Easter Island Origins: Implications of Osteological Findings

George W. Gill, Sonia Haoa C., and Douglas W. Owsley

Introduction

A primary objective of the 1981 Easter Island Anthropological Expedition[1] was to acquire a well-documented sample of prehistoric Easter Island skeletons, to collect craniofacial metrics and to record observations of nonmetric characteristics (as well as some data on postcranial traits) that would make possible a thorough study of population affinities. The 1981 expedition was highly successful with regard to both the archaeological recovery of well-documented human skeletons and a concurrent field analysis of osteological remains (Gill, Owsley, and Baker 1983; Gill 1986a). During the six-month field season in 1981, plus an earlier brief archaeological field season in 1979,[2] and a few short field laboratory sessions between 1981 and 1991,[3] recovery, curation, full osteometric data collection and a complete inventory of skeletal pathology were accomplished on a sample of 426 prehistoric and protohistoric skeletons. Analysis of another 110 Easter Island skeletons from other museums in North and South America was also accomplished during that same period (Gill and Owsley 1993; Owsley, Gill and Ousley 1994). Even though a total sample of 536 skeletons was examined for this study, the total number of adult Easter Island crania sufficiently well preserved to be utilized in the metric examination is, of course, considerably less (n=105). Radiocarbon dates were obtained from the human bone from ten sites following the 1981 field season. Numerous obsidian hydration dates were also obtained from burial tombs and caves. Dates range from the Middle Period, through the Late Prehistoric and a few into the Protohistoric Period. Since a few are post-contact, careful metric analyses were conducted on all 105 adult crania to test for possible admixture. Only one cranium shows indications of recent non-Polynesian admixture (Owsley, Gill and Ousley 1994).

Table 1
Craniometric Comparisons
Male Means

	PERU Howells 1973	HAWAI'I Snow 1974	EASTER ISLAND Gill & Owsley 1993	MARQUESAS Pietrusewsky 1976	ARIKARA Bass 1964
MAX LG	178	184	191	191	179
MAX BR	138	145	134	139	141
BAS BR	131	143	144	142	133
BIZ BR	135	138	136	137	140
FAC HT	(71)	72	70	73	75

Table 2
Craniometric Comparisons
Female Means

	PERUE Howells 1973	HAWAI'I Snow 1974	EASTER ISLAND Gill & Owsley 1993	MARQUESAS Pietrusewsky 1976	ARIKARA Howells 1973
MAX LG	169	175	181	177	171
MAX BR	135	141	131	133	136
BAS BR	125	137	137	132	127
BIZ BR	126	129	126	125	131
FAC HT	(67)	68	65	65	(71)

Background Studies

Six craniometric studies of Easter Islanders have been completed since the end of the 1981 field season (Gill, Owsley and Baker 1993; Gill 1986a; Gill and Owsley 1993; Owsley, Gill and Ousley 1994; Gill n.d.; Baker and Gill (this volume). Even though all of these are preliminary, some conclusions can already be drawn regarding the origins of the prehistoric Rapa Nui. Tables 1 and 2, though involving only five of our 92 measurements, provide a general impression of the findings from these preliminary osteometric studies.

The five variables illustrated in Tables 1 and 2 are: maximum cranial length, maximum cranial breadth, basion-bregma height, bizygomatic breadth and facial height (nasion-alveolare). Our Easter Island sample listed here (altered slightly from Gill and Owsley 1993) is based upon 105 measurable adult crania. Most of the other sample sizes from the other populations are smaller but adequate (with the exception of Pietrusewsky's Marquesas' adult cranial sample (n=17).

For these tables, we chose a sampling of our more important craniofacial dimensions and compared them to the same metrics from two other Polynesian populations and to Amerindian samples (one South American and one North American). Underlined values indicate population means that differ by more than 5mm from the comparable variable from our Easter Island sample. As the tables show, only one population, the one from the Marquesas Islands, matches closely the Easter Island population sample. This conclusion results from viewing a wide variety of samples from throughout the Pacific and the Americas and using a much fuller set of measurements.From all preliminary osteological analysis it is clear that the prehistoric Easter Islanders represent an East Polynesian population closely related to the Marquesas Islanders. Such a conclusion does not preclude a small genetic contribution from one or more additional populations. With this in mind, a decision was made at the end of the 1981 field season to collect osteological data on two South American Indian skeletal series from Peru. The objective was to eventually examine the Easter Island population for a possible element of Amerindian trait. Should the thinking of Heyerdahl (1968, 1989) be even partly correct, such a contribution

should be detectable.

Scott J. Baker was dispatched from the 1981 Easter Island Anthropological Expedition in June of that year to Lima, Peru. He was able to obtain nonmetric trait observations on two large Peruvian samples which were appropriate to our study. Craniometrics were not deemed useful from these Peruvian series because all crania had been subjected to artificial deformation. Since these skeletal series are described elsewhere (Chapman and Gill, this volume), nothing more regarding sample composition need be stated here.

In an initial unpublished study in 1982, Baker compared Easter Island and Peruvian discrete traits. A few parallels were observed, which surprised us at the time, since our metric studies were already under way and clearly revealed an East Polynesian craniometric profile.

