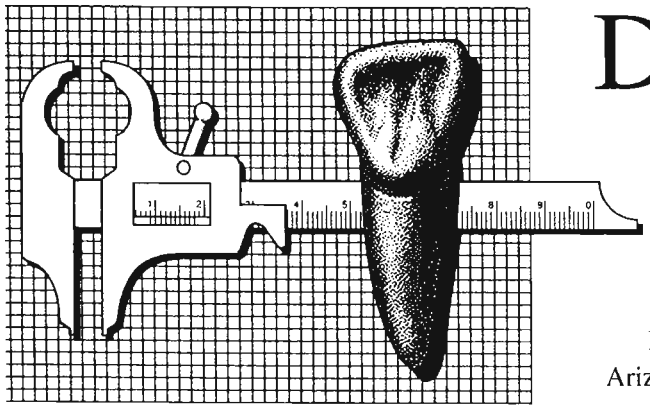

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DENTAL TRANSFIGUREMENT AND ITS POTENTIAL FOR EXPLAINING THE EVOLUTION OF POST-ARCHAIC INDIAN CULTURE IN THE AMERICAN SOUTHWEST

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ABSTRACT The term "dental transfigurement" is suggested for the non-therapeutic modification of prehistoric teeth. In North America, prehistoric dental transfigurement was a common practice only in Mesoamerica. Hence, among the few explanations possible for the rare occurrences of dental transfigurement in the prehistoric American Southwest, the most likely one is migration, that is, the actual presence of Mesoamericans who traveled to and subsequently died in the American Southwest. One case, especially, may contribute to understanding the rapid development of the large planned prehistoric towns in and around Chaco Canyon, New Mexico. This case, the oldest example of prehistoric American Southwest dental transfigurement known so far, was part of a mass burial in one of the rooms that N.M. Judd excavated at Pueblo Bonito — a room that Judd believed had been built during the initial phase of construction of this great Chacoan town.

INTRODUCTION

This communication has two purposes. The first is to bring to the attention of this journal's readership the recent suggestion (Turner and Turner, 1999) for using the term "dental transfigurement" (to transform the figure or outward appearance) in preference over the ethnocentric term "dental mutilation." Like terms such as savage, barbaric, and primitive, dental mutilation possesses a racial tone and should probably be abandoned from usage. The second is to illustrate an example of dental transfigurement believed to be the earliest case thus far known in the prehistoric American Southwest. This case has some potential for helping to understand the rapid rise of large towns in the prehistoric American Southwest.

Dental transfigurement and dental mutilation refer to the non-therapeutic modification of the labial and occlusal surfaces of anterior teeth. As is well known, tooth modification involving chipping, filing, incising, inlaying, coloring, ablation, and other forms of socially-prescribed physical treatment have been frequently reported at and following historic contact by European explorers and travelers in many parts of the world (Scott and Turner, 1997). Australasia, Africa, and Mesoamerica were three world centers where dental transfigurement was relatively common, presumably arising in each region as independent innovations.

The purposes and reasons for dental transfigurement told to ethnographers and other early observers of aboriginal cultures include cosmetic beautification, individual and idiosyncratic choice, group and human (to be different from animals) identification, rituals of puberty and entry into adulthood, status indicators, and so forth. For example, el-Hak (1961) said that members of the northern African Dinka tribe extract the lower six anterior teeth and push the upper six forward so that they protrude as a substitution for circumcision.

Du Bois (1960) observed that Alor (southeast of Borneo and north of Australia) boys and girls have their teeth filed and blackened during adolescence as a preliminary to marriage. To have one's tongue showing pinkly between the gaping front teeth was considered attractive. van Reenen (1986) proposed that the type of dental transfigurement was closely linked with tribal affiliation, that is, a form of identification. Dental transfigurement may also have been performed as a posthumous funeral rite according to Campillo (1979).

The full depth of antiquity for dental transfigurement in each of the three main world centers is uncertain, however. At present, the world's oldest possible example, involving bilateral lower central incisor ablation, seems to have been performed on a female whose skull was excavated from the 20,000 year-old Minatogawa site on Okinawa (Hanihara and Ueda, 1982). Various dental transfigurement types are well known later in time in this region and all along the Pacific rim of East Asia from Jomon period Japan to Neolithic Thailand. Kennedy, et al. (1981) reported on an 8,000 year-old burial from Madhya Pradesh, India, that had incised incisors. Ablation may be as old in northwest Africa because Wells (1964) found that dental ablation was practiced by the Upper Paleolithic inhabitants of that region.

My interest in dental transfigurement arises from the long-standing Americanist controversy over the archaeological question of whether or not individuals or groups traveled directly from prehistoric Mesoamerica to the American Southwest, and on their arrival directly and markedly influenced the transformation of the age-old nomadic social and economic American Southwest lifeway to one of centralized sedentism in large villages and towns.

Were various elements, undeniably Mesoamerican, carried directly to the American Southwest by Mesoamericans? Such elements include maize, live macaws, copper bells, artifacts of marine shells, and so forth. Or, were these and other Mexican elements introduced over many generations along relatively more indirect lines, such as inter-community trade and exchange networks from the Mesoamerican frontier to and throughout northern Mexico and the American Southwest?

This question is theoretically important and hotly debated, bearing as it does on deciding whether American Southwest Indian culture advanced mainly by local evolution, the view held by many American Southwest archaeologists, or was influenced by actual Mesoamerican migrants who introduced new ways and concepts in addition to the above mentioned trade items, a viewpoint with relatively fewer champions. Patently, a scenario involving direct and indirect exchange is also possible.

Let it be emphatically said that no Americanist denies that some Mexican cultural elements reached the prehistoric American Southwest. The method of transmission and the degree of influence are what make up the core of the debate. For more on this see Schaafsma and Riley (1999).

Ideally, the best evidence for actual Mesoamerican presence would come from some sort of genetic marker trait that had its mutational origin in Mesoamerica. No such morphological or molecular trait has been recognized so far. On the other hand, a number of distinctive Mesoamerican cultural traits, such as those just mentioned, exist. Yet, almost none of these is linked to a given individual. However, one cultural practice is so linked, and it can be viewed as strongly indicative of the presence of actual migrants. This is dental transfigurement. In Mesoamerica, dental transfigurement is relatively common and ancient (Borbolla, 1940; Romero, 1958, 1960, 1970, 1986; Cifuentes Aguirre, 1963; Fastlicht, 1971; Campillo, 1979; Gill, 1985; Serrano and Martinez, 1989; Pompa, 1994 personal communication; Hermann et al., 1999), whereas it is very rare elsewhere in North America (Milner and Larsen, 1991).

The first mention of dental transfigurement for an American Southwest Indian skull was made by Saville (1913). He observed filed anterior teeth in a skull curated in the Smithsonian Institution's National Museum of Natural History. The skull had been excavated in the 1890s by J.W. Fewkes at a prehistoric Hopi Indian ruin in northeastern Arizona named Sikyatki. Oddly, it was sent as an exchange specimen to the South Australian Museum of Adelaide, Australia, where dental anthropologist T.D. Campbell (1944) noticed the dental modification, probably because of his earlier studies on Aborigine teeth and related behavior, including ablation.

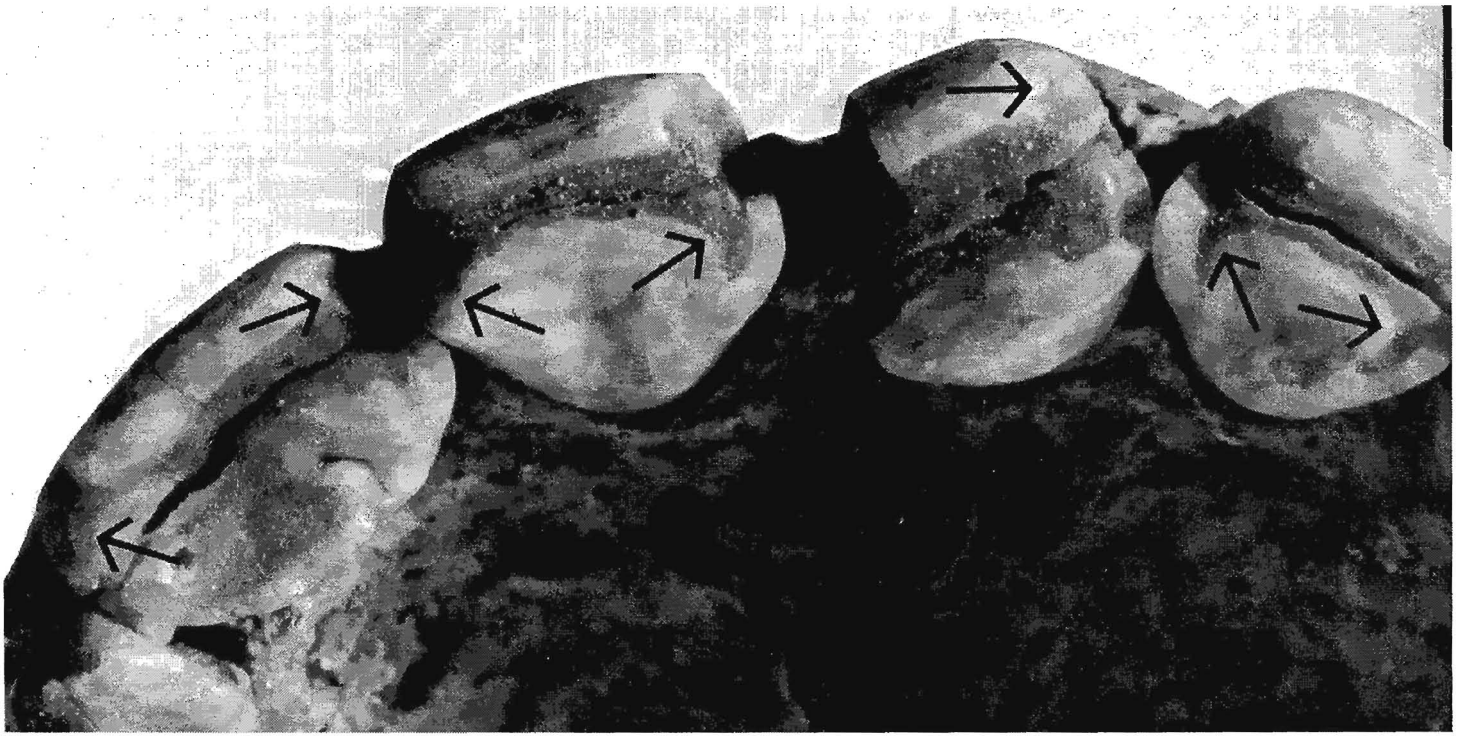

Fig. 1. Mesoamerican dental transfigurement in an old adult male (45 to 60 years) (NMNH 327099) recovered by N.M. Judd (1954) in July, 1924, from Pueblo Bonito room 330, Chaco Canyon, northwestern New Mexico. This room, along with several others was believed by Judd to have been built during the first construction phase of Pueblo Bonito (A.D. 900-1100). As such, this presumed Mesoamerican was directly associated with the rise of the Chaco Anasazi great houses and extensive road complex. He was found with at least 31 other men and women (Palkovich, 1984) strewn wildly on the floor. One possible explanation for this remarkable interment, among other extraordinary features, is that some or all may have been sacrificed upon his death (Turner and Turner, 1999:129). Such practices occurred throughout Mesoamerica, even in northern frontier sites such as Alta Vista, approximately 900 air miles south of Pueblo Bonito, or roughly a 30 to 40 day walk (CGT neg. 6-3-97:36).

While the nearly exact geographic origin of this skull is known, its precise antiquity is not, a circumstance which reduces its usefulness as an indicator of prehistoric Mesoamericans in the American Southwest. The Sikyatki skull could date to either prehistoric or historic times, that is, before or after AD 1539. However, the Sikyatki site seems to have been abandoned following a deadly and ruinous raid by Hopi Indians from other villages at about the time that the Spanish arrived in New Mexico, but before they ventured westward to Arizona (Turner and Turner, 1999).

Since Fewkes did not record the exact location in the ruin that he found the skull, we must allow that it could represent an individual who was a member of the small Indian army that the Spanish conquistadors put together in Mexico and led to the American Southwest. This adult male could have deserted and fled westward, subsequently dying and being buried by chance in the ruins of Sikyatki. As far-fetched as this scenario seems to me, it should not be outrightly dismissed in light of the frequency that intrusive burials have foiled ostensibly simple stratigraphic associations in many parts of the world. Still, the skull very likely dates to the late prehistoric period of American Southwest culture history.

MATERIALS

More than 30 years would pass after Campbell's (1944) report before another example of American Southwest dental transfigurement would be recognized. This I did in July, 1978, when studying the dentition of Pecos Pueblo, New Mexico, curated in the Peabody Museum, Harvard University. The individual (59987) was a male with an incised left upper first incisor. I was never certain whether the

individual (59987) was a male with an incised left upper first incisor. I was never certain whether the incising was intentional or the result of some sort of task activity. In any event, Pecos Pueblo was occupied into historic times, and the man could have lived after the Spanish arrived.

