Voyaging and Interaction in Ancient East Polynesia

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EAST POLYNESIAN CHIEFDOMS WERE LARGELY isolated and inwardly focused at the time of European contact, but archaeological findings show that this classic insularity was a relatively late development. Earlier periods, beginning by A.D. 1000, are characterized by widespread interaction both within island groups and among distant archipelagoes, even spanning the cultural boundary between East and West Polynesia. Inter-island communication is represented by imported artifacts, especially stone tools and pearl shell *(Pinctada margaritifera)*, but the archaeologically documented frequencies of these imports decline abruptly after A.D. 1450. Why? Evidence suggests that declining frequencies of imports reflect a pattern of decreasing access to distant resources (e.g., Rolett 1998; Walter and Campbell 1996; Weisler 1997). This interpretation is consistent with the notion of contracting interaction spheres. The idea of contracting interaction spheres is not a new one in Polynesian archaeology (e.g., Irwin 1992; Rolett 1998; Walter 1998) but it has proven difficult to identify factors that could have influenced such a change. One of the main unresolved issues is why and how a fall-off in open-sea voyaging spheres occurred nearly simultaneously in multiple archipelagoes as varied and as isolated as the Marquesas, the Southern Cooks, and the Pitcairn group. At the heart of the problem lies the question whether these changes in voyaging are somehow related. This paper builds upon the recently proposed hypothesis (Rolett 1998:257–262) that internal developments in the Societies, an archipelago distinguished by its accessibility and the size of its resource base, may have had a regional influence on East Polynesian voyaging networks.

The myriad varied geological histories of Polynesian islands offer ideal conditions for identifying prehistoric overseas movement of artifacts and raw materials. In some cases imported artifacts in an archaeological assemblage are readily apparent, as when stone tools are found on coral islands that lack naturally occurring volcanic stone. One such example is the discovery of basalt adzes and food pounders on coral islands in the Tuamotus (Emory 1975:20–21, 100–108). On high volcanic islands, while stone imports may not be readily apparent, exotic stone can be identified by compositional studies involving X-ray fluorescence (XRF), electron microprobe analysis, and petrography (e.g., Weisler 1997). Re-

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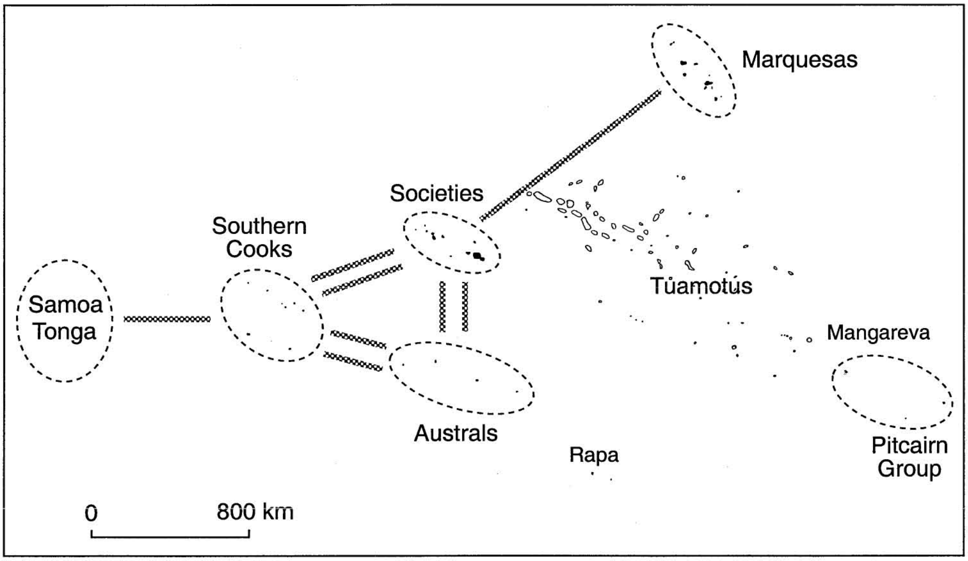

Fig. 1. A model of voyaging and interaction spheres within the ancestral East Polynesian homeland.

cent research of this kind reveals a general pattern of prehistoric contact among all except the most isolated Polynesian islands.