This line of inquiry was not pursued further until the 1987-88 field season with the Kon Tiki Expedition to Easter Island when one of us (GWG) conducted a study of Easter Island rocker jaws. This study was then extended to additional Rapa Nui skeletal samples at the National Museum of Natural History, Santiago, Chile, and the American Museum of Natural History, New York. Results were subsequently published (Gill 1990). Table 3 is from that published report.

Table 3
ROCKER JAWS

Polynesian Islands	Percentage Rocker Jaws
Hawai'i (Snow)	80.0
New Zealand (Houghton)	72.6
Tonga (Pietrusewsky)	76.4
Easter Island (Gill)	48.5
Marquesas	90.0

The Easter Island rocker jaw frequency of 48.5 is surprisingly low for a Polynesian population. Conclusions at the time of analysis were that the low frequency could be accounted for by either Founder Effect or the infusion of a non-Polynesian population element into the otherwise basically East Polynesian population. This could thus provide the necessary genetic "dilution" to lower the frequency from the expected 75% or more.

Recent Findings

Other evidence for a non-Polynesian (possibly South American) population element were sufficient (from Baker's 1982 study) to encourage a more thorough comparison with the Peruvian skeletal data retrieved from the field in 1981. This effort was undertaken recently as part of a University of Wyoming Masters Thesis project (Chapman 1993; Chapman and Gill, this volume). Chapman has looked at all discrete trait data from the University of Wyoming files from Easter Island and Peru, as well as all data on nondiscrete, continuous non metric traits from those same populations. Since this information is covered in detail elsewhere, it should suffice here to add only that a particular focus was developed in Chapman's study. Attention was directed toward traits that differ radically between Amerindians and Polynesians, such as palate form, zygomaticomaxillary suture form, Inca bone frequencies, and

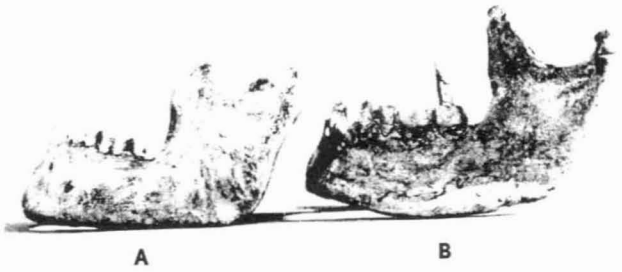

Figure 1. A Polynesian rocker jaw (B) from the Marquesas Islands, and a non-rocker mandible (A) from a Plains Indian. Both are casts of original specimens from the American Museum of Natural History, New York (B) and the University of Wyoming Human Osteology Collections (A).

a few other discriminating characteristics.

Since the human osteology research focus at the University of Wyoming has for many years been the skeletal attribution of race, with particular emphasis on the traits that characterize Amerindian populations (Gill 1986; Gill et al. 1988; Gilbert and Gill 1990; Gill and Rhine 1990; Gill 1995), and with the availability of such a large quantity of both Peruvian and Easter Island skeletal data, the University of Wyoming appeared to be the "ideal habitat" for Chapman's study on Rapa Nui-Peruvian comparisons and contrasts. In fact, at this time all current editions of the standard textbooks in forensic anthropology and general human osteology present methods for the skeletal attribution of race that have been developed at the University of Wyoming (e.g., Bass 1995:93-97; Krogman and Iscan 1986:75-77; Rathburn and Buikstra 1984:329-339; Reichs 1986:143-159; Steele and Bramblett 1988:60-61 and White 1990:328-339).

Many traits that have been examined in recent studies by us and by Chapman are, as would be expected, common to both Polynesians and Amerindians. These have obviously been of less interest than those that appear to differ radically between indigenous Americans and Polynesians. Primary

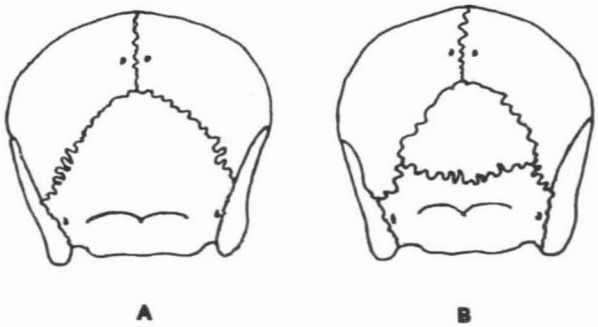

Figure 2. Posterior cranial views showing a separate Inca bone (B) which constitutes the superior aspect of the squamous of the occipital bone on some individuals (mostly Andean Indians). The much more common
condition in *Homo sapiens* is a squamous region of the occipital without the separate Inca bone (A).

among these, as suggested earlier, are the frequencies of rocker jaw, Inca bone, shape of the zygomaticomaxillary suture, and form of the palate (maxillary aveolus).