However, in September, 1988, I found a case of unquestionably deliberate dental transfigurement in the dentition of a skeletal assemblage excavated at a Classic period Hohokam village called Grand Canal, situated within the city limits of Phoenix, Arizona (Turner and Turner, 1995; Bair et al., n.d.). This burial and many other inhumations and cremations were excavated under the field supervision of G.A. Bair for Soil Systems, Inc. The individual, identified by T.M. Fink (1989) as having been a male aged 25 to 35 years, was buried with some exceptional mortuary goods that suggest that he had social or economic status above many if not most other individuals laid to rest in this large cemetery.

Soon after the publication of the Grand Canal find, announcements of other examples of dental transfigurement began to appear (Turner et al., 1997; Burnett, 1997; Minturn and Lincoln-Babb, 1998; Turner and Turner, 1999). In addition, Lincoln-Babb reported in Flagstaff, Arizona, at the 1996 Pecos Conference, that she had found two prehistoric southern Arizona Hohokam males (Features 110 and 156), excavated at the Las Acequias site near Phoenix, to have dentally transfigured teeth.

As of this writing, the dozen or so examples of American Southwest dental transfigurement include mesial and distal edge notching, filed labial-occlusal notching at the crown midpoint, and two cases of labial surface polishing — the latter practice known elsewhere only in the Valley of Mexico. One of these two examples of labial polishing is illustrated in Regan et al. (1996:836). It was recovered by archaeologists working under the directorship of G.E. Rice from a pit in a Salado platform mound site called Schoolhouse Point Mound located near Lake Roosevelt in central Arizona. The site dates between AD 1150 and 1450.

The highly parallel polishing striations cover the labial surface and run from the occlusal border to the crown-root junction. What is remarkable about the cultural implications of the fragmentary remains of this young adult is that they were found in a pit containing the incomplete remains of another adult (male) with the notched border variant of intentional dental transfigurement.

My first discovery of prehistoric American Southwest incisor labial polishing happened during a routine dental study of Hohokam and Mogollon remains at the Museum of Northern Arizona in June, 1988. This example occurred in an adult female from a southern Arizona Hohokam site (NA 18,003) dating between AD 1280 and 1400. The woman had been buried on her back in an extended position. Like the Salado case, she too was associated spatially with a platform mound (R. Ciolek-Torrello, 1988, personal communication). Studies on tooth surface striations have been reviewed by Lalueza Fox (1992), who attributes labial polishing mainly to oral hygiene practices.

Most of the presently known American Southwest examples of dental transfigurement probably belong to the late prehistoric and early historic time periods. As such, they would, on the one hand, be largely irrelevant to the question of Mesoamerican influence on the evolution of American Southwest Indian culture. On the other hand, their presence in the American Southwest might well be looked upon as late examples of a long-standing custom of actual Mexican visitors (e.g., opportunists, traders, wanderers, even warrior-priest cultists and followers). In either case, archaeologically-derived American Southwest crania with dental transfigurement are the best currently available biocultural evidence to argue for an actual presence of Mesoamerican Indians in prehistoric Arizona and New Mexico. While their number is presently few, the amount and types of influence they may have introduced could have been highly significant, given that an analogy can be made with the immense influence the few early Spanish missionaries had on many groups of American Southwest Indians (Spicer, 1962).

A case of dental transfigurement temporally earlier than the Southern Arizona Hohokam example was present in a skull found a number of years ago, but unrecognized until recently (Fig. 1). This specimen is in the physical anthropology collections of the Smithsonian Institution's Natural History Museum,

Washington, D.C. The mostly complete skeleton is that of an old adult male. It was recovered by N.M. Judd as part of his National Geographic Society-sponsored Pueblo Bonito excavations in Chaco Canyon, New Mexico. Judd (1954) firmly believed that the above ground masonry room where he found several skeletons (Room 330) was built by the Indians he referred to as the "Old Bonitians early in the construction sequence of this Great House, namely in Pueblo II times (AD 900 to 1100)."

DISCUSSION

Mechanisms, processes, agents, conditions, migrations, and historical pressure are among the many factors that need to be considered in any study of cultural evolution or change. Heretofore, American Southwest archaeologists have generally recognized that external influences from Mexico have played a significant role in changing the economy and related considerations of prehistoric American Southwest culture(s) from nomadic hunting and gathering to sedentary village agriculturalists. The primary mechanism was the introduction of maize that had been domesticated earlier in central Mexico. With maize must have also come some of the fertility ritual and ceremony associated with the growing of this valuable cereal. Later, other cultural elements were introduced, some of which have been previously noted.

Saying this leads to the aforementioned long-standing debate in Americanist archaeology on just how these Mesoamerican elements reached the American Southwest. On the one hand, some archaeologists envision a slow village-to-village exchange process, without any direct migration (regardless of size) of Mesoamerican carriers of these elements. On the other hand, a few archaeologists see the need for some degree of direct contact, that is, actual Mesoamericans in the American Southwest.

Heretofore, the argument against actual presence has rested on two facts. (1) The architecture, pottery styles, settlement patterns, and other physical features and stylistic considerations show no strong integrated resemblances with those of Mexico. For example, no pyramids, temples, or other forms of major public architectural complexes have been found in the American Southwest. Metallurgy is absent, as is evidence of trade or craft specializations, and so forth. (2) No actual Mesoamericans have been identified in the American Southwest. In a sense, the argument against a Mesoamerican presence has rested on negative evidence, which is not the best sort of evidence to rely upon in any debate, let alone in a context such as occurs in archaeology where so very little of any culture preserves. Still, the few resemblances between the American Southwest and Mesoamerica are more of a mosaic than an integrated complex, so the anti-migrationists have a reasonable argument.

Now, however, dental anthropological evidence in the form of dental transfigurement is accumulating. This new information points to the possibility of actual Mesoamerican migrants having traveled to the American Southwest or, and very unlikely in my view, some American Southwest Indians traveled to Mesoamerica, had their teeth fixed, and returned afterwards. While most of the cases of dental transfigurement are too late to have had any thing to do with the earlier settlement pattern changes in American Southwest culture, one seems to be early enough to be linked to the first stage of construction at Pueblo Bonito — the architectural icon of prehistoric American Southwest culture, and one of the major sites that migrationists or "fast diffusionists" hold up as an example of direct Mesoamerican influence. While this one possible Mesoamerican may not convince hard core anti-migrationists that even if Mesoamericans had been in the American Southwest early enough to have influenced the rise of the Chacoan way of life, we have no indication that their numbers were large enough to have had much influence. Patently, adherence to this argument ignores the question: how many individuals does it take to stimulate major changes in a culture? The answer is, of course, that the number can vary depending on circumstances.

CONCLUSION

In conclusion, this note draws attention to the term, dental transfigurement. It also illustrates how dental anthropology can be of potential help to areas of research completely removed from the realm most of us think about as the domain of dental anthropology.

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PEOPLE OF THE *SAMURAI* CLASS KEPT THEIR ANTEMORTEM LOST TEETH

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ABSTRACT Three hundred and fifty-seven skeletons were excavated from the old site of the Sougenji temple in Kitakyushu City, Fuknoka Prefecture, Japan, in 1992. These skeletons were remains of the *samurai* class and had been buried during the seventeenth or eighteenth century (Edo period). To clarify *samurai* dental habits, we examined their teeth and alveolar condition. Alveoli could be detected at least partly in 141 skeletons. Detailed examination revealed that 22 bodies had been buried with their own antemortem lost teeth. As most of the Sougenji people were buried in vessels, the likelihood that the belongings of one person would mix with those of another was small. The roots of three teeth were artificially shaved, indicating that those teeth were likely used as artificial teeth. However, most of the antemortem lost teeth lacked artificial shaved tracks. Although the meaning behind the preservation of antemortem lost teeth remains obscure, the present data indicate that oral health care appears to have been a part of the Sougenji *samurai* culture. This is the first such report.

INTRODUCTION

Dyeing teeth (blackening teeth), tooth brushing, and false teeth were all customary practice during early modern times (Edo period) in Japan (Hasegawa, 1993). Tooth dyeing is thought to have been practiced in Japan since before recorded history. In the Edo period tooth dyeing signified marriage status among women. Tooth brushing with a tufted toothpick was recorded as early as the Edo period, during which time many types of tooth powder were sold (Hasegawa, 1993). Furthermore, technicians made false teeth during that period (Hasegawa, 1993). These findings suggest that during the Edo period people took care of their teeth and oral condition.

The *samurai* were originally warriors and they came into existence during the Middle Ages. They belonged to the highest class during tile Edo period. However, because large-scale excavation of *samurai* skeletons from one site has not yet been performed, overall *samurai* dental care has not been clarified. Three hundred and fifty-seven skeletons of the *samurai* class were excavated in 1992. We examined their teeth and alveolar condition to establish *samurai* dental habits.

MATERIALS AND METHODS

The old Sougenji temple site in Kitakyushu City, Fukuoka Prefecture, Japan, includes burials. Sougenji temple was initially erected at Shinshu Matsumoto in the Chubu District by Ogasawara Hidemasa, who was lord of Shinshu Matsumoto. When the Ogasawara family moved to Kokura in Kyushu in 1632, the Sougenji temple was moved as well. The Sougenji temple burned down in 1866, but was rebuilt in 1869 and moved to its present location in 1975. However, the burials did not move. The bodies at this site were Ogasawara retainers and belonged to the *samurai* class.

The site was excavated in 1992, revealing over six hundred graves. Three hundred fifty-seven skeletons were excavated. Based on the archaeological remains, such as the form and design of the vessels, archaeologists determined that the bodies were buried during the 17th or 18th century (Ogata, 1995). Matsushita (1995) examined the skeletons buried at the Sougenji site and estimated their age and sex based on bone morphology. He classified adult skeletons as young age (20-39 years old), middle age (40-59 years old), and old age (over 60 years old). Alveoli could be detected at least partly in 141 adult skeletons. The senior author visually observed their teeth and alveolar condition and determined that a tooth fell out antemortem if the alveolar socket was completely closed.

RESULTS OF THE OBSERVATIONS

Twenty-two of the 141 skeletons were buried with some teeth (Table 1). The alveolar sockets of these teeth were completely closed. As filth and calculus adhered to all roots of those teeth as far as near their apex, those teeth were thought to have been lost to periodontal disease. Among the skeletons buried at Sougenji site, approximately 66% were in vessels and 19% were in wooden tubs. The height of the vessels ranged from 70-90 cm and the interior diameter was approximately 50 cm. Each vessel had a stone lid. Although the wooden tubs had decayed and disappeared, archaeologists established that they had been in wooden tubs based on the condition of the graves (Ogata, 1995).

Twenty-one out of 22 skeletons were buried in a vessel, indicating that the belongings of others did not mix. The shape and color of the teeth remaining in each vessel were similar. The lack of excess teeth indicated that these

antemortem lost teeth belonged to the skeleton in the vessel. Therefore, we believe that these bodies were buried with their own antemortem lost teeth.

The condition of the alveoli and the antemortem lost teeth in each vessel are listed in Table 1. Figures 1-26 show the alveolar condition and antemortem lost teeth in vessels No. 113, 139, 154, 301, 337, 327, and 391.

Only two of the skeletons had artificially shaved teeth. One was No.113 (Fig. 3), which contained the remains of an elderly female. Thirteen upper teeth and 14 lower teeth remained in the vessel. The alveoli of the mandible were entirely closed, suggesting that fourteen lower teeth were antemortem lost teeth and were buried with the woman. However, the alveolar part of the maxilla is missing. Consequently, we could not determine whether the 13 upper teeth had been lost antemortem. Bilateral upper central incisors were observed. Their the appearance differed considerably, as the root of the left incisor was shortened and the crown was polished (Fig. 3). Based on these findings, we considered the left incisor to be an antemortem lost tooth, which was buried with the woman.

The vessel with skeleton No.154 contained the remains of an elderly male. The upper alveoli between the right second premolar and left canine were entirely closed (Fig. 9), and the maxillary upper central and lateral incisors remained in the vessel (Fig. 10). These incisors lacked roots and had pinholes on the proximal surface. None of the other teeth among the 22 skeletons with their own antemortem lost teeth had artificial marks.

DISCUSSION

Skeletons of the early modern age have been excavated from various parts of Japan (Morita and Kawagowe, 1960; Suzuki *et al.*, 1962; Suzuki, 1967; Tateshi, 1970; Waki, 1970; Morimoto et al., 1976; Watanabe et al., 1982; Nakahashi, 1987; Matsushita and Wakebe, 1990; Matsushita et al., 1990; Saiki et al., 1991). However, none of these studies or other studies of excavated skeletons in Japan reported the presence of antemortem lost teeth with skeletons. One reason for this is that the alveolar bone is relatively fragile, and consequently is not always found among the excavated bones. Furthermore, distinct skeletons could not always be identified, and thus researchers could not establish whether the teeth were antemortem lost teeth from that skeleton. In the present study, because approximately 66% of the Sougenji burial containers were in vessels, including 21 with antemortem lost teeth, we could clearly distinguish individual skeletons. Thus, identification of antemortem lost teeth was possible.