The investigation of voyaging spheres is critical for understanding isolation and interaction as factors in the development of East Polynesian chiefdoms. Studies of voyaging networks and the frequency of inter-island contacts will help identify and explain the nature of the East Polynesian homeland, an entity that dates to early in the first millennium A.D. and which existed within the boundaries of the centrally located archipelagoes (the Societies, Cooks, Australs, Tuamotus, and Marquesas) (e.g., Kirch 2000; Rolett 1998; Walter 1998). A model for interaction within the East Polynesian homeland is shown in Figure 1. This model is designed to show only the major lines of exchange, illustrating a current consensus that the East Polynesian homeland existed as a region comprising multiple groups of islands, rather than as an isolated area consisting of a single archipelago. Evidence also suggests two-way voyaging from central East Polynesia to Hawai'i, New Zealand, and Easter Island (Finney 1994; Green 1998), but with a frequency far less than that of voyaging within the core interaction zone. Sailors from the low islands of the Tuamotus excelled at open-sea voyaging. It seems probable, therefore, that a significant but unknown degree of interaction among the Societies and the Marquesas was through a chain of contacts via the Tuamotus. Using linguistic evidence, Kirch (2000:245) also postulates a chain of interaction extending from the Australs to the eastern Tuamotus and Mangareva, but archaeological knowledge of these islands is rather weak and there is no concrete support yet for this aspect of the model.

EARLY EAST POLYNESIAN INTERACTION SPHERES

The concept of a regional homeland is premised on the argument that early Polynesian voyaging was an intentional process involving systematic long-distance two-way crossings. Initial hypotheses depended largely on evidence from experimental voyages and computer simulations (Finney 1994; Irwin 1992). Direct archaeological evidence for the regional homeland model has emerged mainly within the past decade. The most detailed data are for the Marquesas, the Southern Cooks, and the Pitcairn group, archipelagoes that have been focal points of recent research in central East Polynesia. The Marquesas are a group of ten mountainous volcanic islands on the eastern margin of Polynesia. The largest of these islands are intervisible but the prevailing winds and the alignment of the archipelago makes it easier to sail from south to north than in the opposite direction. It was once widely believed that Marquesan culture developed in nearly complete isolation but recent work now demonstrates at least a low level of long-distance communication with other archipelagoes (Rolett 1998:60–61; Weisler 1998).

Geochemical analyses of artifacts from Hanamiai, a coastal dune on Tahuata, document an 800-year sequence of inter-island contact (Rolett 1998:188–198). Over half of the adzes dating to early stages of the Hanamiai sequence (A.D. 1025–1450) are made of imported, high-quality basalt from Eiao, an island located 130 km north of Tahuata. The relative frequency of Eiao adzes falls off in later periods, as tools made of stone from Tahuata and other southern Marquesan islands begin to dominate the artifact assemblages. This trend continues from A.D. 1450 to 1800, even though most of the local stone is inferior in quality to the Eiao material. There is a parallel trend in the falling frequency of phonolite, a kind of stone that most likely originates from Ua Pou, in the central Marquesas. Phonolite was only used for producing informally shaped flake tools. It is abundant in the early Hanamiai artifact assemblages but disappears entirely in assemblages dating after A.D. 1450. The basalt and phonolite are contrasting materials that derive from different islands. Despite this and the fact that they were used for separate purposes, the frequencies of both kinds of stone fall off during the same period in Marquesan prehistory.