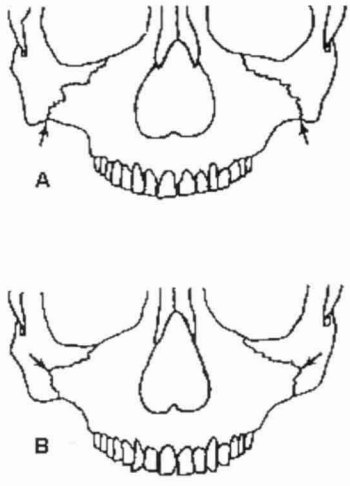

Figure 3. Zygomaticomaxillary suture shapes as first described by Martindale. The "angled" form (A) is common among Amerindians and other Mongoloid populations, while the "curved" form (B) is more common among Polynesians and Whites. Arrows indicate the points at which the widest diameter is obtained (from Gill 1986b)

A brief explanation of these four physical traits might be of value to non osteologists. Basically, these four characteristics can be defined as follows:

1. Rocker Jaw. The rocker mandible is a jawbone that is convex along the inferior margin of the horizontal ramus instead of concave, as is the common human condition. Figure 1 illustrates a Polynesian rocker jaw of a male Marquesan compared to a non rocker mandible of a male American Indian from the Northwestern Plains of North America. A true rocker mandible actually rocks back and forth on a smooth surface. The normal mandible will not rock because, as stated by Houghton (1977:365), "Most mandibles of *Homo Sapiens* rest stably on a plane surface, touching it on each side along the lower border of the body and at the prominent angular process, with the two points of contact separated by the antegonial notch." The antegonial notch is a concave area just anterior to the notch of the jaw. No antegonial angle is found on the rocker form of mandible, but rather a continuous convex curve exists along the entire inferior margin. Environmental factors do not affect rocker jaw development, but rather growth changes during the period of maturation of most Polynesians (and a small percentage of non-Polynesians who also show this mandibular form).

2. Inca bone. The Inca bone is a large separate area of ossification within the squamosal portion of the occipital bone (Figure 2). Inca bones are more common among South American Indians, particularly in the Andean area, than elsewhere in the world.

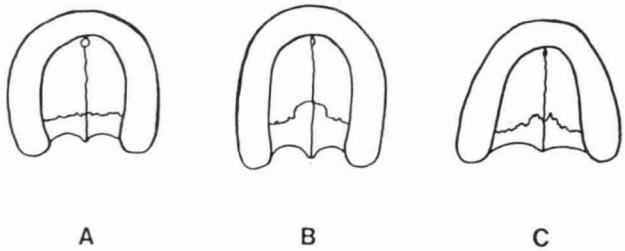

Figure 4. The three basic plate shapes common to *Homo Sapiens*. The elliptical palate (A) is common among Amerindians, the hyperbolic form (B) is very common among Blacks and Australoids, and the parabolic palate (C) is the most common form among Whites and Polynesians (from Gill 1986b)

3. Zygomaticomaxillary suture form. American Indians usually show a widely flaring form to the zygomaticomaxillary suture, while Whites and Polynesians tend to show a curved form. Figure 3 depicts these two forms of suture.

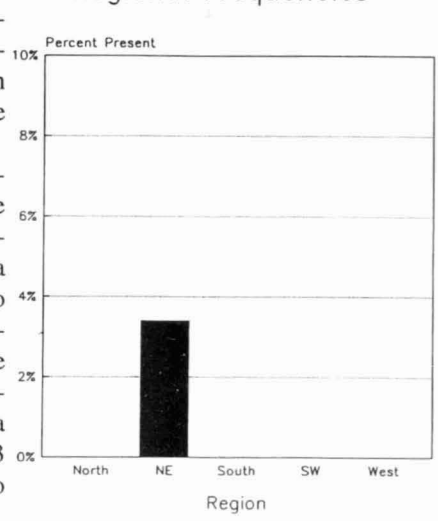

Figure 5. Inca bone frequencies on Easter Island by region (from Chapman 1993)

4. Palate shape. The shape of the maxillary alveolus, or tooth-bearing ridge of the upper jaw, differs between individuals. Also the frequencies of the three main shapes (parabolic, elliptic and hyperbolic) differ by race. Figure 4 illustrates the three forms of the human palate.

Most human populations have a very low frequency of rocker jaws, or actually no occurrence at all. Therefore the fact that most Polynesian populations reveal a frequency from 72.6% to 90% has been considered important. In fact, the rocker jaw has virtually become the hallmark of Polynesian ancestry among human osteologists. Our own study (Gill 1990) finds the prehistoric Easter Island population to certainly be basically Polynesian, regarding the number of rocker jaws. However, with a frequency of only 48.5%, the Easter Island sample reveals the lowest incidence in all Polynesia.

Inca bones are virtually absent among Polynesians but can reach frequencies of 30% among ancient Peruvians. As illustrated in Figure 5, a few Inca bones have been observed among Easter Island skeletons, at least from one site area.

Approximately 85% of North American Indians, at least from the Plains and Southwest regions of North America, show an "angled" form to the zygomaticomaxillary suture (Gill 1986b). By far the majority of Whites show the "curved" form. A review of the literature by Chapman (1993), as well as a look at some Marquesas Islands data from the American Museum of Natural History (n=25), suggests that Polynesians, like Whites, show only about 15% angled sutures. As illustrated in Fig. 4 in Chapman and Gill (this volume) Peruvians show about 50% curved and 50% angled sutures, a lower incidence than among the North American Indians, but a much higher frequency than among Whites or Polynesians. Fig.4 in Chapman and Gill (this volume) also illustrates, however, an intermediate frequency of angled sutures (between Peruvian and Polynesian) at least at some Easter Island site areas.