Initially, we believed that these *samurai* preserved their own antemortem lost teeth to make their own false teeth. This appears to have been the case with the maxillary central and lateral incisors of No.154 (Fig. 10). The incisors appear to have been tied to the remaining teeth by thread or wire or used for artificial teeth in a wooden denture.

Artificial stone teeth, which appear to have been tied to the remaining teeth, were also excavated from the Sougenji site. Wooden dentures incorporating human teeth have been reported previously by Iida (1962). The maxillary left central incisor in No.113 (Fig. 3) was also thought to have been used in making false teeth. However, none of the other teeth from the twenty-two skeletons had artificial marks. Thus, due to the small number of teeth apparently used for false teeth and because molars were seldom used for false teeth, we must assume that the other antemortem lost teeth were preserved for other purposes. Wooden upper and lower full dentures and two stone upper partial dentures were excavated from the Sougenji grave. Approximately 33 % of the males had slick polished labial and buccal tooth surfaces, though lingual surfaces of those teeth were stained. Furthermore, as the polished surfaces were restricted areas which could be touched by a tufted toothpick, we presumed that the polished surfaces were caused by tooth brushing. These findings all indicate that the *samurai* class buried at Sougenji must have taken care of their teeth and oral condition as part of body health control.

Matsushita (1995), who also examined skeletons buried at the Sougenji site, reported that 34 skeletons were thought to be old age and 43 skeletons to be middle age, indicating that the life expectancy of the *samurai* class at Sougenji was relatively long. However, if the purpose was maintenance of oral health, preservation of the antemortem lost teeth would have been unnecessary. The preservation of antemortem lost teeth and burying them with the bodies indicates a level of interest in the teeth that exceeds simple health care. There may have been psychological reasons or, relatively more likely, religious significance.

In order to better understand this habit, we should determine how widespread the preservation of antemortem lost teeth was among the *samurai* class by examining other populations from that era. Such large-scale excavations of *samurai* skeletons have not yet been performed, preventing such comparisons. Although skeletons of common people during early modern times have been excavated, they have generally been buried in wooden tubs or interments. Consequently, the condition of the skeletons has been generally poor and the skeletons cannot be

clearly distinguished from one another. Therefore, judging whether the loose teeth were antemortem lost teeth of the accompanying skeleton has been difficult. We hope that larger scale excavations of *samurai* skeletons can be performed to allow further assessment of dental care among this population.

SUMMARY AND CONCLUSIONS

To evaluate *samurai* dental care, we examined the teeth and alveolar condition. Twenty-two skeletons were buried with some teeth and the alveolar sockets were completely closed. These 22 bodies were thought to have been buried with their own antemortem lost teeth. Previous thought held that members of this population preserved their own antemortem lost teeth for use as their own false teeth. However, only two skeletons among the 22 skeletons had artificial marks on their teeth.

Other findings indicated that the Sougenji *samurai* people brushed their teeth and used artificial teeth, indicating these people practiced good dental care. This is the first large-scale study to demonstrate good dental care. Although the reason that the Sougenji *samurai* people preserved their own antemortem lost teeth is not clear, the practice appears to have served a more personal than practical purpose. Perhaps, the Sougenji *samurai* people may have preserved these teeth for some psychological reasons. Further study is required to better understand the dental habits of the *samurai*.

ACKNOWLEDGEMENT

We express our gratitude to Dr. Matsushita Takayuki, Doigahama Site Anthropological Museum, for his valuable advice.

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TABLE 1. Condition of the alveoli and antemortem lost teeth in vessels of 22 skeletons

				Teeth in alveoli and condition of alveoli																Antemortem Lost Teeth in Vessel													
				Right								Left								Right								Left							
ID	Sex	Age	Jaw	M3	M2	M1	P2	P1	C	I2	I1	I1	I2	C	P1	P2	M	M	M	M	M	M	P2	P1	C	I2	I1	I1	I2	C	P1	P2	M1	M2
12	M	40-59	Upper	×	×	×	●	×	○	×	×	○	×	×	×	○	○	○	○	M^3				P^1					I^2	C	P^1			
			Lower	○	○	○	○	●	○	●	×	×	●	○	●	●	×	×	×								I^1							M^2
78	F	40-59	Upper	—	—	●	●	●	●	×	×	×	×	×	×	×	/	×	×									I^1	I^2	C	P^1			
			Lower	×	×	×	×	×	×	×	×	Δ	Δ	○	○	×	×	○	○		M_2	M_1	P_2	P_1		I_2							M_1	
95	F	60-	Upper	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—															
			Lower	●	×	×	×	●	○	×	×	×	×	×	×	×	×	×	×		M_2	M_1				I_2			I_2	C	P_1	P_2	M_1	M_2
103	M	40-59	Upper	○	●	○	○	○	○	○	○	—	—	—	—	—	●	○	○															
			Lower	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○									I_1						
109-2	F	20-39	Upper	○	○	/	×	×	○	○	×	○	×	×	×	×	○	○	○				P^2	P^1			I^1		I^2	C	P^1	P^2		
			Lower	○	○	○	○	○	○	○	○	○	○	○	○	×	○	○	○													P_2		
113	F	60-	Upper	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—									I^1						
			Lower	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	M_3	M_2		P_2	P_1	C	I_2	I_1	I_1	I_2	C	P_1	P_2	M_1	
139	F	60-	Upper	/	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×		M^2	M^1	P^2	P^1		I^2	I^1	I^1	I^2	C		P^2	M^1	M^2
			Lower	×	×	×	×	×	×	×	×	×	×	×	×	×	×	—	—	M_3	M_2	M_1		P_1	C	I_2	I_1	I_1	I_2	C	P_1	P_2	M_1	
154	M	60-	Upper	—	—	—	×	×	×	×	×	×	×	×	—	—	—	—	—							I^2	I^1							
			Lower	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×			M_1	P_2	P_1	C									
169	F	40-59	Upper	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—															
			Lower	×	×	○	○	○	○	×	×	×	○	○	○	○	○	×	×							I_2	I_1	I_1						
179	M	40-59	Upper	×	×	○	Δ	×	Δ	×	×	Δ	×	○	×	○	●	○	○	M^3			P^2	P^1	C	I^2	I^1	I^1	I^2		P^1			
			Lower	○	○	○	○	○	○	○	○	○	○	○	○	○	○	×	○															M_2
301	M	40-59	Upper	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—															
			Lower	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×		M_2			P_1	C	I_2	I_1			I_2	C	P_1			M_2
327	M	60-	Upper	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×		M^2	M^1	P^2	P^1	C	I^2	I^1	I^1	I^2	C		P^2	M^1	M^2
			Lower	○	×	Δ	Δ	×	×	×	×	×	×	×	×	×	Δ	Δ	×			M_1	P_2	P_1	C	I_2			I_2	C	P_1	P_2	M_1	
337	M	40-59	Upper	×	×	×	×	×	○	×	×	×	×	×	×	×	×	×	×	M^3		M^1								C			M^1	
			Lower	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×		M_2	M_1	P_2	P_1					I_1	I_2			P_2	M_1	
338	F	40-59	Upper	×	×	×	/	○	○	×	×	×	×	×	×	—	—	Δ	Δ			M^1								C				
			Lower	×	●	○	×	×	○	Δ	×	×	Δ	○	×	○	×	○	●							I_2	1		I_1	I_2		P_1			
346	F	60-	Upper	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—															
			Lower	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×			M_1	P_2	P_1		I_2	I_1	I_1	I_2	C	P_1	P_2	M_1	
358	F	40-59	Upper	×	×	×	×	×	×	×	×	×	×	○	×	×	×	×	×	M^3	M^2	M^1	P^2	P^1	C	I^2	I^1	I^1	I^2			P^2	M^1	M^2
			Lower	○	○	×	○	○	○	○	×	×	○	○	○	×	×	○	○			M_1					I_1	I_1				P_2		
364	M	60-	Upper	×	/	×	×	×	○	○	×	×	×	○	○	○	×	×	×									I^1						
			Lower	×	×	○	/	○	○	○	×	×	○	○	○	○	○	×	×		M_2													
391	F	60-	Upper	/	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×		M^2	M^1			C	I^2	I^1			C		P^2	M^1	M^2
			Lower	×	×	×	×	×	×	×	×	×	×	○	×	○	×	×	×		M_2	M_1	P_2		C								M_1	
443	M	40-59	Upper	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—															
			Lower	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	M_3			P_2							C		P_2	M_1	M_2
462	M	40-59	Upper	—	×	×	○	Δ	○	×	○	○	○	○	×	×	—	—	—		M^2	M^1		P^1							P^1	P^2		
			Lower	◆	○	○	○	○	○	○	○	○	○	○	○	○	○	○	◆															
475	F	40-59	Upper	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—															
			Lower	—	—	×	×	×	×	×	×	×	×	×	×	×	×	—	—					P_1						C				
477	M	60-	Upper	—	—	—	—	×	×	×	×	×	×	×	×	×	×	—	—					P^1	C	I^2	I^1	I^1	I^2	C	P^1	P^2	M^1	
			Lower	—	×	×	×	×	×	×	×	×	×	×	×	×	—	×	Δ		M_2	M_1	P_2	P_1	C	I_2				I_2	C	P_1	P_2		M_2

○ remaining tooth, ● postmortem lost tooth, × closed alveolus, Δ closing alveolus, / unclear alveolus, \uninterrupted tooth, ◆ congenital missing tooth, — damaged alveolus. I is incisor. P is premolar. M is molar. Superscript indicates position in the maxilla. Subscript indicates position in the mandible.

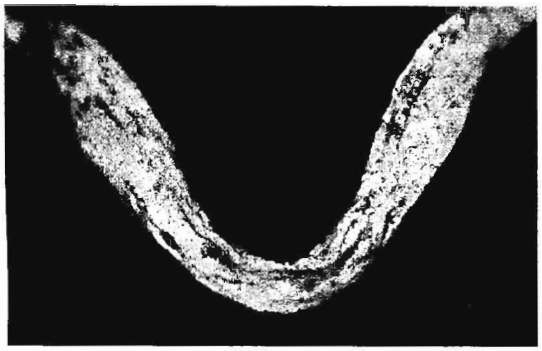

Fig. 1. Aveolar surface of mandible of Skeleton 113.

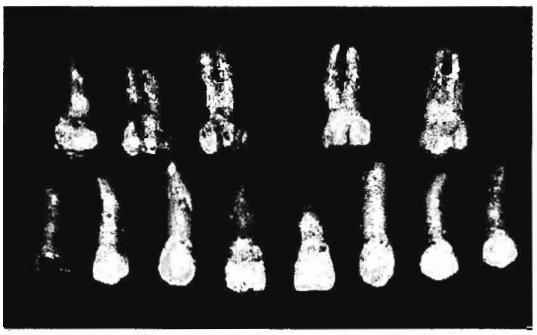

Fig. 2. Maxilary teeth in vessel with Skeleton 113.

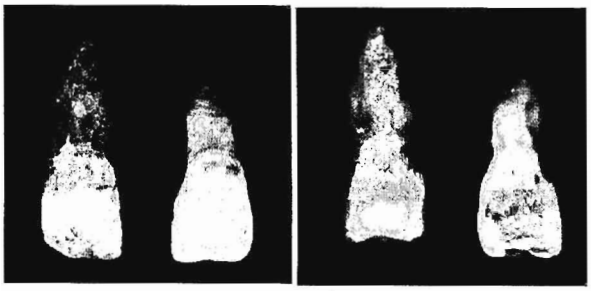

Fig. 3. Maxillary central incisors of skeleton 113. The root of the left incisor had an artificially cut plane and a polished crown.

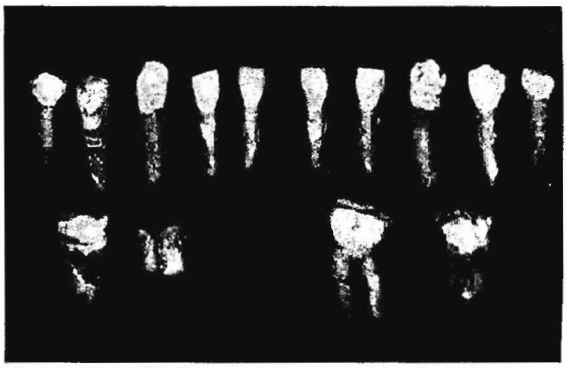

Fig. 4. Mandibular teeth in vessel with skeleton 113.

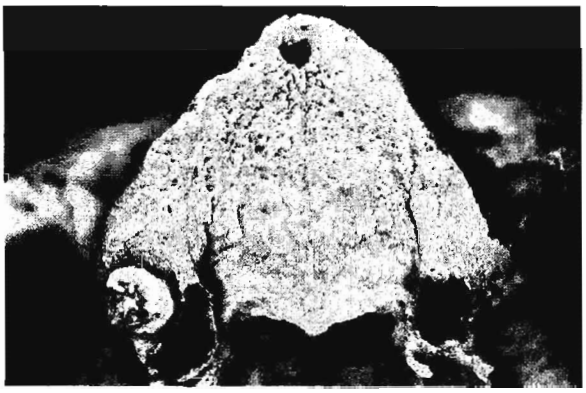

Fig. 5. Maxillary alveoli of Skeleton 139.