Archaeological evidence for the Southern Cooks and the Pitcairn group portrays two additional examples of prehistoric East Polynesian interaction spheres. In both of these cases, the core of the interaction sphere is a cluster of small islands with contrasting geological landscapes. Inter-island contact, dating as early as the eleventh century A.D., is determined mainly by the geochemical analysis of adze stone. In the Southern Cooks, Rarotonga is the only island with extensive outcrops of volcanic stone, and the analyses show that basalt adzes from Rarotonga were transported throughout the archipelago (Sheppard et al. 1997). Smaller amounts of adze stone from two other islands, Mangaia and Aitutaki, also gained regional distribution. Voyaging allowed at least limited contact among the Cook Islands and other archipelagoes, as is shown by the archaeological discovery of imports including Tongan pottery and basalt adzes from Samoa and the Societies (Allen and Johnson 1997; Walter 1998; Walter and Dickinson 1989; Walter and Sheppard 1996; Weisler and Kirch 1996).

In the case of the Pitcairn group, workshops on volcanic Pitcairn supplied basalt adzes and volcanic glass for neighboring Henderson, a raised coral island (Weisler 1997). The much more distant island of Mangareva provided Henderson with cobbles of vesicular basalt used for heating earth ovens. In addition, Mangareva also likely provided Henderson with pearl shell, a material that grows rarely if ever on the Henderson coast but which flourishes in Mangareva's magnificent lagoon (Weisler 1997).

The Southern Cooks also received substantial quantities of pearl shell, probably imported from other islands within the Cooks or from the Societies (Kirch et al. 1995; Walter and Campbell 1996). Pearl shell was a preferred material for manufacturing fishhooks in the Southern Cooks and the Pitcairn group, as it was throughout tropical East Polynesia. However, in both regions, the availability of pearl shell falls off sharply beginning around A.D. 1450 and most fishhooks from the later periods are made of shell from smaller, less desirable species. Significantly, the falling frequencies of pearl shell coincide with apparent declines in the availability of other imports. Thus, functionally distinct materials (pearl shell and volcanic stone) from different sources display parallel patterns of declining frequency. This is analogous to the Marquesan case in which imported phonolite and Eiao basalt also disappear in unison during the Hanamiai sequence.

What accounts for these simultaneous changes through time in the overseas transport of functionally different materials? The trends likely represent a general pattern of declining access to distant resources and, by implication, declining levels of inter-island voyaging. For the Marquesas, this interpretation is supported by independent evidence from investigation of the subsistence strategies (Rolett 1998). As revealed by changes in both the Hanamiai artifact and faunal assemblages, fishing in offshore waters was relatively common during the early periods but notably rare after A.D. 1450. The same canoes and sailing strategies employed in inter-island voyaging were also used for offshore fishing. It seems probable, therefore, that the parallel declines in offshore fishing and access to imported stone are linked to reductions in the overall scale of open-sea voyaging and inter-island contact.

PROCESS

What factors may have led to declining voyaging and the contraction of East Polynesian interaction spheres? Anderson (1996) suggests that during the settlement of East Polynesia one early incentive for exploration was the reward of rich faunal resources (especially colonies of birds) to be found on previously uninhabited islands. He argues that: "predation took early precedence over horticultural expansion and that since preferred faunal resources were depleted fairly easily and quickly, there was an incentive for some people to move on in search of new reserves quite soon after colonization" (Anderson 1996:369). If the lure of faunal resources did help to draw Polynesians into the eastern Pacific, then the motivation for voyaging may have declined over time as it became increasingly difficult to discover uninhabited islands. Moreover, if people searching for uninhabited islands risked a hostile reception when they landed at islands that were already settled, then the rate of exploration may have slowed simply because Polynesians eventually colonized nearly all of the inhabitable landfalls in the eastern Pacific.

Climatic change has also been suggested as a general causal factor influencing the decline of voyaging, based on the argument that the Little Ice Age (A.D. 1400–1850) tended to make voyaging increasingly difficult (Bridgeman 1983). Irwin (1992:89–90) rejects this argument on the basis that prehistoric Polynesian voyaging strategies would have been adapted to a wide range of weather patterns, so that it is unlikely that climatic variation through time was great enough to have had a major impact.