Perhaps one of the most useful traits for discerning Amerindians from Polynesians and Whites is the form of the

palate. Late Prehistoric North American Indians show about 50% elliptic palates and 50% parabolic. Whites almost always show parabolic palates, with very few elliptic and hyperbolic. As illustrated in Fig. 3 of Chapman and Gill (this volume),

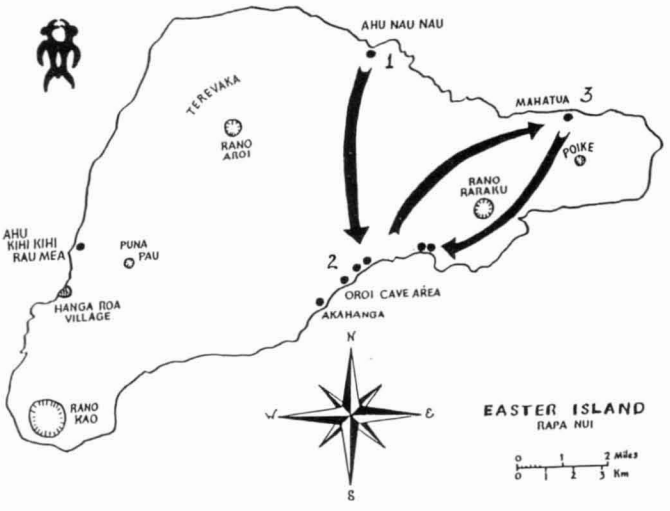

Figure 6. Burial sites from excavations from 1978 and the 1981 Easter Island Anthropological Expedition which produced significant skeletal samples adequate for craniofacial trait comparisons. Direction of gene flow between these three areas are indicated.

Peruvian Indians and West Mexican Indians show nearly 60% elliptic palates.

Polynesians from the Marquesas and New Zealand, on the other hand, show none at all, and the prehistoric Hawaiians almost none (only 4% elliptic). Virtually all Polynesians, like Whites, show a very high frequency of parabolic palates (see Fig. 2 of Chapman and Gill, this volume). Once again, some Easter Island site groups are intermediate between Peruvians and Polynesians on a discrete skeletal trait (but in this instance actually much closer to Peru than Polynesia).

On nearly all of the traits examined in the Chapman study, plus our rocker jaw study, the same pattern emerges. The prehistoric Easter Islanders depart slightly from Polynesian norms, and in the direction of the Peruvian condition. This trend could result from a coincidence of Founder Effect, drifting in each case toward a Peruvian norm, or a combination of this effect plus insufficient sample sizes of Polynesians in a few instances. Osteological data on many Polynesian populations are few or lacking. However, it would be surprising if a combination of Founder Effect and insufficient sample would in nearly every case bias the result in the same direction (toward Peruvian norms).

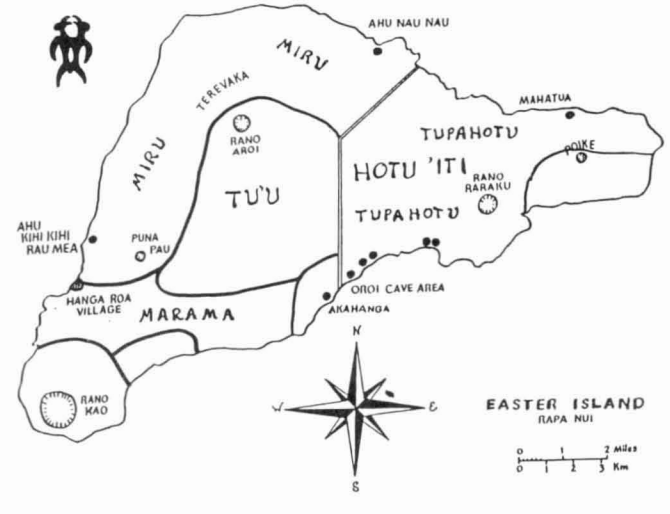

Figure 7. Some important boundaries from Routledge's prehistoric clan map, which coincide well with observed distributions of discrete traits, and explain the direction of gene flow.

Furthermore, the patterning of the trait occurrences on Easter Island, by tribal area, makes coincidence an even less likely explanation. Most of these traits which seem to suggest some Amerindian influence are high or highest in frequency along the Northeast coast of Easter Island. This area is the same in which certain cultural associations appear strongest (e.g., *tupa* structures, and folklore of the mysterious *Hanau eepe*).

An overview of the location of the key sites in our study in relation to the Easter Island coastline (see Figure 6) is useful, especially in reference to directions of gene flow in prehistoric times as demonstrated by Zimpel and Gill (1986) and Gill and Owsley (1993), and the ancient tribal boundaries as depicted by Routledge (1919) (Figure 7). The locations of the ancient tribal boundaries help greatly to explain the results of our discriminant function study of lineage trait complexes and gene flow (Zimpel and Gill 1986) and some dramatic differences observed in frequency, by tribal area, of certain discrete anomalies such as the bipartite patella (at Ahu Nau Nau) and ankylosed sacroiliac joints (at Oroi caves) (Gill and Owsley 1993).

These dramatic differences in frequencies of discrete traits on Easter Island, by tribal area, not only coincide with Routledge's clan boundaries but also strongly support Métraux' statements regarding tribal endogamy on prehistoric Easter Island, especially among members of the aristocratic Miru tribe of the Northwest coast. We have found no skeletal evidence for gene flow from other parts of Easter Island into Miru territory. All evidence suggests that when a Miru married outside the tribe he or she also moved out of the tribal area, thus maintaining the "purity" of the royal lineage.