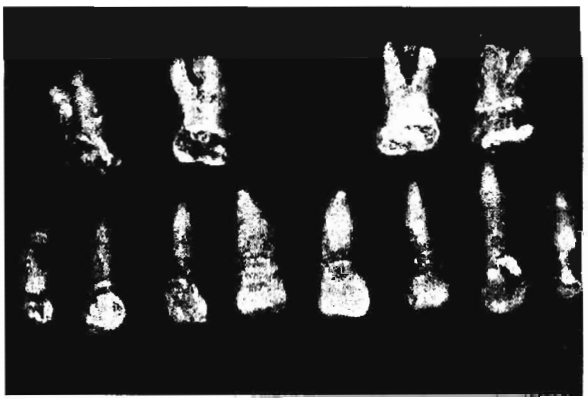

Fig.6. Maxillary teeth in vessel with skeleton 139.

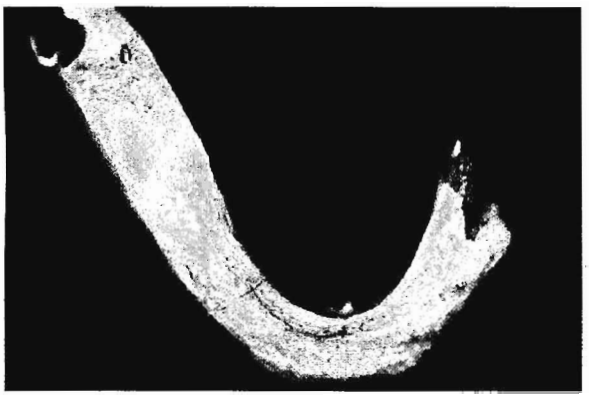

Fig. 7. Alveolar aspect of mandible of Skeleton 139.

Fig. 8. Mandibular teeth in vessel with Skeleton 139.

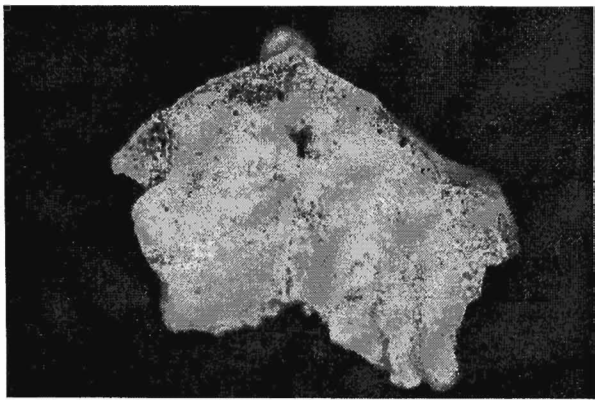

Fig. 9. Alveolar aspect of maxilla of Skeleton 154.

Fig. 10. Teeth remaining with Skeleton 154.

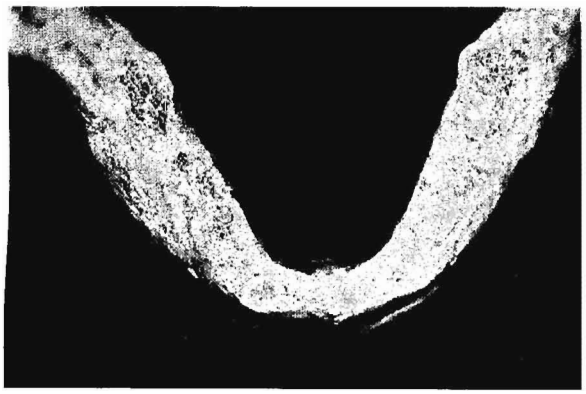

Fig. 11. Alveolar aspect of mandible of Skeleton 154.

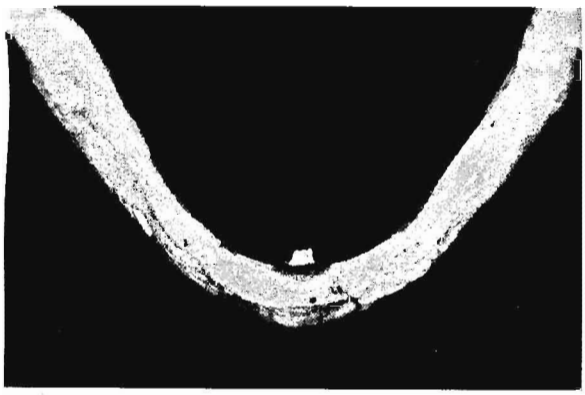

Fig 12. Alveolar aspect of mandible of Skeleton 301.

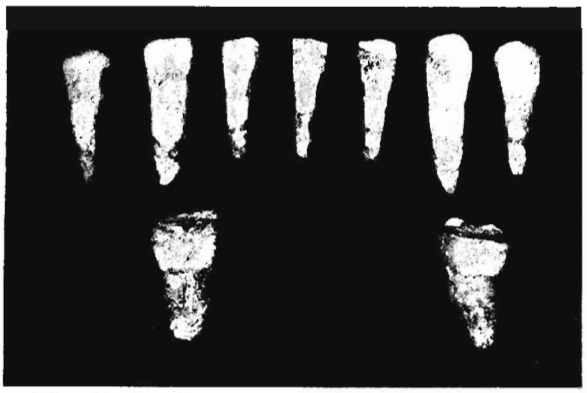

Fig. 13. Teeth in vessel with Skeleton 301.

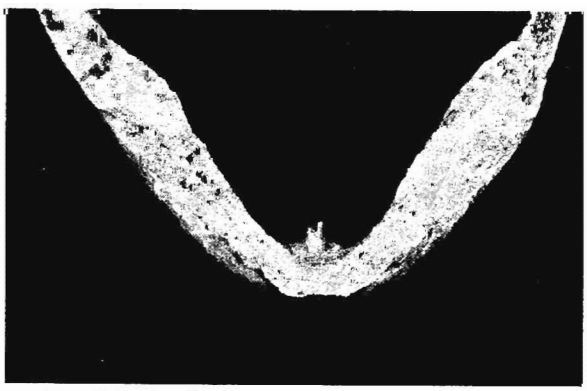

Fig. 14. Alveolar aspect of mandible of Skeleton 346.

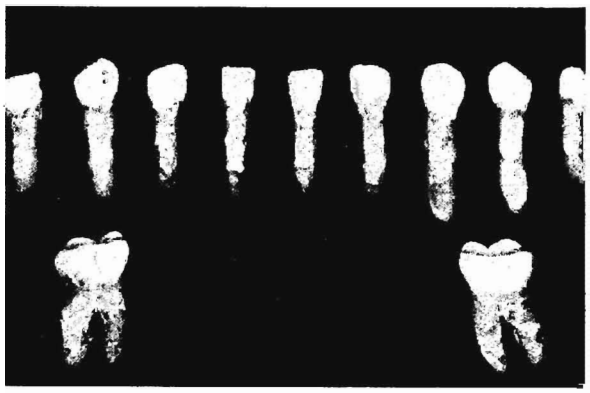

Fig. 15. Teeth in vessel with Skeleton 346.

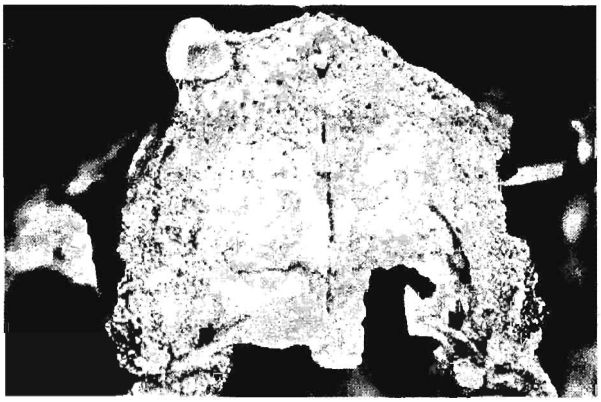

Fig. 16. Alveolar aspect of maxilla of Skeleton 337.

Fig. 17. Teeth in vessel with Skeleton 337.

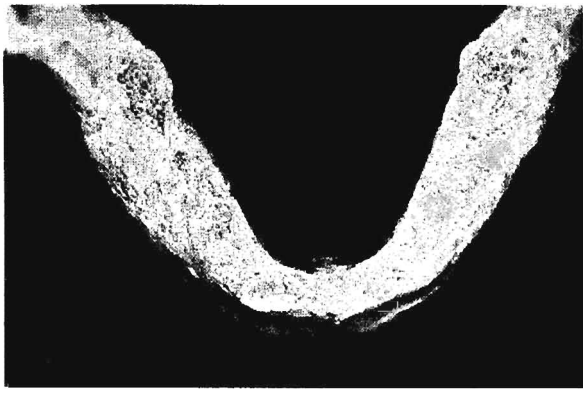

Fig. 18. Alveolar aspect of mandible of Skeleton 337.

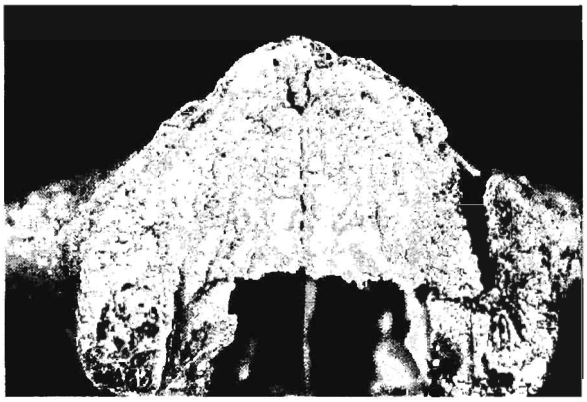

Fig 19. Alveolar aspect of maxilla of Skeleton 327.

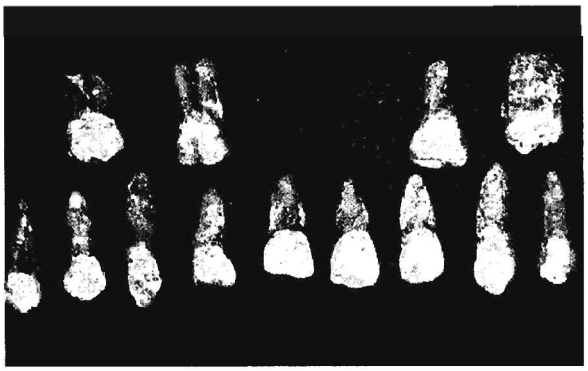

Fig. 20. Maxillary teeth with Skeleton 327.

Fig. 21. Alveolar aspect of mandible of Skeleton 327.

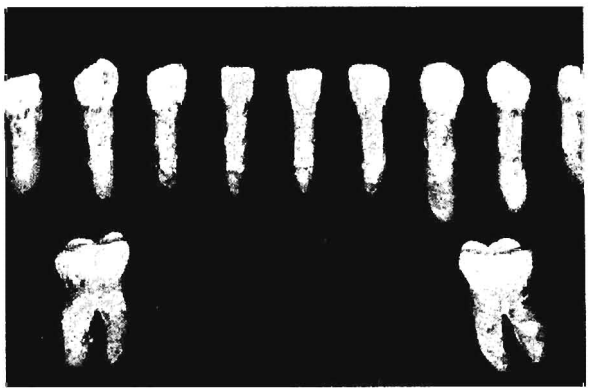

Fig. 22. Mandibular teeth with Skeleton 327.

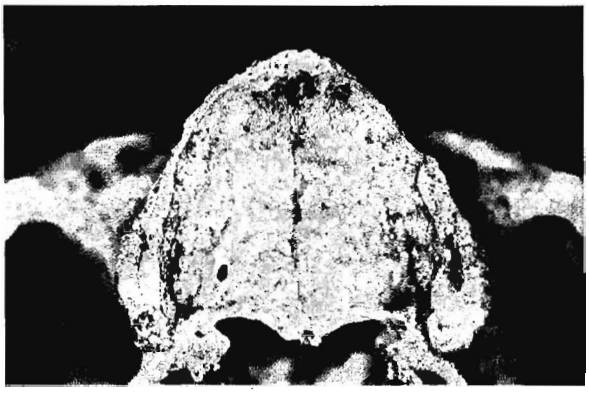

Fig. 23. Alveolar aspect of maxilla of Skeleton 391.

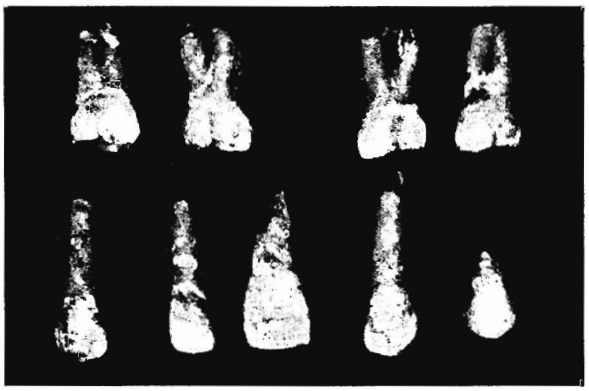

Fig. 24. Maxillary teeth with Skeleton 391.