A more discernible environmental factor is the role of human-influenced deforestation, which affected voyaging by limiting the availability of timber suitable for canoe construction. Weisler (1994:98–99) makes a convincing argument that the deforestation of Mangareva was linked to the eventual loss of voyaging canoes, and to a general decline of inter-island contacts in the Mangareva-Pitcairn area. On other islands as well, the depletion of timber resources surely placed similar constraints on the ability to build and maintain voyaging canoes. Easter Island (Rapa Nui) is an extreme example; the island was nearly completely deforested by the time of European contact and the small canoes in use during that period leaked so badly that they were barely seaworthy (Van Tilburg 1994). Rapa, the southernmost of the Australs, is another example. The first Europeans to visit this island noted that while the coastal plain and lower hills supported sparse forests the mountains were barren, with some areas completely denuded (Bellingshausen 1945:223; Ellis 1829:365). In describing the canoes he saw in 1820, Bellingshausen wrote: ". . . probably owing to the lack of trees of sufficient thickness these craft were made of planks bound together by ropes made of the twisted fibers of the bark of trees. Some are as much as 25 feet in length, but have a width of no more than 1 foot 2 inches" (1945:224).

Social factors also enter into the equation. One idea is that the costs of long-distance voyaging came to outweigh the benefits, leading established Polynesian societies to invest their resources in other endeavors such as chiefly rivalries and the construction of religious sites (Finney 1994:292–304; Walter 1996:524). A related model draws attention to the value of long-distance voyaging for small populations on recently settled islands (Kirch 1988). Voyaging may have served as a lifeline that allowed contact with people on other islands, providing access to marriage partners and facilitating the transfer of domestic plants or animals not introduced at the time of initial colonization. The need for voyaging diminished as communities became larger and self-sufficient, and voyaging might have declined if the costs came to outweigh the benefits.

Although voyaging was not for utilitarian purposes alone, material needs created a powerful incentive. Finney (1994:294) suggests it is not coincidental that, at the time of European contact, inhabitants of the Tuamotus possessed the highest level of canoe technology and voyaging skills in central East Polynesia. Rather, he proposes that this reflects the importance of long-distance voyaging as the means by which inhabitants of these coral atolls maintained access to the resources of distant high islands.

The influence of social and environmental factors, in terms of their effect on open-sea voyaging, would have varied during different stages in the history of an island culture. For example, the effects of deforestation as a limiting factor probably intensified through time, even though the rate and ultimate extent of deforestation varied among islands. The influence of density-dependent social factors including chiefly competition and intergroup hostility would have also intensified through time. In the same way that histories of deforestation were inevitably affected by local environmental settings, demographic factors such as the size of an island's initial founder population obviously helped to determine the timing of density-dependent processes of social change.

The enormous environmental diversity among central East Polynesian islands hints at the degree to which local conditions influenced both population growth and human-induced environmental change. In this context, and ruling out the likelihood of any single all-important factor (e.g., global climatic change), how do we explain the contemporaneous declines of open-sea voyaging in areas as distant as the Marquesas, the Cooks, and the Pitcairn group? Is the timing coincidental or does it reflect a regional process that transformed voyaging networks throughout central East Polynesia? None of the current models for explaining the contraction of interaction spheres systematically considers the degree of environmental diversity among East Polynesian islands. Table 1 documents some of this diversity, by listing basic data for island size, elevation, and isolation. This offers a starting point for investigating the significance of environmental factors in influencing the expansion and contraction of central east Polynesian voyaging networks.