A primary focus of the Chapman (1993) study was the area east of Miru territory, just across the hostile border between the also warring confederacies of the Tu'u and the Hotu'iti. In the Northeast area, in the vicinity of Mahatua, the curious occurrences of Amerindian skeletal characteristics have been most apparent. As mentioned, Inca bones occur in the area. These extra bones, typical of Andean Indians, have been found at no other Easter Island sites. Also, the elliptic palate form and angled zygomaticomaxillary suture, typical of Amerindians, are found at much higher frequencies along the Northeast coast of Easter Island than they are in Miru territory. In fact, the Miru people as exemplified by the North coast skeletal sample from Ahu Nau Nau, seem from all skeletal indications, to be typical East Polynesians. Metrically, all Easter Island sub-populations are typically East Polynesian, but regarding discrete trait occurrences some are and some are not. The Miru (Ahu Nau Nau skeletons) show a 0% frequency of Inca bones, a 0% frequency of elliptic palates, a very low frequency of angled zygomaticomaxillary sutures,

and many other indications of late prehistoric genetic isolation from other Easter Island tribal groups, and correspondingly from the slight trace of Amerindian influence detectable elsewhere around the island. Thus, the Ahu Nau Nau population appears to have been less "Peruvian" than the other prehistoric Easter Islanders.

Former Hypotheses

How, then, is one to explain a small Amerindian skeletal element, found in this otherwise East Polynesian population? Two hypotheses that have been offered are:

An early Peruvian element on Easter Island, which was later overwhelmed by Polynesians from the west (Heyerdahl 1989).

An East Polynesian population which was established first on Rapa Nui, and then influenced perhaps in the Middle Period, by a boatload of lost Peruvian sailors who landed there and married into the population (Englert 1970; Bellwood 1978).

If the first of these hypotheses is correct, much higher frequencies of Amerindian traits should be present, and probably should be detected metrically (in addition to the discrete trait evidence). Also, one might expect to see evidence of ceramics, textiles and developed lithics that should accompany any significant movement of Amerindians from either Mesoamerica or South America into Polynesia.

If the second hypothesis is correct, and a boatload of Peruvian sailors (ten men according to folklore) encountered an already established Middle Period population of thousands of Polynesians, could subsequent generations possibly be sufficiently influenced genetically to show the discrete trait frequencies indicated by our studies? It would seem highly unlikely. An island-wide reduction in rocker jaw frequencies of more than 30% (from an East Polynesian norm of over 80%) could simply not happen from the genetic influence of ten men integrated into a population of thousands. Neither could such a large number of elliptic palates be generated by such an insignificant infusion of genes so late in Rapa Nui history.

Background for a New Hypothesis

For these reasons, we regard the earlier explanations as inadequate. One of us (GWG) has formulated an alternative hypothesis based upon an idea of William Mulloy's, a theory of Peter Buck's and a key observation made by Heyerdahl (and others) regarding ocean currents.

Insights by Mulloy

Mulloy (personal communication, 1973) was impressed by the traditional boat-shaped houses on Easter Island. The fact that the entire domestic organization of a people was structured within the confines of an overturned canoe impressed him. Mulloy once said: "I don't know where the Easter Islanders came from, but I'll tell you one thing, they were on the sea a helluva long time." We concur with Mulloy that a group of Polynesian seafarers would not change their basic house type to that of chronic sea rovers on a month-long voyage from some neighboring Polynesian island. These people had been away from their original homeland for years. For a long time they had been making coastal stopovers along many shores where the overturned canoe became their temporary home. After so many years engaged in a nomadic life as coastal fishermen, the temporary home became their only home.

Observations by Lee

As Georgia Lee has pointed out (Lee 1997) based upon her inventory of art styles and motifs, the Marquesan islanders must have had a stopover somewhere on their way to Easter Island. They not only lost the stick figure from their art, and a few gods from their Polynesian pantheon, but they picked up boat-shaped homes as an adaptation to a new life.

A Theory by Buck

Peter Buck (1938) notes that the sweet potato exists in Polynesia as virtually undeniable evidence of South American contact with Polynesia. He saw Polynesians, not Amerindians, as the great sailors responsible for its introduction. He believed it much more likely that the Polynesians, as part of the eastward expansion across the Pacific, encountered the Americas (and sailed back again with the sweet potato)than that Amerindians journeyed westward into the Pacific.

Insights from Heyerdahl, de Velde, and others

According to Heyerdahl (1968, 1989) and other men of the sea (de Velde, personal communication 1981), and additional scholars familiar with ocean currents (Finney 1993), it is very difficult to sail to Easter Island by way of Polynesia in a primitive craft, yet it appears to be a relatively easy voyage from South America. De Velde sailed into Easter Island in 1981 and joined our expedition for a few days. He recounted stories of the voyage from the South American coast in his small craft.

Folklore

Many anthropologists pay little attention to native folklore. Although by itself it proves nothing, we have been impressed by how often the stories about population origins and composition are basically true. Sometimes the old stories can even be tested osteologically. Folklore has guided us correctly in Mesoamerica regarding the complex origin of a coastal population in Toltec Period (Postclassic) West Mexico (Gill and Case 1983). Ethnohistorical information gathered by Routledge and Métraux on Easter Island regarding tribal endogamy and tribal boundaries has also been supported by two separate lines of osteological research involving discrete postcranial anomalies and a discriminant function of 31 discrete cranial traits (Gill and Owsley 1993). Chapman's (1993) recent study of additional discrete traits supports the same concepts regarding the location of tribal boundaries and tribal endogamy.

