concept directionality for the trait. Current research (Burnett, in progress) will provide a more in-depth analysis of the worldwide variation of MxPAR.

It is somewhat surprising to find such a paucity of studies addressing this trait in the literature since it can occur in such high frequencies in some populations. I am interested in knowing if other Dental Anthropology Association members, particularly foreign members, are aware of any additional references to this trait other than those provided here.

ACKNOWLEDGMENTS

Special thanks to Diane Hawkey, Troy Case, and Dr. Donald Morris for their comments on an earlier version of this article and Dr. Ruchard Scott for his suggestions concerning analysis of MxPAR.

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PRESIDENT'S ADDRESS (continued from page 1)

Perhaps the most effective way to increase awareness of our association is through word-of-mouth. If you know of prospective association members, ask the newsletter editors to send them a complimentary copy of the newsletter. I am especially concerned that dental anthropologists attempting to do research in remote or impoverished areas with inadequate access to libraries receive the newsletter. Since such scientists frequently suffer from currency restrictions and other financial problems, we have established a fund that allows them to join the association and receive the newsletter at no cost. When you renew your membership, please consider supporting the work of other dental anthropologists by donating to this fund. If you know of scientists in this predicament, please give us their names. At present about ten association members are sponsored in this way.

DENTAL ANTHROPOLOGY ASSOCIATION SECTION

NEWS ABOUT DENTAL ANTHROPOLOGISTS

Mr. Andrea Cucina, a doctoral student from Catholic University in Rome, finished two joint projects with M.Y. İścan on dental hypoplasia at Fort Center, a south Florida Pre-Columbian population (the paper will appear in American Journal of Human Biology).The second is on dental pathology in archaic Florida populations.

Dr. Eva Klonowski of the University of Iceland finished a four month Fulbright fellowship with İşcan studying forensic anthropology and age changes in modern Icelandic population.

Fulbright Scholar Dr. Gerald Quatrehomme of the University of Nice, France, is spending a year of sabbatical leave with İşcan to study forensic anthropology and age estimation for French skeletons and to write a book on skeletal trauma.

In February, Susan R. Loth completed her Ph.D. from the University of the Witwatersrand under the direction of Prof Maciej Henneberg, now Wood-Jones Professor at the University of Adelaide. The dissertation title is "Sexual Dimorphism in the Human Mandible: A Developmental and Evolutionary Perspective."

M.Y. İşcan has been named Distinguished Research Professor of the Year by Florida Atlantic University.

CORRECTION

The correct email address for Joel D. Irish is JDIRISH@UNM.EDU. The telephone number is (505) 277-3240.

MINUTES FROM THE 1996 ANNUAL MEETING OF THE DENTAL ANTHROPOLOGY ASSOCIATION (DAA), RALEIGH-DURHAM, APRIL 11, 1996

I. CALL TO ORDER (John R. Lukacs):

The meeting was called to order by president John R. Lukacs at 7:36 pm.

II. OLD BUSINESS

A. Election Procedures

John Lukacs introduced the issue of the procedure of electing officers. Since only a small percentage of members attend meetings where the voting takes place, Lukacs suggested that perhaps an election by mail would be more appropriate than the present practice of holding an election at the annual business meeting. Several ideas, such as attaching the ballot to the membership form, were discussed. It was noted, however, that the return rate for the ballot might not be any higher than the meeting attendance. John Lukacs suggested putting a note in the *Dental Anthropology Newsletter* indicating the concerns about election attendance, and requesting members to attend the annual meetings. After much discussion, the general consensus by those present was to keep voting procedures the same as they have been.

B. New President-Elect

John Mayhall was nominated for president-elect. M. Yaşar İşcan made the motion to close the nominations. C. Loring Brace seconded the nomination. A vote was taken by show of hands, and Mayhall was unanimously elected.

III. NEW BUSINESS

A. Increase in Dental Anthropology Association Dues

The Dental Anthropology Association secretary-treasurer, Shara Bailey, suggested that the association

could benefit from an increase in dues. Based on Bailey's recommendation, John Lukacs suggested $3.00 increase for students and $5.00 increase for regular members. John Mayhall suggested raising dues by $5.00 for students and by $10.00 for regular members. Phillip Walker expressed concern that doubling association dues may mean a loss in membership. C. Loring Brace agreed. M. Yaşar İşcan made a motion to increase dues to $8.00 for students and $15.00 for regular members. Brace seconded the motion. A vote was taken by show of hands and was passed.

Thus, as of January 1, 1997, dues will be $8.00 for students and $15.00 for regular members. A notice containing this information will appear in the October, 1996, *Dental Anthropology Newsletter.*

B. DAA Sponsorship of Symposia

The topic of DAA organization of symposia during the Annual Meetings of the American Association of Physical Anthropologists (AAPA) or sponsorship of a separate meeting (such as those held by the Paleopathology Association) was raised. Phillip Walker argued that, in order for many members to participate, they would have to take additional time from teaching. C. Loring Brace agreed. Moreover, the Paleoanthropology Association will compete with a separate meeting every other year. Therefore, the DAA should work closely with the AAPA to make sure that it works for the DAA. Walker will make certain that a DAA symposium is on the agenda next year. John Mayhall will meet with the AAPA to determine how often the DAA can be guaranteed representation on the program. Walker suggested that the next newsletter contain a request for participants to keep the momentum going and prepare early.