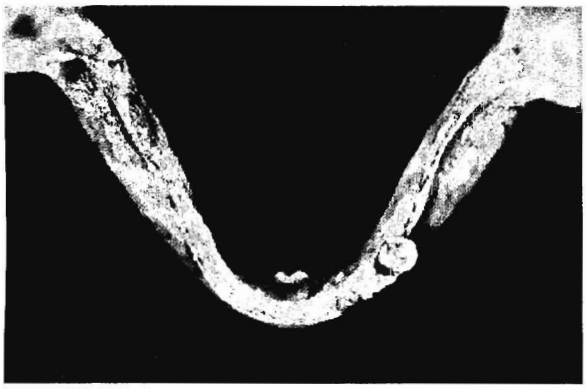

Fig. 25. Alveolar aspect of mandible of Skeleton 391.

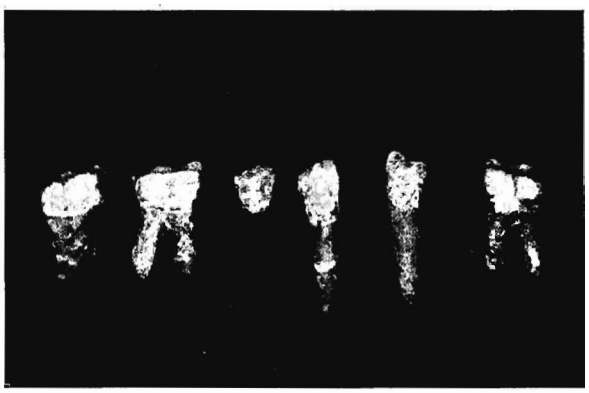

Fig. 26. Mandibular teeth with Skeleton 391.

DENTAL ANTHROPOLOGISTS' SECTION

VISITING RESEARCH SCHOLARS - PRESENT & PAST - DEPARTMENT OF ANTHROPOLOGY, ARIZONA STATE UNIVERSITY

Yoshitaka Manabe is working at Arizona State during the 1999-2000 academic year. Impressed by Prof. Turner's article, "Late Pleistocene and Holocene Population History of East Asia Based on Dental Variation," his research has been based on the ASU Dental Anthropology System. At present, Manabe is investigating the temporal and regional variation of tooth morphology in China and Japan, in order to search for the homelands of the migrant Yayoi populations which caused the quick and large-scale change (Sundadonty to Sinodonty) at the time of the shift from the Jomon to the Yayoi periods in the Japanese Islands. Research of the size and shape of the cervix of the teeth, the alveolar arch, and the palate is also in progress. In fact, Manabe is interested in microevolution of every masticatory organ. In Japan Manabe is Associate Professor in the Department of Oral Anatomy, Nagasaki University School of Dentistry in Nagasaki. He is also a coauthor of the paper on *samurai* antemortem lost teeth in this issue of *Dental Anthropology*.

Liu Wu spent the academic year 1990-1991 at Arizona State. During that time Liu was an editor of *Dental Anthropology* (then, the *Dental Anthropology Newsletter*) and developed the plaque for the mesial trigonid crest, which is now part of the ASU Dental Anthropology System. After a hiatus of eight years he has returned to the United States, this time to Penn State University. Liu is analyzing the mandibular molars from a large sample of miocene hominoids from Yuanmou County, Yunnan Provence in southwestern China, using EDMA (Euclidian Distance Matrix Analysis). Liu, DAA member L. Hlusko, and L. Deng will present their work at the Annual meeting of the American Association of Physical Anthropologists in April.

LITERATURE CITED

Turner CG II. 1987. Late Pleistocene and Holocene population history of East Asia based on dental variation. Am J Phys Anthropol 73:305-321.

DENTAL ANTHROPOLOGY AT THE UNIVERSITY OF CALIFORNIA, SANTA BARBARA

CHRISTINA TORRES-ROUFF
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Phil Walker's bioarchaeology laboratory at the University of California is teeming with researchers conducting interesting projects related to dental anthropology. At the moment, seven graduate students and one post-doctoral researcher are involved in ongoing work in this laboratory and many of them are incorporating denial anthropology into their research. These projects concern time periods and populations as diverse as prehistoric California Indians and the modern indigenous people of Amazonia and the highlands of New Guinea.

Several students are studying the teeth of prehistoric people to obtain information on health, growth disruption, and adaptation to changing environmental conditions. Susan Kerr and Bonnie Yoshida have recently completed analysis of a large collection of skeletal remains from San Nicolas Island, a tiny desert island with few terrestrial resources located 60 miles off the coast of southern California. These people would have relied almost exclusively on the sea for their sustenance. When incorporated with non-dental data on health status (*cribra orbitalia*, porotic hyperostosis, stature, and so on), the dental health evidence will help lo reveal the adaptive responses people made to life in this marginal, insular environment. Dental data will also be used to test hypotheses concerning temporal variation in subsistence activities that have been developed using archaeological evidence.

Corina Kellner has completed the analysis of a three to five year old child she excavated with Christina Conlee at Pajonal Alto, a site in south coastal Peru. This child was buried at two meters in a sitting position and had subperiosteal reactions on the upper and lower limbs, carious lesions in the deciduous dentition, as well as cribra orbitalia. The child was also small in body size (as measured in long bone length) when compared with dental age. Corina feels that the dental evidence is significant because pathological conditions, especially in children, can give bioarchaeologists clues regarding a population's ability to mitigate stressful environmental and social circumstances. Examinations of more burials from this time period are needed to put the health of this child into a larger sociocultural context.

Corina is currently working on her dissertation research, which entails examining the health of a prehistoric population from Nasca, Peru. She is looking for associations between skeletal evidence for changes in health and archaeological evidence of the florescence of the Nasca Culture in the Early Intermediate Period [EIP] and the initial phases of the Middle Horizon (AD 1 to AD 1,000). During the EIP social complexity seems to flower in Nasca area. Corina's goal is to test basic theories about the development of social complexity using this sample. Great social and environmental changes take place during the EIP. She will examine the effects these changes may have had on the health of the people who lived during this time of rapid cultural change. As part of addressing these issues, Corina will record the frequency of carious lesions, abscesses, and enamel hypoplasias on a large skeletal series. She will also conduct studies of tooth size and dental wear designed to provided information on the diet and health status of this population.

Michele Buzon is currently involved in two dental anthropological projects with Phil Walker. Along with Francine Drayer and Susan Kerr, she examined remains from a recently discovered nineteenth century cemetery at San Francisco's California Palace of the Legion of Honor. In addition to other skeletal indices of health, the frequency of enamel hypoplasia, carious lesions, and dental abscesses is being analyzed. Overall, it appears that the prevalence of health problems among these people is similar to that of other lower class nineteenth century American populations.

Fig. 1. From left to right Christina Torres-Rouff, Michele Buzon, Corina Kellner, and Edward Hagen in Phil Walker's physical anthropology lab.

The results of this research will be presented at the upcoming annual meeting of the American Association of Physical Anthropologists in San Antonio, Texas.

Michele is also working with Dr. Walker on the analysis the relationship between age at death and the teeth of modern human populations. This work is based on an analysis of a skeletal collection from St. Brides Church in England and the Hamann-Todd and Terry Collections in the United States. Another project involving modern teeth is being conducted by Francine Drayer, Lakhbir Singh, and Phil Walker. They are collaborating in the analysis of a large sample of teeth extracted by dentists working in different areas of India to document tooth wear and dental health differences between people living in urban and rural areas. The result of this study provide information about the effects that changing cultural practices and differences in socioeconomic status are having on dental health.

Ed Hagen, Nicole Hess, and Nathan Craig are about to begin fieldwork in which they will collect dental health data on people living in several rural Yanomamo villages. The Yanomamo are an Amazonian tribal society whose culture has been well documented by ethnographers. Ed Hagen will be taking intraoral photographs of Yanomamo villagers in order to look for a relationship between dental health and a broad range of social variables.

Phil Walker and Doug Hayward of Biola University are working on the analysis of denial health date on the Mulia Dani, a group of tribal people in an extremely isolated area of highland New Guinea. A large series of dental health observations is being coded with information on age, sex, social status, and food preferences. Margaret Schoeninger and Lee Hayes at the University of Wisconsin are obtaining information on the nutritional status of these same individuals through stable isotopic studies of hair samples. Both of these studies of tribal societies promise to yield fascinating information about the diet and dental health of this geographically isolated modern population.

In collaboration with Phil Walker, Ed Hagen has completed work on a computer program designed to assist dental researchers in the identification of human teeth. The Human Dentition Software has photo quality of three dimensional images of teeth that can be rotated by the user in order to be viewed from any angle. The software also illustrates the diagnostic features necessary to identify and side incisors, canines, premolars, and molars need includes practice tests. It is used quite successfully by students in Phil Walker's classes. A free Macintosh-compatible version and a demo of the Windows version of this soft are available for download at http://www.sscf.ucsb.edu/~hagen/hds.html. Material contained in these programs can also be obtained from the Dental Anthropology web site (http://www.anth.ucsb.edu/faculty/walker) where you will find a QuickTime data base of three-dimensional images of all teeth in the human permanent and deciduous dentitions.

As you can see from all of these exciting projects, dental anthropology is nourishing at UCSB. There is a great interest in pursuing questions related to the field and ample collections available for study. Phil Walker and his students are taking advantage of all of these resources in order to contribute to future dental anthropological research.

DENTAL ANTHROPOLOGY IN THE CZECH REPUBLIC

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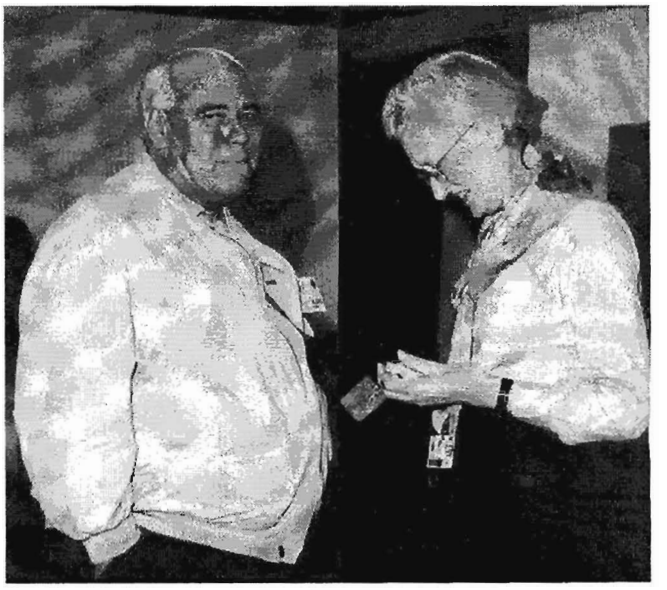
Milan Dokládal's newest book was published in 1999. Its title is *Morfologie Spálených Kostí: Význam pro identifikaci osob* [Morphology of Burned Bones: Importance for personal identification]. Written in the Czech language, this 185 page, soft-cover book has some information on teeth and a 1 ½ page long English summary. It was published by the Medical Faculty of Masaryk University, Brno, Czech Republic.



Milan Dokládal examining hominid teeth with Cynthia Reid in the Department of Anatomy, Medical School, University of the Witwatersrand, Johannesburg, South Africa. Both participated in the Dual Congress 1998.

Fig. 1. Some of the participants in the Scuola estiva "Biologia Scheletrica e Antropologia Dentale" (la Edizione), Tivoli, Italy. Standing from left to right: Andrea Cucina (lst), Domenico Mancinelli (7th), Richard Meindl (8th), George Armelagos (9th), Alan Goodman (l0th), Alfredo Coppa (11th), Pierpaolo Petrone (12th), and Joel Irish (l5th). Sitting from left to right: Simona Minozzi (lst), Elena Santandrea (4th), Carla Signoretti (5th), Rita Vargiu (6th), and Luciano Fattore (7th).

DENTAL ANTHROPOLOGY IN ITALY

JOEL D. IRISH
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The field of dental anthropology was afforded a prominent role in two recent events in Italy. First, the *XIII Congresso degli antropologi italiani*, a biennial meeting of the Associazione Antropologica Italiana, took place during October 4-8, 1999, in Rome and Sabaudia. The meeting featured a symposium entitled *"Antropologia dentale delle popolazioni pre-protostoriche del Mediterraneo,"* organized by Dr. Alfredo Coppa of the Universitá di Roma. Topics involved dental enamel hypoplasia, microwear, morphology, metrics, and affinity estimates among Mediterranean-area peoples. The participants included: L. Bondioli, C. Fitzgerald, R. Macchiarelli, J.D. Irish, S. Minozzi, G. Tartarelli, J. Moggi-Cecchi, R. Vargiu, A. Cucina, M. Lucci, and A. Coppa.