Folklore among the North American Indians regarding the presence of bearded Whites seems to coincide with Norse sagas that tell of Viking voyages along the North American coast. Legends on both sides of the Atlantic were ignored by some scholars for years until archaeological evidence surfaced at L'Anse aux Meadows (Ingstad 1964). The sagas actually played a role in the eventual discovery of this important archaeological site.

Amerindian folklore from Mesoamerica and from along the west coast of South America regarding bearded Whites from the sea is less well explained at this time than are the related stories from North America. The now well-

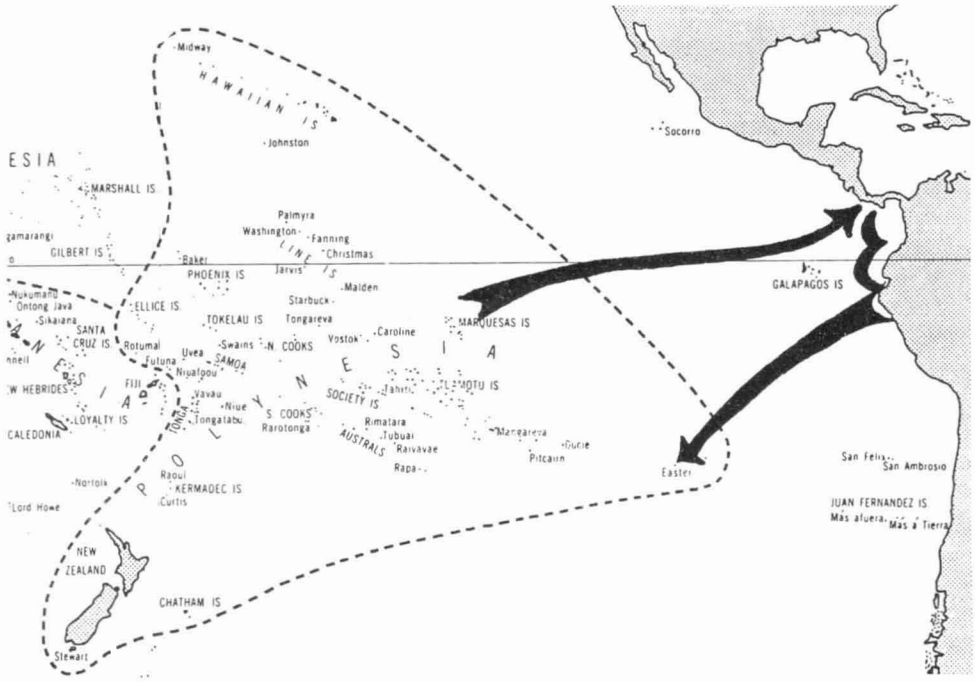

Figure 8. Proposed sea route to Easter Island from the Marquesas Islands

documented Viking voyages to North America provide the needed explanation for the North American folktales. Accounting for the presence of Europeans on the west coast of South America in prehistoric or protohistoric times is more difficult. Fortunately, in light of recent osteological evidence it is also unnecessary. Since the days of J.B. Birdsell's osteological work in Asia and the Americas, physical anthropologists have known that bearded Whites (resembling the Ainu people of northern Japan) were probably a widespread racial element in East Asia prehistorically and even entered the New World by way of the Bering Strait. Recent human osteological research further supports Birdsell's perspective (Gill 1991; Steele and Powell 1992; Brace 1995). Just as the ancient people of all of Japan and much of China (prior to the Bronze Age) were Asiatic Caucasoids, and at least a few of the early Americans, so it would seem were the earliest Polynesians. Therefore, the most isolated of the Polynesians, the East Polynesians, simply missed most later waves of gene flow of the "Mongoloid complex." For these reasons they also remained the most Caucasoid in appearance of any of the Polynesian peoples.

It is our contention that the bearded Whites, or Viracocha people, mentioned by Heyerdahl (1989) as the "people of the sea" from South American Indian folklore could well be East Polynesian voyagers, probably from the Marquesas Islands. It is simply unnecessary to postulate Europeans sailing around the Horn or crossing the Isthmus of Panama to account for occasional glimpses of bearded White sailors along the west coast of the Americas.

The East Polynesians and the Ainu of Japan are certainly among the last of the East Asiatic Caucasoids. Bearded Whites they are. Europeans they are not.

It would seem from all accounts of all of the earliest European explorers who encountered Easter Islanders, from Roggeveen onward, that the original Rapa Nui were of this same population element, perhaps with an even higher frequency of white skins and Caucasoid facial features than the contact period Marquesas Islanders.

Thus, we subscribe to an old theoretical point of view regarding the racial composition of East Asia and Polynesia formulated by Birdsell (1972) and others of his generation, and also accepted by Mulloy, Englert, and others familiar with the people and the history of Easter Island and East Polynesia. The theory has been supported recently by additional osteological analysis of Archaic and Paleoindian populations that also represent early migrations from East Asia before the Mongoloid complex of characteristics became firmly established (Gill 1991; Neves and Pucciarelli 1991; Steele and Powell 1992).