Table 1. Environmental Data for High Islands in Central East Polynesia

ARCHIPELAGO	ISLAND	AREA (km^2)	ELEVATION (m)	ISOLATION (km)[a]
Australs	Raivavae	18	437	180
Australs	Rapa	40	650	600
Australs	Rimatara	9	83	150
Australs	Rurutu	32	389	210
Australs	Tubuai	45	422	210
Australs	*Total area*	*144*		
S. Cooks	Aitutaki	18	124	187
S. Cooks	Atiu	28	71	22
S. Cooks	Mangaia	70	169	165
S. Cooks	Mauke	20	24	37
S. Cooks	Mitiaro	22	24	22
S. Cooks	Rarotonga	67	653	165
S. Cooks	*Total area*	*225*		
Gambiers	Mangareva	15	441	880
Marquesas	Eiao	52	577	50
Marquesas	Fatuiva	80	960	35
Marquesas	Hatuta'a	18	420	5
Marquesas	Hiva Oa	320	1190	65
Marquesas	Mohotani	15	520	15
Marquesas	Nukuhiva	330	1208	65
Marquesas	Tahuata	61	1050	4
Marquesas	Ua Huka	77	853	20
Marquesas	Ua Pou	105	1252	20
Marquesas	*Total area*	*1058*		
Pitcairn	Henderson	37	33	550
Pitcairn	Pitcairn	6	309	175
Pitcairn	*Total area*	*43*		
Societies	Bora Bora	38	727	20
Societies	Huahine	74	669	28
Societies	Maupiti	12	372	47
Societies	Moorea	132	1212	14
Societies	Raiatea	238	1033	164
Societies	Tahaa	82	590	4
Societies	Tahiti	1042	2241	2000
Societies	*Total area*	*1618*		

[a] Distance to the nearest island with an area equal to at least 75% of the home island.

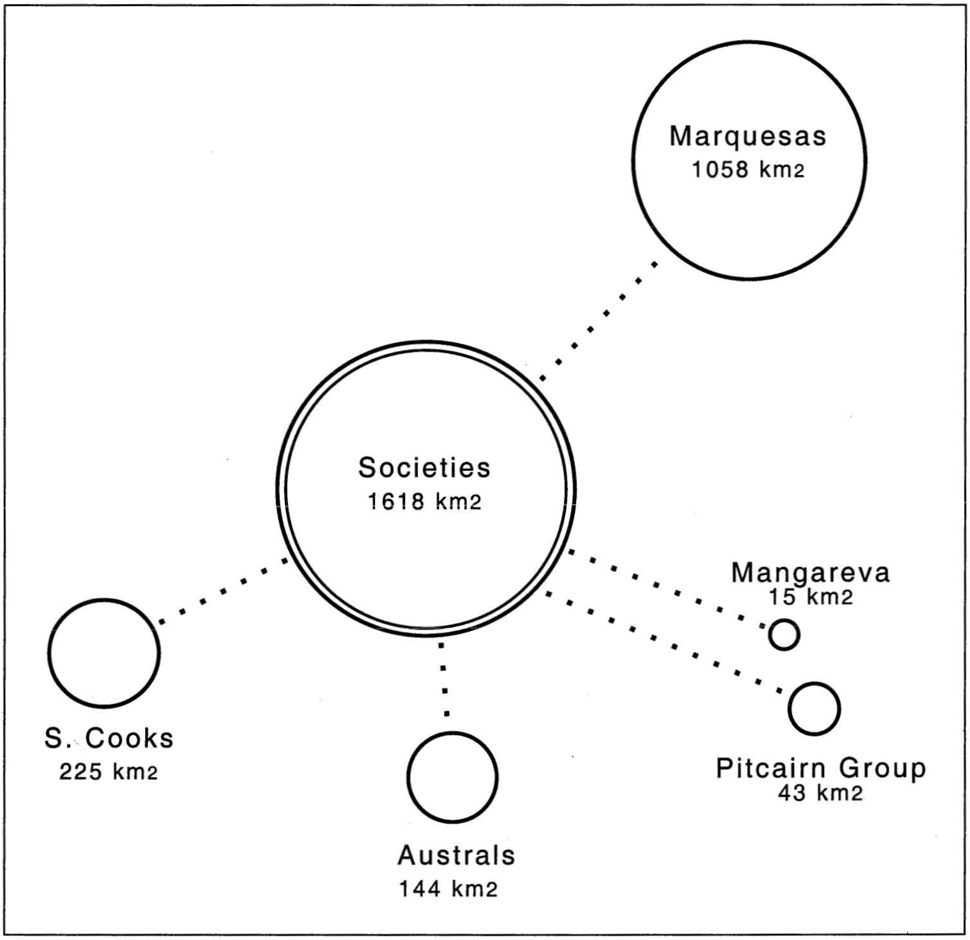

Fig. 2. Schematic view of the relative position and land area of the high islands in central East Polynesia. The Societies are uniquely important because of their central location and size.