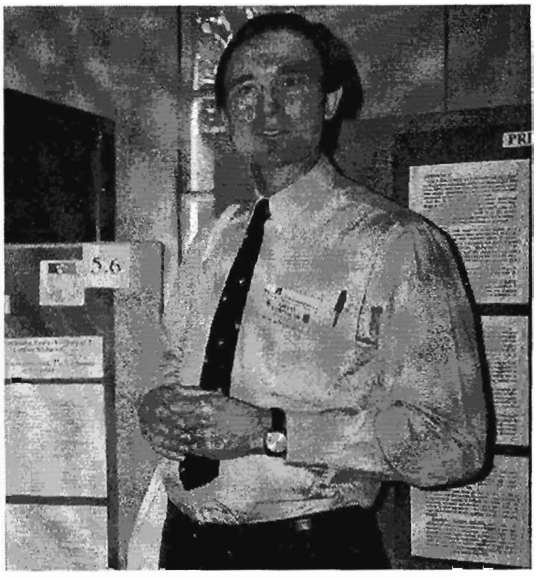
The second event, the *Scuola estiva "Biologia Scheletrica e Antropologia Dentale" (la Edizione)*, was held in Tivoli from October 9-12 (Fig 1). The school was sponsored by the Universitá di Roma "La Sapienza," Dipartimento di Biologia Animale e dell'Uomo, and Soprintendenza Archeologica per il Lazio, in conjunction with the Associazione Antropologica Italiana. Drs. Alfredo Coppa and Mauro Rubini organized the event, with the assistance of Andrea Cucina, Silvia Mogliazza, and Rita Vargiu. More than 25 anthropology graduate students from throughout the country attended. Over the four days, five lecture/laboratory short courses were presented by five American instructors. Dr. Alan Goodman of Hampshire College and Dr. Joel Irish of the University of Alaska Fairbanks taught courses on dental enamel hypoplasia and tooth morphology, respectively. Additional sections on skeletal paleopathology, paleodemography, and cranial discrete traits were conducted by Dr. George Armelagos of Emory University, Dr. Richard Meindl of Kent State University, and Dr. Robert Corruccini of Southern Illinois University. Due to the success of this year's school, a second edition is being planned for 2000.

NEWS of DENTAL ANTHROPOLOGY FROM ADELAIDE: New Issues of *Perspectives in Human Biology*

GRANT TOWNSEND
Dental School, The University of Adelaide, Australia 5005

Three new issues of the journal, *Perspectives in Human Biology*, including one devoted entirely to dento-facial variation, are now available. *Perspectives in Human Biology* is published by the Centre for Human Biology, Department of Anatomy and Human Biology, the University of Western Australia. The series editor is Charles Oxnard.

The three volumes contain peer-reviewed papers that arose from presentations made at the Joint Conference of the Australasian Society for Human Biology (ASHB) and the Commission of Human Ecology of the International Union of Anthropological and Ethnological Sciences (IUAES) held in Adelaide from December 1 to 5, 1997. The meeting attracted participants from 23 countries and covered a wide range of subjects. Besides colleagues from Australia and New Zealand, researchers from Canada, China, Switzerland, Czech Republic, Estonia, Finland, France, Germany, Hungary, India, Indonesia, Italy, Israel, Japan, Latvia, Mexico, Poland, Sweden, South Africa, the Netherlands, and U.S.A. contributed to the conference.



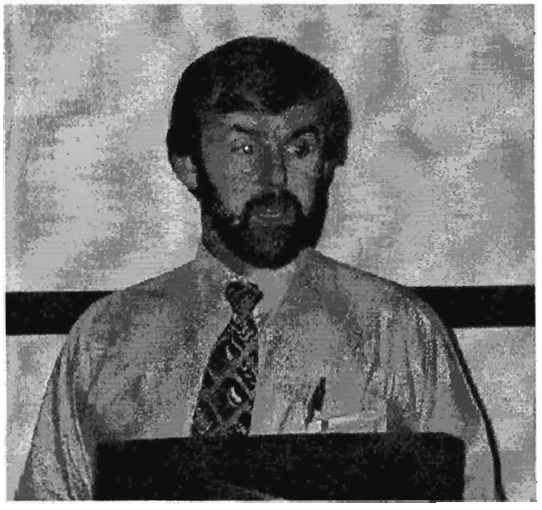
Grant Townsend stands beside the poster "Asymmetry in the Deciduous Dentition - Fluctuating and Directional Components," which he co-authored with Pamela Dempsey and Lindsay Richards.

The first issue, *Is Human Evolution a Closed Chapter?*, was edited by Maceij Henneberg and Charles Oxnard. It contains papers arising from sessions that dealt with the fossil, physiological, and parasitological evidence for human evolution; the recent evolutionary changes occurring during the Holocene; changing patterns of human disease; human biological variation; and the human future. The second issue, *Child Growth, Secular Trends and Continuing Human Evolution*, edited by Maceij Henneberg and Raghbir Singh, deals with matters relating to the ontogenetic process. Several papers present a new approach to the interpretation of secular trends. They present new evidence of changes in various human populations and in a range of biological characteristics reaching beyond the one most commonly studied - stature.

The third issue, *Dento-facial Variation in Perspective*, was edited by Grant Townsend and Jules Kieser. The papers cover a broad range of themes involving the dento-facial structures, including clarification of the roles of genetic and environmental influences on observed variation, the effects of wear on the dentition, descriptions of dental and facial morphology in different human populations, and new morphometric methodologies. This issue adds to several recent publications in the field that is frequently referred to as "dental anthropology". However, the reader will quickly see, after perusing the titles of

Poster session paraticipanats at the ASHB and IUAES conferences in Adelaide. Left to right: Back row: Shintaro Kondo, Hirofumi Aboshi, Grant Townsend, and Jules Kieser. Front row: Mieke Ruth, Catherine McKenna, Sandra Pinkerton, Anu Narayanan, Candy Thomas, Jane Taylor, Wendy Schwerdt, and Koh Nakajima.

Ikuo Kageyama reading the paper, "A three-dimensional study of the deciduous and permanent molars in Australian Aborigines," which he co-authored with John Mayhall and Grant Townsend.



Lindsay Richards participated in four papers that are published in the third issue of *Perspectives in Human Biology*. Two of these papers deal with topics of ongoing studies of twins : the environmental causes of handedness in twins and Carabelli's trait on both dentitions in Australian twins. The names of theses papers and all of their authors are listed in the section, "Papers on Dento-Facial Variation," to the right.

the papers included, that the term "dental" needs to be interpreted in a broad sense. Although many contributions focus on teeth, for example on intra-coronal components, or whole dental crowns, or on tooth sets within the dental arches, they are best viewed within the context of the entire dento-facial complex — a functionally inter-related and dynamic system.

Individuals interested in these books can contact Professor Grant Townsend at the Dental School, The University of Adelaide, Australia 5005, fax: 61-8-8303-3444, Email: grant.townsend@adelaide.edu.au. The cost of each volume is AUS$25.00 plus postage and handling. A special discount price of AUS$65.00 is offered for those wishing to purchase all three issues.

The papers in the issue on dento-facial variation are listed below for dental anthropologists, who may be interested in the topics covered in the book. A review will appear in the next issue of *Dental Anthropology*.

PAPERS ON DENTO-FACIAL VARIATION

Abbott AH, Netherway DJ, Moore MH and David DJ Intrarcranial volume of patients with craniosynostosis: Preliminary results.

Aboshi H, Kasai K, Ozaki T and Kanazawa E Dental arch forms in South Pacific populations.

Brown T Facial profiles: Population standards and variability.

Chintakanon K, Sampson WJ, Townsend GC, Wilkinson TM and Turker KS Magnetic Resonance Imaging of the temporomandibular joint in children with Class II Division I Malocclusion.

Dempsey P, Schwerdt W, Townsend GC and Richards L Handedness in twins: The search for genetic and environmental causes.

Dempsey PJ, Townsend GC and Martin NG Insights into the genetic basis of human dental variation from statistical modelling analyses.

Kageyama I, Mayhall JT and Townsend GC A three-dimensional study of the deciduous and permanent molars in Australian Aborigines.

Kaidonis J, Townsend GC and Richards L The interpretation of microwear detail on human teeth: Mastication or tooth grinding?

Kieser J, Panting N, Dias G and Thackeray F Basicranial flexion and glenoidal morphology in humans.

Kondo S, Nakajima K, Yamada H and Wakatsuki E The size of the crown components of the mandibular molars in the Cook Islanders.

Mayhall JT The dental complex: A morphological smokescreen or compass?

Narayanan A, Smith S and Townsend GC Dental crown size in individuals with cleft lip and palate.

Netherway DJ, Abbott AH, Abbott JR and David DJ Techniques for the characterisation of the human craniofacial skeleton using computer tomography data.

Pinkerton S, Townsend G, Richards L, Schwerdt W and Dempsey P Expression of Carabelli Trait in both dentitions of Australian twins.

Richards LC, Beaumont SL, Kaidonis JA and Townsend GC Craniofacial morphology and tooth wear in three Australian populations.

Springbett SM, Townsend GC, Kaidonis J and Richards LC Tooth wear in the deciduous dentition: A cross-cultural and longitudinal study.

Thomas CJ and Townsend GC Anterior spacing in the primary dentition: A study of Australian twins and singletons.

Townsend GC and Alvesalo L Premolar crown dimensions in 47,XXY (Klinefelter syndrome) males.

Townsend GC, Dempsey P and Richards L Asymmetry in the deciduous dentition: Fluctuating and directional components.

Winning T, Brown T and Townsend GC Quantifying asymmetry in the human facial skeleton.

IS PHYSICAL (DENTAL) ANTHROPOLOGY DEAD?

JOHN MAYHALL

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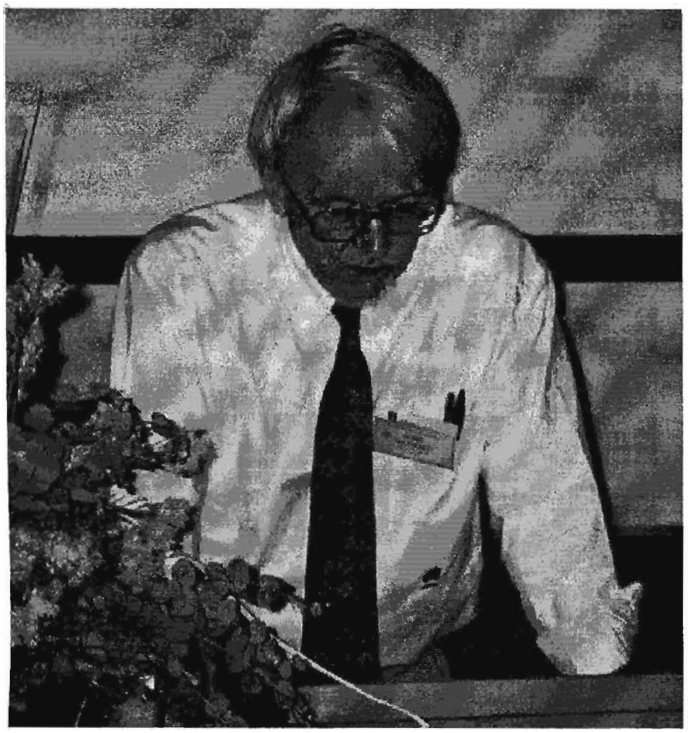

John Mayhall, president of the Dental Anthropology Association, reading his paper at the ASHB and IUAES conferences in Adelaide.

I recently met a friend on the University of Toronto campus, a physician/ clinical biochemist who is also a Vice Dean of Medicine, and as we walked together chatting about the weather (beautiful as always in Toronto), University matters, etc., he asked if physical anthropology were dead. His experience with anatomy departments suggested that physical anthropology and, in particular, osteology had been superseded by cell biologists, geneticists and others that he didn't classify as physical anthropologists. I suggested that physical anthropology was alive and getting farther from the grave rather than approaching it but now many of us are trained in areas that might not have been part of his vision of physical anthropology. I used as my examples the work being published in dental anthropology. We are seeing increasingly sophisticated work on dental and population genetics, growth, development and maturation, and pathology, etc., all of which intimately involve the dentition.

This conversation brought home the problem that many of us face when we attempt to explain dental anthropology to someone; it has become a broad, but at the same time, detailed field. A single definition isn't sufficient. (Can you give a succinct definition for "Dental Anthropology" that would include all those you consider as dental anthropologists?) This doesn't worry me except for the fact that, maybe, we haven't done as good a job of helping our colleagues understand that one can study teeth in a detailed way but still have a very wide appreciation of the extent that the dentition can assist in solving problems of man and nature. I remember Dr. Dahlberg suggesting that if I were to apply for a position in a dental school I would be better to call myself an oral biologist rather than a dental anthropologist. (Once I had fooled them at our faculty of dentistry I reverted to being a dental anthropologist.)