New Hypothesis

From the evidence of human osteology, art, archaeology, oceanography, history and folklore emerges a new point of view on Easter Island origins. Basically it involves a new sea route from the Marquesas to Easter Island, by way of South America (Figure 8). We envision it beginning first as a great voyage by East Polynesians, probably Marquesas Islanders, to Central America or northern South America. It seems likely that they initially sailed to the northeast, encountered the equatorial counter-current and eventually made their way to the Americas. These people were on a colonizing voyage and therefore had all basic plant domesticates with them and probably the pig, dog and chicken. Uninhabited off shore islands probably became their home base, but realizing that they had encountered an inhabited "great land," they established themselves mostly through fishing and trade. At least some moved on southward along the coast, perhaps moving in small craft from island to island. When on land they lived in their overturned canoes. They lost some of their Polynesian culture in this new life. They learned of new gods, new skills and new foods. They adopted one valuable tuber most like their own taro, the sweet potato. They became more interested in stone carving.

Some years later the majority of these seafarers regrouped to attempt a return colonizing voyage to their Polynesian homeland. A few skilled Andean stone carvers had befriended them and taught them special skills. Some even married into this alien group. Some joined the voyagers.

The return voyage did not go as planned. Plagued with problems, perhaps storms, they were carried southward into the Humboldt Current. They were able to follow this current to Easter Island. They knew they were lucky to be there. They made no organized attempts to leave their new home. The many years of voyaging to the Americas, living there for a time and voyaging back had not been easy. They lost the domestic pig and the dog; they managed to maintain the chickens and domestic plants, however, and even added the bottle gourd and the sweet potato.

The founding Rapa Nui people remembered both previ-

ous homelands in legend and song. They had become culturally enriched and more diverse than other Polynesian people while in the Americas and had even received a small amount of gene flow from their continental neighbors. They thrived in their new homeland because of this diversity, even though the new home was terribly isolated and quite small.

One very old Rapa Nui song, sometimes still sung by Kiko Paté, speaks to the new island home and chastises the little island of Rapa Nui for stealing them away on their return voyage to their homeland with all the new things that they had acquired and were bringing from the "great land" or "big island." We believe that this is precisely what happened.

This new hypothesis of Easter Island settlement accounts for:

1. The detectable thread of Amerindian osteological trait in a basically East Polynesian population.

2. Some Peruvian concepts in an East Polynesian culture, but lacking any fully developed Andean elements.

3. Loss of some basic Polynesian culture elements, and acquisition of others that would seem to fit a unique history (e.g., boat-shaped houses).

4. Folklore suggesting two places of origin. This explains how a Polynesian *ariki* in large canoes (or canoe) could have arrived from the east.

In sum, as Heyerdahl (1989) has said before, all primitive craft (including the ships of the European explorers) sail to Easter Island from the east. What the sailors are not able to see, however, and human osteologists are, is that the ones who made that ancient voyage from the Americas were Polynesians and not the indigenous Americans themselves.

Footnotes

[1] International research effort funded by National Geographic Society, Center for Field Research-Earthwatch, the government of Chile, University of Wyoming and other agencies, and organized for the salvage, curation and study of prehistoric Easter Island skeletons. Co-principal investigators: George W. Gill, Ph.D., Scientific Leader, University of Wyoming; Sergio Rapu H., Sebastian Englert Museum; Claudio Cristino F., University of Chile.

[2] One-month archaeological/osteological field season on Easter Island funded by University of Wyoming and Sebastian Englert Museum of Easter Island, which consisted of the study of 100 skeletons from Ahu Nau Nau excavated by Sergio Rapu and Sonia Haoa in 1978, and the recovery of 20 additional skeletons from the south coast of Easter Island (Rapu and Gill), which were in imminent threat of destruction.

[3] 1987-88 Kon-Tiki Expedition to Easter Island funded by Kon-Tiki Museum, Smithsonian Institution and University of Wyoming. Archaeology team: T. Heyerdahl, A. Skjølsvold, G. Figueroa, S. Haoa; Osteology team: G. Gill, D. Owsley, R. Mann, S. Haoa, S. Long. 1989 Human Osteology Collections Curation on Rapa Nui funded by World Monuments Fund (G. Gill, S. Haoa, S. Baker, S. Brown). 1990-91 Human Osteology Data Recovery funded by University of Wyoming (G. Gill, D. Owsley, S. Haoa, C. Clayton). October 1991 Human Osteology Data Recovery funded by University of Wyoming (Gill, Haoa).

References

Bass, William M. 1964. The Variation in Physical Types of the Prehistoric Plains Indians. *Plains Anthropologist Memoir* 1, vol. 9(24):65-145.

1995. *Human Osteology*. Fourth Edition, Missouri Archaeological Society Special Pub. 2, Columbia.

Bellwood, Peter 1978. *The Polynesians: Prehistory of an Island People*. Thames and Hudson, London.

Birdsell, J.B. 1972. *Human Evolution*. Rand McNally, Chicago.

Brace, C.L. 1995. *The Stages of Human Evolution*. Fifth Edition. Prentice Hall, Englewood Cliffs, New Jersey.

Buck, Peter H. 1938. *Vikings of the Sunrise*. Lippincott, Philadelphia.

Chapman, Patrick 1993. Analysis of Non-Metric Cranial Traits from Prehistoric Easter Island with Comparisons to Peru. Masters Thesis, Department of Anthropology, Univ. of Wyoming.

Englert, Sebastian 1970. *Island at the Center of the World*. Charles Scribners and Sons, NY.