Size comparison of the individual islands reveals a sharp contrast between the Societies and the surrounding archipelagoes. The Societies include two of the largest islands in the region, Tahiti (1042 km^2) and Raiatea (238 km^2), while no island in the Cooks is larger than 70 km^2, and none of the Austral Islands exceeds 49 km^2 in size. The contrast is equally striking if we consider the total land area for each archipelago; the Societies have a total area of 1618 km^2 compared with 225 km^2 for the Cooks and 144 km^2 for the Australs (Fig. 2).

This pattern reveals a regional imbalance in the distribution of terrestrial resources. It is significant because our knowledge of human impact on island environments suggests that the smallest islands often suffered the most rapid and acute consequences of human-induced environmental change. This implies that resource imbalances among islands likely increased through time, with smaller islands becoming comparatively more depleted than the larger ones. Records for central East Polynesia support this assumption. For example, in addition to Mangareva and Rapa, already cited, both Rurutu (32 km^2) and Tubuai (45 km^2) (Australs) were noticeably deforested by the time of European contact. Joseph Banks, naturalist on Cook's first voyage, wrote of Rurutu that: "The island to all appearance that we saw was more barren than any thing we have seen in these seas . . ." (Banks 1962:332). The missionary William Ellis (1829:381) described neighboring Tubuai as ". . . compact, hilly, and verdant; many of the hills appeared brown and sunburnt, while others were partially wooded." The canoes of Tubuai were rather small, as is illustrated by these comments from James Morrison, who sailed there aboard the Bounty after first visiting Tahiti: "Their Canoes are differently built from any of the other Islands which we have seen, and are from 30 to 40 ft long and Carry from 12–24 men. . . . They have no sailing Vessels and Never leave the land except they are blown off as all the Islands of which they have any account are at too great a distance for them to hold any intercourse . . ." (Morrison 1935:68). During the same period, the Societies were producing impressive fleets of double-hulled voyaging and war canoes, including vessels much larger than any known from the Australs or the Cooks. At Tahiti, Cook counted 330 double-hulled canoes on a single occasion (1961:385–386). His detailed measurements of one canoe under construction show that the twin hulls were each 108 ft long (1961:402).

While the Tahitian fleet can and should be viewed to reflect the richness of the resource base, even the Tahitian landscape showed signs of stress. Tahiti's high mountains create orographic rain from moisture in the trade winds, supporting lush vegetation in the island's interior and along the windward coast. But the leeward coast lies in the island's rain shadow and Cook noted that here: "The tops of most of the ridges and mountains are barren and as it were burnt up with the sun . . ." (1955:120). This description closely parallels William Wilson's notes on Mangareva: "The tops of the hills, to about half way down, are chiefly covered with sun-burnt grass; and in some places there are spots of reddish soil, as on the middle grounds of Otaheite" (1799:118). Both the grasslands and the exposures of red earth are telltale signs of human impact on dry ecosystems. They indicate histories of repeated burning and severe erosion caused by rainwash (Decker 1970:270; Kirch 1994:225–226; Rolett 1998:29, 32). Another visitor to Tahiti also noticed the fire-associated vegetation and eroded slopes, specifying that these were restricted to the leeward coast (Cuzent 1860:30–31). Unlike Tahiti, Mangareva is too low to produce orographic rain and the effects of fire and erosion reached to the island's summit.