No, physical anthropology and dental anthropology aren't dead, but we must make sure that the reports of our death are very, very premature. The Dental Anthropology Association has gone a long way in bringing the field to others' attention but this is only a beginning. We must make sure that our colleagues know what we do, why we do it and how we can assist them with their scientific problems. If we do this, we begin the process of not only increasing understanding of dental anthropology but creating new positions and opportunities for our students. The future is not in the hands of the "old fogies" but in those of the students that hope that their interest in dental anthropology will pay off in a position where they can "practice" their chosen field. We must not limit our sales jobs to anthropology departments but look at other areas of academia for opportunities for dental (physical) anthropologists.

We feel that we have a lot to offer those interested in the dentition; a great journal, timely deadlines for publication of papers, a bibliography section that helps keep our members apprised of what is published and a group that have similar interests (plus some very nice people that attend our meetings and symposia). I can assure you that your executive committee is and will continue to explore ways of expanding our membership, as well as providing services that our members desire.

DENTAL ANTHROPOLOGY ASSOCIATION
Annual Meeting

The annual business meeting of the Dental Anthropology Association will take place at 7:30 PM on April 13, 2000. The location is the Adams Mark Hotel, 111 Pecan Street East, San Antonio Texas. The DAA meeting coincides with the Sixty-Ninth Annual Meeting of the American Association of Physical Anthropologists. To date the agenda has three items. The Albert A. Dahlberg prize for the best student paper will be presented. A president-elect to serve from 2000 to 2002 will be elected. John Mayhall (University of Toronto), who has served as president of the association since 1998, will step down and Edward F. Harris (University of Tennessee, Memphis), who has acted as president-elect for the past two years, will assume the office of president.

Joel D. Irish, Candidate for President-Elect

The candidate for president-elect, presented by the Dental Anthropology Association Nominating Committee, is Joel D. Irish (University of Alaska Fairbanks). His paper, *DENTAL ANTHROPOLOGY IN ITALY*, appears on page 17. Irish is a founding member of the Dental Anthropology Association. He has served the association as secretary-treasurer from 1992 through 1995 and as an editor of the *DENTAL ANTHROPOLOGY NEWSLETTER*, the forerunner of *Dental Anthropology*, from 1990 through 1995. His brother designed the logo that appears on *Dental Anthropology*.

In a brief autobiographical note, solicited by the editor, Irish wrote: I received my B.S. and M.A. degrees in anthropology from Minnesota State University, Mankato, and my Ph.D., with a focus on dental anthropology under Christy Turner, from Arizona State University in 1993. During the time I was at ASU I was fortunate to become involve in several bioarchaeological projects, including the Roosevelt Platform Mound and Maricopa Road Cemetery projects, as a physical anthropologist, and as a seasonal archaeologist for the U.S.D.A. Forest Service in Sitka, Alaska.

After graduation I was employed as an assistant principal investigator, and then principal investigator, for the Cultural Resources Group of Louis Berger and Associates. With offices all over the U.S., I worked for them as an archaeologist/physical anthropologist throughout the Southwest, as well as Iowa, Virginia, and New Jersey. During this time I was able to maintain an academic connection by teaching an occasional anthropology class at ASU, where I was an adjunct professor, and later at Coe College in Cedar Rapids, Iowa.

Two years later I was afforded the opportunity to return to academia full time, and accepted a three year position at the University of New Mexico. Along with the usual physical anthropology classes, I offered a dental anthropology class that became quite popular. The course has remained on the books there, and is now taught on a semi-regular basis. I am currently assistant professor and curator of biological anthropology at the University of Alaska Fairbanks. I hope to offer the dental anthropology course in the near future, but am now set teaching a variety of other courses, including human osteology, paleoanthropology, and an anthropological statistics class.

My research over the years has involved the use of dental traits to learn the origins and relationships of Late Pleistocene to recent North and Sub-Saharan African peoples. Because of this interest, I was recently invited by. Professor Alfredo Coppa to present a paper at the XIII *Congresso degli antropologia Italiani*, and to teach a class on dental morphology for *Scuola estiva*, in Saudaudia and Tivoli, Italy (discussed on page 17 in this issue).

Most recently, I just returned from three weeks field work in Egypt, where I worked with Dr. Fred Wendorf and others of the Combined Prehistoric Expedition to Nabta Playa, to analyze Neolithic burials. I also worked with Dr. Renee Friedman of the Hierakonpolis Expedition, Luxor, in the dental analysis of more than 100 predynastic burials.

BOOK REVIEWS

DENTAL ANTHROPOLOGY: FUNDAMENTALS, LIMITS, AND PROSPECTS. Edited by Kurt W. Alt, Friedrich W. Rösing, and Maria Teschler-Nicola. Wien, New York: Springer-Verlag (hardback), 1998. 564 pp. ISBN 3-211-82974-1. $89.95, Dm 138 (cloth).

Firmly situated in a biocultural framework, this comprehensive volume brings together an impressive diversity of subjects in dental anthropology. Thirty-three authors contributed 26 chapters to this volume, which proceeds from an historical overview of the study of teeth, through fundamentals of dental morphology, structure and evolution, to current research topics in dental anthropology. These topics include the relationship between teeth and the health, nutrition, and behavior of past human populations, the use of teeth to estimate age and sex, and geographical and familial dental variability. One of the exciting aspects of this book is that in addition to critically evaluating the present state of knowledge in their subjects, many chapter authors analyze new data, arriving at conclusions that enhance methodological rigor and refine research directions in important areas of inquiry.

The first three sections of the book establish fundamentals, setting the stage for later sections. In Section 1, which consists of an introductory chapter, editors Alt, Rösing, and Teschler-Nicola stress the interdisciplinary relevance of dental anthropology, a theme manifested throughout the book. Section 2, "Teeth in History," contains four chapters, beginning with Alt's "Johan Wolfgang von Goethe, Weimar, and Dental Anthropology." According to Alt, the idea for this volume originated at a dental anthropology symposium held in Weimar, home of Goethe, who apparently delved into comparative dental anatomy when he wasn't busy writing Faust. Chapter two (Alt, Brace, and Türp) traces the history of dental anthropology from its origins in classical antiquity to the development of the field of dental anthropology this century. In the third chapter of this section, Alt and Türp review various methods for designating teeth, calling for standardization using the FDI 2-digit system). In the final chapter of this section, Teschler-Nicola, Kneissel, Brandstatter, and Prossinger analyze the function of an Etruscan dental bridge (700-600 BC), pictured in color on the book's cover.

Section 3, "Dental Morphology, Structure, and Evolution," contains six chapters, covering the anatomy and morphology of human teeth (Türp and Alt), hereditary dental anomalies (Alt and Türp), enamel microstructure (Radlanski), the temporomandibular joint (Obrez and Türp), catarrhine maxillary sinus anatomy (Koppe and Nagai), and dental research in paleoanthropology (Henke). Instructive diagrams, photographs, micrographs, summary tables, and extensive bibliographies make these chapters excellent basic resources. Radlanski's chapter presents his clearly illustrated and well-supported model linking prism path, prism angulation, and enamel volume. Henke's is a concise, selective survey of current dental research in paleoanthropology focusing on comparative dental morphology, early hominid phylogenetic relationships, dietary reconstruction, and modern human origins.

The fourth section focuses on dental pathology and epidemiology. Caselitz's review of caries research traces increasing caries rates over time to increasing neolithization and improved standards of living in archaeological series worldwide. He also finds that the intensity of carious lesions in local Northern German Medieval series increases with time. With clear photographic documentation, chapters on periodontal disease (Strohm and Alt), periapical lesions (Alt, Türp, and Wachter) and jaw tumors (Strouhal) present classification schemes and outline criteria for diagnosing these conditions in skeletal remains. This section concludes with a chapter on enamel hypoplasia in archaeological samples (Schultz, Carli-Thiele, Schmidt-Schultz, Kierdorf, Kierdorf, Teegen, and Kreutz). The authors review issues of enamel hypoplasia classification, evaluation, etiology, and epidemiology.

The fifth section of this book, "Nutrition and Human Behavior," begins with Prossinger's and Willms' review of methods for reconstructing paleodiets and nutritional status and their summary of dietary change in Central European prehistory. Grupe's chapter on trace element analysis is of special interest because she demonstrates new applications which have the potential to reveal weaning ages and migration patterns in past populations. These applications are especially useful, because, as Grupe points out, enamel is less susceptible to diagenetic trace element change than bone. Rose's and Ungar's chapter is a detailed history of advances in the studies of gross dental wear and dental microwear. Increasing standardization, technological improvements, and expansion of the modern primate comparative database have enhanced the value of microwear analysis, promising greater insight into paleodiets. This section closes with a chapter by Alt and Pichler on ways in which artificial modifications of teeth offer clues to past human behavior.

The sixth section centers on forensic objectives in dental anthropology. Liversidge, Herdeg, and Rösing review the advantages and limitations of different methods of juvenile dental age estimation, providing valuable recommendations for usage. In their review, Rösing and Kvaal argue that relatively new methods employing racemization, cementum annulation, and histological analysis provide the means for achieving greater accuracy in adult age estimation. Age-related changes in dental tissues are carefully laid out in a chapter by Solheim. In the last two chapters of this section, Teschler-Nicola and Prossinger evaluate methods of sex determination based on tooth dimensions and Prossinger offers a generalized linear regression model for reconstructing missing tooth dimensions in order to differentiate individuals by sex.

The final section of this volume includes just two chapters: one on geographic variation in tooth size (Schnutenhaus and Rösing), and one on kinship analysis using dental traits (Alt and Vach). Schnutenhaus and Rösing conclude that tooth measurements should not be used to determine modern population affinities: inter-observer error and method-dependence preclude biologically meaningful results. Alt and Vach demonstrate how dental anthropology and archaeology can work together to elucidate family relationships in prehistoric samples. These are interesting chapters, and additional articles might have better developed the focus of this section on dental variation. For example, a chapter on worldwide variation in morphological traits would have complemented Schnutenhaus' and Rösing's contribution.

In summation, the chapters in this volume attest to the many and varied areas of anthropological research that dental anthropology can illuminate. Because most chapter authors provide extensive reviews, this book could be used profitably in advanced bioanthropology courses on dental anthropology, forensics or bioarchaeology. The emphasis on improving methodological rigor and the presentation of innovative research should also make this book of great interest to dental anthropologists.

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HOW ANTHROPOLOGY INFORMS THE ORTHODONTIC DIAGNOSIS OF MALOCCLUSION'S CAUSES. By Robert S. Corruccini. Mellen Studies in Anthropology Vol. 1. Lewiston, New York. The Edwin Mellen Press. 1999. 206pp. ISBN 0-7734-7980-5, $89.95 (hardback).

Robert Corruccini has been at the forefront of anthropological studies of dental occlusion for most of the last 20 years. His research, ranging from cross-cultural studies on occlusal variation, through twin studies investigating the heritability of occlusal traits, to the effects of dietary consistency on occlusion in non-human mammals, has appeared in diverse journals targeting both anthropology and orthodontia. This book is a compilation of this diverse research and therein lies its value for individuals in both fields, although, as can be seen by the title, the primary audience is intended to be students and practitioners of orthodontics.

There have long been differences between anthropology and orthodontia in how the etiology of malocclusion is viewed. Currently, anthropologists tend to favor environmental factors, such as diminished dietary toughness, while orthodontists generally espouse genetic ones, such as admixture leading to disharmonious mixing of various tooth and jaw sizes and shapes. Within the framework of this debate lies the thread that connects all of Corruccini's research: that environment, not genetics, is the primary etiologic factor behind the extremely high rates of occlusal problems found in the modern, developed, nations.

Beginning with a review of the history of occlusion research, including a good treatment of genetics vs. environment, in Chapter 1, and through the succeeding seven chapters, Corruccini clearly lays out his argument in favor of environmental causation. Following a discussion of methods in Chapter 2, Chapter 3 surveys the many occlusal variation studies Corruccini has carried out involving peoples from around the world. Ranging from rural Kentuckians in whom marked differences in occlusion are seen between subsequent generations to like differences found between rural and urban Bengali youths, each study points to changes in dietary toughness as the force behind the revealed occlusal variation. Chapters 4 and 5 review, respectively, occlusal variation within the context of the epidemiological transition in minor diseases and Begg's theory on the effects of interproximal attrition on space available for erupting teeth, and therefore, its impact on crowding. One point discussed in Chapter 4, that is important for understanding the origins of the genetics perspective in orthodontia, relates to the types of samples encountered by orthodontists and anthropologists. Orthodontists, on the one hand, deal with small, frequently familial, groups of westernized people, a research base that tends to emphasize the genetic relatedness of individuals with poor occlusion. Conversely, anthropologists traditionally study larger groups of ethnically related peoples, frequently in their native area. This latter perspective, in which a view focusing on variation between populations is taken, tends to result in environmental forces becoming paramount in discussions of etiology.