C. World Wide Web (WWW) Page

Phillip Walker suggested circulating the *Dental Anthropology Newsletter* on the WWW. In particular, Walker suggested placing the *Dental Anthropology Newsletter* on the Internet. She Haeussler, newsletter editor, had sent a statement in which she opposed placing the entire newsletter on the WWW because (1) many members do not have access to the Internet, and (2) public availability of the newsletter is unfair to the members who pay dues in order to receive it. The suggestion was made to put only the Table of Contents on the Internet, as that might raise interest in the association. Other suggestions for material for a WWW page included a directory of members. However, several members expressed concern that since the membership directory and bibliography are items that are included in a paid membership, public access would be unfair to dues-paying members. Sheldon Peck stated that he likes the present system of publishing the newsletter as a hard copy. John Lukacs suggested that we ask members their opinions on putting various aspects of the Dental Anthropology Association on the Internet in the next newsletter.

IV. OTHER BUSINESS

Report from the Secretary-Treasurer (Shara E. Bailey)

A. Status of the Treasury

As of April 1, 1996, the Association's net assets are $2,736.84 compared to $2,975.39 one year ago. This drop in assets can be attributed to software purchases as well as an increase in publication costs for the Dental Anthropology Newsletter. The DAA made two major software purchases in 1995 which totaled $362.25. These included a new database program (Microsoft Access) for managing the DAA membership and treasury, and software to set up the VISA/Mastercard payment system. The winter issue of the DAN cost $516.41 (24 pages) for publication - an increase of 5% over last winter's issue. The Arizona State University Department of Anthropology provides bulk mailing for U.S. members; however, foreign postage costs the DAA approximately $465 each year. In addition, the DAA has other expenses including phone charges, office supplies, and monthly maintenance of bank accounts.

Many members have responded positively to the establishment of a credit card payment system. As of April 1, 1996, 26 (10 US, 16 Foreign) members have taken advantage of being able to use their credit card to pay membership fees. This member-convenience costs the DAA approximately $15.00 per month.

B. Membership Status

As of April 1, 1996 the DAA has 324 members, which is six less than one year ago. During the past year we acquired 13 new members, but were forced to drop 19 for non-payment. The majority of those dropped were foreign members.

Two hundred ten members are from the US and 108 members are from foreign countries. One hundred ten regular and student members (60 from the US, 50 from foreign countries) (34%) of the members are past due in payment of membership fees. Nineteen individuals (13 from the US and 6 from foreign countries) (6%) are over a year past due in payment of membership fees. The DAA Office continues to contact overdue members in an effort to collect fees rather than drop members.

In 1995 members donated $85 to the DAA Foreign Membership Fund. Thanks go to those who donated to this fund that sponsors foreign members who are unable to pay their own membership fees.

V. OTHER BUSINESS

Report from the *Dental Anthropology Newsletter* editor (A.M. (Sue) Haeussler)

A. Year in Review

During the past year the newsletter published three issues. They contained nine dental anthropological papers, eleven news articles, five reports, a ten-year index containing 186 entries, three lists of 288 recent publications, one letter, one obituary, and the minutes from last year's association meeting. Of the nine papers, three dealt with dental morphology, two with pathology, and two with cultural treatments. Two were president's reports. Twenty-five authors from eight countries contributed the manuscripts.

B. Commendations

The next issue (Volume 10, Number 3) will mark the completion of ten years of publication. The responsibility for the regular publication and longevity of the newsletter is the many members who have written articles and submitted news and other reports.

The four editors, who have worked on the newsletter during the past year at Arizona State University, deserve commendation. They are Shara Bailey, Joel D. Irish, Esther Morgan, and Korri Dee Turner. Thanks are also due to Tasman Brown, C. Loring Brace, John R. Lukacs, Daris Swindler, and Christy G. Turner II, who have reviewed articles, proof read, contributed manuscripts, advised the editor, and supported the newsletter during the past year. Special thanks are due to John R. Lukacs, who not only wrote presidential addresses, but contributed an article, a news story, and the ten-year index.

C. Dates for Manuscript Submission

Manuscripts for Volume 10, Number 3, are due on April 15. Manuscripts for the Volume 11, Number 1, are due on September 15. Manuscripts for Volume 11, Number 2, are due on December 15.

VI. TRANSITION

John Lukacs turned the presidency over to Phillip Walker, with John Mayhall as president-elect.

VII. ADJOURNMENT

The meeting was adjourned at 8:45 pm.

Minutes prepared by Shara E. Bailey
DAA Secretary-Treasurer
Submitted May 14, 1996

INFORMATION FOR CONTRIBUTORS TO THE *DENTAL ANTHROPOLOGY NEWSLETTER*

The *Dental Anthropology Newsletter* welcomes papers on dental anthropological topics and news items about research and those doing it. Manuscripts for the next issue (Volume 11:1) are due on September 15, 1996, and those for the following issue (Volume 11:2), on December 15, 1996. The newsletter follows the style of the *Journal of the American Association of Physical Anthropologists* as far as is practical for a small publication whose goal is communication among members of a broad international audience.

RECENT PUBLICATIONS OF INTEREST TO DENTAL ANTHROPOLOGISTS

Abdel Fattah RA (1996) Incidents of symptomatic temporomandibular (TM) joint disorders in female population with missing permanent first molar(S). Cranio - the Journal of Craniomandibular Practice *14(1)*:55-62.

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