Finney, Ben 1993. Voyaging and Isolation in Rapa Nui Prehistory. *Rapa Nui Journal* 7(1):1-5.

Gilbert, Randi and George W. Gill 1990. A Metric Technique for Identifying American Indian Femora. In: G.W. Gill and J. S. Rhine, eds. *Skeletal Attribution of Race*, pp. 97-99. Maxwell Museum of Anthropology, Anthropological Papers 4, University of New Mexico.

Gill, George W. 1995. Challenge on the Frontier: Discerning American Indians from Whites Osteologically. *Journal of Forensic Sciences*, Vol. 40 (5):783-788.

Gill, George W. 1986a. Final Report of Investigations of the 1981 Easter Island Anthropological Expedition. Unpublished Report, National Geographic Society, grant no. 2256-80.

1986b. Craniofacial Criteria in Forensic Race Identification. In K.J. Reichs, ed., *Forensic Osteology*. Charles C. Thomas, Springfield, Il. Pp. 143-159.

1990. Easter Island Rocker Jaws. *Rapa Nui Journal*, 4(2):21.

1991. Human Skeletal Remains on the Northwestern Plains. In G.C. Frison, ed., *Prehistoric Hunters of the High Plains*. Academic Press, NY; Pp. 431-447.

Gill, G.W., D.W. Owsley, and S.J. Baker. 1993. Craniometric Evaluation of Prehistoric Easter Island Populations. Paper Presented at the 52nd Annual Meeting, American Association of Physical Anthropologists, Indianapolis. Abstract in the *American Journal of Physical Anthropology*, vol.60(2):197.

Gill, G.W., S.S. Hughes, S.M. Bennett and B.M. Gilbert.1988. Racial Identification from the Midfacial Skeleton with Special Reference to American Indians and Whites. *Journal of Forensic Sciences*, Vol. 33(1):92-99.

Gill, G.W. and Stanley Rhine, eds. 1990. *Skeletal Attribution of Race*. Maxwell Museum of Anthropology, *Anthropological Papers 4,* University of New Mexico.

Gill, G.W. and D.W. Owsley. 1993. Human Osteology of Rapa Nui. In: S.R. Fischer, ed. *Easter Island Studies*. Oxbow Monograph 32, Oxford. Pp. 56-62.

Heyerdahl, T. 1968. *Sea Routes to Polynesia*. Rand McNally and Co., Chicago.

1989. *Easter Island: The Mystery Solved*. Random House, NY.

Houghton, Philip. 1977. Rocker Jaws. *American Journal of Physical Anthropology*, 47:365-370.

Howells, W.W. 1973. *Cranial Variation in Man*. Papers of the Peabody Museum of Anthropology and Ethnology. Harvard University, Cambridge. Vol. 67.

Ingstad, Helge. 1964. Vinland Ruins Prove Vikings Found the New World. *National Geographic* 126(5):708-734.

Krogman, W.M. and M.Y. Iscan.

1986. *The Human Skeleton in Forensic Medicine*. Second edi-

tion. Charles C. Thomas, Springfield, IL.
Lee, Georgia 1997. Petroglyph Motif Distribution in East Polynesia. *Rapa Nui Journal* 11(1):5-9.
Métraux, Alfred. 1957. Easter Island. Oxford University Press, NY.
Neves, W.A. and H.M. Pucciarelli. 1991. Morphological Affinities of the First Americans: An Exploratory Analysis Based on Early South American Human Remains. *Journal of Human Evolution*, Vol. 21:261-273.
Owsley, D.W., G.W. Gill and S.D. Ousley. 1994. Biological Effects of European Contact on Easter Island. In: C.S. Larsen and G.R. Milner, eds. *In the Wake of Contact: Biological Responses to Conquest.* Wiley-Liss, Inc., NY. Pp. 161-177.
Pietrusewsky, M. 1969. An Osteological Study of Cranial and Infracranial Remains from Tonga. *Records of the Auckland Institute and Museums*, Vol. 6:287-402.
1976. A Study of Human Skeletal Remains from Hane Dune Site, Uahuka, Marquesas. Part II of Prehistoric Human Skeletal Remains from Papua New Guinea and the Marquesas. *Asian and Pacific Archaeology Series*, No. 7. Social Science and Linguistics Institute, University of Hawaii.
Rathbun, T.A. and J.E. Bulkstra, eds. 1984. *Human Identification.* Charles C. Thomas, Springfield, IL.
Reichs, K.J. 1986. *Forensic Osteology.* Charles C. Thomas, Springfield, IL.
Routledge, K.S. 1919. *The Mystery of Easter Island.* Hazel, Watson and Viney, London.
Snow, Charles E. 1974. *Early Hawaiians.* University Press of Kentucky, Lexington.
Steele, D.G. and C.A. Bramlett. 1988. *The Anatomy and Biology of the Human Skeleton.* Texas A&M University Press, College Station.
Steele, D.G. and J. F. Powell 1992. Peopling of the Americas: Paleobiological Evidence. *Human Biology* 64(3):303-336.
White, Tim D. 1991. *Human Osteology.* Academic Press, N.Y.
Zimpel, C. And G.W. Gill. 1986. Discrete Trait Analysis of Easter Island Crania: Evidence for Prehistoric Tribal Endogamy. Abstract in *American Journal of Physical Anthropology*, 69(2):283.