Chapter 6 consists of a review of several nonhuman animal studies undertaken by Corruccini and various colleagues. These experiments entailed splitting groups of baboons, rats, or squirrel monkeys into two samples and feeding each either hard or soft diets and then recording the effects of the dichotomous diets on the development of the gnathic complex. In every case the sample fed the softer diet exhibited higher rates of occlusal irregularities as well as reduced development of the bones and muscles involved in mastication. Corruccini uses Chapter 7 to discuss genetic studies focusing on mono- and dizygotic twins. Each study shows that, for the vast majority of traits, the environmental component is the most important factor in variation in occlusion. In explanation Corruccini states (p. 164) that "Although it is generally agreed that a polygenic mode of inheritance is most likely to explain occlusal variation, our findings indicate that complicated environmental effects contribute more to the variability observed than suggested by early twin studies (and the general tone of the

literature). Significant genetic variance was noted for certain traits in certain populations, with limited consistency or repeatability over populations. Heritability estimates were generally low to moderate in magnitude, within-pair estimates for these traits centering around 20 percent."

In the eighth, and concluding, chapter Corruccini sums up his argument succinctly noting, "Malocclusion syndromes follow certain non-random patterns of occurrence that support the idea of an underlying chewing stress principal factor as opposed to the myriad other etiologies" (p.173- 174). He also revisits a theme that is consistent throughout the book. This is that the idea of environment as the predominant etiological factor in malocclusion is not a new idea. Nearly all of the early researchers, mostly dentists, (for example Sim Wallace 1904; Hooton, 1918; Campbell, 1925, 1938; Waugh, 1937; Hrdlička, 1940a,b) who encountered changing occlusal patterns in rapidly acculturating societies attributed these changes to either diminished diet or reduced masticatory use. This fact seems to have become forgotten after the mid 1950's and the heightened interest in genetics that resulted from the discoveries of Crick and Watson.

In summary, this book is, excepting the somewhat awkward title, a good examination and compilation of Robert Corruccini's work on occlusion. It brings together in one place the arguments supporting an environmental etiology for malocclusion and emphasizes that function, rather than genetics, is at the root of most of the orthodontic problems encountered by our modern populace. I especially recommend this book to our colleagues in dentistry and orthodontia as I think it will, if nothing else, enlighten them to a different view of the forces involved in the development of occlusal irregularities.

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ATLAS OF OCCUPATIONAL MARKERS ON HUMAN REMAINS. By Luigi Capasso, Kenneth A. R. Kennedy, and Cynthia A. Wilezak. Teramo, Italy: Edigrafital S.p.A. Journal of Paleontology—Monographic Publication 3, 1999. 184 pp. $40.00 (paper).

Markers of occupational stress (MOS) are distinctive morphologies or pathologies that can develop as a result of work-related activities. Capasso *et al.* have compiled information on nearly 150 conditions and reproduced them in a single atlas. This atlas begins with a preface by Gian Franco De Stefano and Gertrud Hauser, authors of *Epigenetic Variants of the Skull*, which much of this book resembles in general layout. The preface is followed by an introduction by the authors who describe this book as "a guide to a number of forms of anatomical variations encountered in human bones, teeth, nails, and hair that have been discussed in the literature." They admit that it is "not an exhaustive coverage of MOS, but rather a broad sampling, with representative photographs and drawings of certain anatomical features associated with habitual activity patterns." The authors expect readers to understand that "in most cases the ties between the presence of a given morphological or pathological characteristic and a given activity are not univocal" and this is a well taken point if one should use this atlas as a preliminary tool for diagnosis. Finally, the authors expect that the atlas will be useful "as it gathers the bibliographical information, visual documentation, and descriptions of what is currently known into a single volume."

Not including the preface and introduction, the book is arranged into four major parts: I) Occupational Markers on the Bones, II) Occupational Markers on the Teeth, III) Occupational Markers on the Nails, and IV) Occupational Markers on the Hair. Section I makes up roughly 88% of the book and includes descriptions of some 130 occupational markers found in the skeleton. Unfortunately for dental anthropologists, Section II) Occupational Markers on the Teeth, only accounts for roughly 8% of the book and covers just twelve different markers. Section III comprises roughly 3% (four markers) of the book and Section IV covers only a single marker found in hair. Each MOS includes its topographic position on the skeleton, its name, synonyms, a description, stress factor(s), occupational activity (or activities), and bibliographic references. Also included with most marker descriptions are photographs and drawings. Finally, the book ends with a comprehensive listing of the literature cited.

In all, the book makes a nice reference guide to a variety of occupational stress makers. Although the book lacks a table of contents, list of figures, and index, some readers may be satisfied with the anatomical ordering of the markers and may not require these other guides. Some of the trait descriptions are lacking, but may represent all that is known of that particular marker. The book deals almost exclusively with post-cranial markers, so its interest to Dental Anthropology members may be limited. The real usefulness of the book lies in its bringing together of various markers into a single volume, its anatomical ordering of the markers for easy reference, and its extensive reference list for further research.

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INTRODUCTION TO THE PRIMATES. By Daris R. Swindler. Seattle: University of Washington Press. 1998. 336 pp. 42 photos, 72 line drawings. ISBN:0-295-97704-3 $22.00 (paper).

This small volume by Daris Swindler, the most recent of his efforts to communicate with the academic community, consists of 11 chapters that span a wide range of subjects: primate evolution, morphology, growth, genetics and behavior. This is an ambitious effort, particularly given the relatively brief length of the volume. Inevitably, one compares it with the other primate text of comparable breadth, John Fleagle's *Primate Adaptation and Evolution.* This, however, would be an unfair comparison for, as Swindler states in his preface, "This book is meant as a beginning resource. For many it will be complete in itself; for others it will provide the background necessary for further studies. For all readers, it is hoped the material will be interesting."

Given this perspective, the book succeeds. As I read it, the book provoked recollections of my own fascination, decades earlier, with biological anthropology when, as a neophyte, first I began to appreciate anthropology for its breadth, its eclecticism, and the inherent fascination of its human and nonhuman subjects. Swindler admirably displays the anthropological universe as if on a platter, with its many delectations that await those who seek to look further. He is a worthy guide to the field, for his work has contributed greatly and inspired many. His own significant scientific contributions to primate morphology repeatedly emerge. I see this volume as an appetizer. I anticipate that it will succeed in whetting appetites for more, and I suspect that its most appreciative audience will be those who are gaining their initial exposure to the field.

The book begins with a delightful chapter on Monkeys and Apes in History, then proceeds through Classification and Distribution of Living Primates; Blood Groups; Chromosomes and DNA; The Skull, Teeth, Diet, and Digestion; The Brain and Special Senses; The Skeleton and Locomotion; Growth and Development; Social Groups and Primate Nehavior; and Fossil Primates. It concludes with a chapter on Primate Conservation. With 336 pages, multiple illustrations and photographs, and 11 chapters, the arithmetic alone obliges that each substantial topic be only cursorily treated. Accordingly, it is not surprising that Swindler's strengths in anatomy and cranio-dental morphology come through most strongly.

However, despite Swindler's overall clarity of expression, there are areas where the reader may be befuddled. The lack of consistent treatment of a particular topic makes it occasionally difficult for the new student of anthropology. Regrettably, these difficulties are compounded by illustrations that are wrongly labeled (many occasions) and presentation of both well-substantiated and marginal observations as though they were of equivalent validity. For example, the organization of the extant primates into a systematic chart is something beginning students must wrestle with, but readers of this volume are not helped by learning on page 33 that there are 14 species of apes (not named), while on page 56 in the section on the Apes, only the two chimpanzee species are named, with *Gorilla*, *Pongo*, *Hylobates*, and *Symphalangus* mentioned only at the generic level. Similarly, in Table 2.1, "Classification of Living Primates," only *Hylobates* is listed among the Hylobatidae, and in Figure 2.7, Hylobatids are not even placed on the world map of the geographic distribution of living primates. Further, the use of taxonomic categories of semisuborder and tribe without their definition serves to merely multiply the number of terms with no heuristic advantage. The alternating levels of complexity will require that ambiguous sections in the text be explicated by faculty teaching the course for which this volume is assigned.

The illustrations certainly add to the book, but could have been more informative by careful proofing. For example, the absence of a scale in Figure 2.6 depicts *Microcebus* (~60 g) as virtually the same size as *Indri* (6 kg) or even *Pongo* (~60 kg)!! While this is obviously not a problem to the

more advanced student, it is for the beginner. And beginners suffer further in that a number of the captions to the line drawings are wrongly labeled. On p.146 the lateral border of the scapula is labeled medial; on p. 141 superior and inferior directions are labeled anterior and posterior. More substantively, the line drawing of a cercopithecoid posterior on p. 153 is definitely not of a baboon male — it has separated callosities and a stubby tail, neither of which are male baboon features. Regrettably, there are numerous spelling errors. The following misspellings appear scattered through the volume: Indria/Indris; Tarsius spectum, Galago demidovi, hamadryus, Presbytes, mangaby, medula, iscium, Ruffled lemur, Indris, altrical, parturation, medula, bevavioral, bicornute, ontogentic, incompatability, ontogency, heterchrony, agression, Cebula, Papio anubus, Alouatta seneculus, Lipilemur.

The section on social behavior is perhaps the weakest, and reveals an appreciation of primatology little influenced by the achievements of the last 20 years. With so little space available for commenting on the most significant aspects of primate behavior, is it surprising that Swindler spends a paragraph describing cooperative hunting in baboons — a behavior never reported by observers who have spent decades studying these species !!! Certainly cooperative hunting is an important behavioral feature of hominids and certain chimpanzees, but presentation of this unsubstantiated report will truly confuse students of primate and human behavioral evolution. The treatment of dominance, admittedly a complicated topic for so little space, results in comments about dominant animals assuming "leadership of the group" despite a broader view of dominance afforded female primates in the following paragraph, where it is observed to be largely relevant to events occurring around food. It is also surprising that Carpenter's studies of vocalizations are described, while Cheney and SeyFarth's studies on specificity of vocalizations in vervet monkeys is omitted. Similarly, Goodall's studies of tool use among chimps is described, but not the more recent studies of continent-wide variation in patterns of tool use in chimps. One cannot help but note the absence of recent important studies of great ape communication in favor of description of the early (also important) work of the Gardners and Hayes.

In the paleontology chapter certain unreferenced assertions, such as "the Paleocene Plesiadapiformes made up some 39% of the fauna," are difficult to evaluate, but seem to me to be unlikely. In the genetics chapter, I found that certain definitions were not helpful. For example, inversion is defined as "turning pieces of chromosomes upside down" and translocation is defined as "exchange of material between chromosomes." The implication of symmetry in the latter definition makes translocation difficult to discriminate from meiotic crossing-over.

Let me conclude by adding that the reader should not overinterpret these observations, for I consider this volume a worthwhile addition to the already substantial contribution made by Swindler to Anthropology. It is a truism that breadth often requires sacrifice of depth, and this inevitably happens here. But again, I am drawn to the primary purpose of the volume and the extent to which it succeeds. The young student of Anthropology will doubtless find much here to fascinate, and the spirit of excitement that lured many of us infuses the volume.

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Fleagle J. 1999. Primate Adaptation and Evolution (2nd edition). New York: Academic Press.

GUIDELINES FOR CONTRIBUTORS TO *Dental Anthropology*

1. Manuscripts of articles and other correspondence should be sent to the editor, A.M. Haeussler, Department of Anthropology, Arizona State University Box 872402, Tempe, Arizona 85287-2402, U.S.A.

Books for review should be sent to Debbie Guatelli-Steinberg, Department of Anthropology, 1218 University of Oregon, Eugene, Oregon, 97403, U.S.A.

3. Manuscripts should have a title page listing the title and the running title, the name(s) of the author(s), and the name(s) of their institute(s). The remainder of the manuscripts should consist of an abstract, text (usually with an introduction, materials and methods, results, discussion, conclusion, summary), and a bibliography.

4. Each manuscript should be typed double space or printed double space with a laser printer and be submitted as an original and two additional copies for review. Photographs should be on glossy photographic paper. The copies, including those of the illustrations, can be xeroxes if they are clear. Authors are encouraged to send raw data with graphic figures so that graphs can be reproduced in the case that the scanned version lacks accuracy.

5. Dental Anthropology follows a style that is similar to that used in the *American Journal of Physical Anthropology* and published in Volume 108, Number 1, pages 131-135 (1999). Abbreviations of journal names follow those found in *Index Medicus*, although unusual and non-English language titles are spelled out. The complete names of journals are also given in the section on recent publications. Individuals who do not have access to the *American Journal of Physical Anthropology* can view the guide on the Dental Anthropology web site (http://www.anth.ucsb.edu/faculty/walker) or by requesting one from the publisher, Wiley-Liss, Inc., 605 Third Avenue, New York, New York 10158-0012, U.S.A. Answers to individual questions about manuscripts can be obtained by contacting the editor of *Dental Anthropology*. The current issue of Dental Anthropology follows the approved style and has examples of many cases of format, including those of text, table, figures, and textual and bibliographic citations.

7. Tables, figures, figure captions, and appendices should occupy separate pages.

8. Manuscripts are reviewed by members of the editorial board. In cases of specialized topics, manuscripts are reviewed by a specialist in the subject of the manuscript.

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