Deforestation on Tahiti and other large islands in the Societies was limited partly because orographic rain and the size of the islands helped remnants of rainforest to survive in the mountainous interiors. Tahiti's fleets of canoes are proof that these forests provided quality timber but Morrison's journal indicates that wood was nevertheless in demand: "Water is plenty all over the Island but Wood for Fuel is not, as there are few other trees in the low land except the Breadfruit & Cocoa Nut, with which it is Covered; but evry tree has its owner, & must be either purchased or leave obtaind to Cut of the Natives" (1935:140).

Turning our focus now to the Southern Cooks, we find that these islands were also comparatively depleted in terrestrial resources by the time of European contact. Rarotonga and Rapa are the only islands among the Cooks and the Australs high enough to produce orographic rain. In the Cooks, while Rarotonga retained substantial forests (Gill 1876:11), the lower islands were badly deforested. Anthropogenic influence on Mangaia's terrestrial ecosystem is well documented by both palynological and archaeological studies (e.g., Kirch 1994:279–286; Kirch et al. 1992). The results show considerable time depth in processes that thoroughly reshaped Mangaia's vegetational landscape. Inaccessible areas of uplifted coral retained some forests but the island's interior was left largely denuded. Cook's party spotted eroding hillsides on both Mangaia and Atiu (Cook 1967:829, 842). Gill (1885:41) notes stands of dense forest on Atiu but he too was struck by "the hills of red clay, scantily covered with fern and guava bush."

TAHITI REVISITED

This basic environmental comparison among the Societies and surrounding archipelagoes emphasizes the uniqueness of Tahiti in terms of the unparalleled scale of its resource base. The comparison is also significant because of its implications for patterns of long-term change; it suggests that the depletion of terrestrial resources advanced more rapidly and to a further degree of deforestation in the Cooks and Australs than in Tahiti. While Tahiti is an order of magnitude larger than the other islands, the lower elevation of the Cooks and Australs is also an important contrast because island environments without orographic rain can be comparatively vulnerable to fire.

Environmental data presented here lend support to the hypothesis that internal developments in the Societies had a regional influence that extended to the Australs, the Southern Cooks, and the Tuamotus. One initial stimulus for this hypothesis was the idea that Polynesians on the smaller, more resource-depleted islands would have benefitted by obtaining timber and finished canoes from the Societies (Rolett 1998:257–262). There is no direct evidence for the inter-archipelago exchange of canoes in this region but Cook saw a well-organized shipyard on Raiatea, from which he believed canoes were exported to other islands within the Societies (Cook 1955:154).

The Societies are also unique in terms of their central location and their high degree of voyaging accessibility, as measured by variables including sailing distance and wind patterns (Irwin 1992:199, Figs. 79, 80). In a practical sense, this means that the Societies are well situated to have played the role of a regional hub in early interaction spheres. Irwin (1992:183) argues that this was likely the case, and that contact-period interaction linking the Tuamotus and Tahiti represented the surviving remnant of an early central East Polynesian voyaging sphere. If inhabitants of the Australs and Cooks were in regular communication with the Societies during a pre-A.D. 1450 period of heightened interaction, then canoes could have been exchanged among archipelagoes in the same way that Tongans are known to have obtained them from Fiji (Haddon and Hornell 1936:330).

The concept of the Societies as a regional hub in early interaction spheres assumes that changes affecting the Societies may have had an indirect influence on the outer islands. Later events illustrate the way that internal developments in the Societies might have influenced voyaging patterns in the outlying archipelagoes. At the time of Cook's voyages, Tahitian chiefdoms were at war with Mo'orea and there is evidence that sailing canoes normally used for local transportation and inter-island travel had been pressed into war service (Haddon and Hornell

1936:135). In the same way, earlier periods of heightened hostilities within the Societies could well have interrupted exports of timber and canoes, both because of increased local demand and because a shift of resources to war efforts would have decreased the number of outbound voyages from the Societies. If increasing local demand restricted the flow of timber and canoes from the Societies to outlying archipelagoes, and this coincided with the depletion of forest reserves on the smaller outlying islands, these developments could help explain the contraction of early central East Polynesian interaction spheres.

We return now to the Marquesas and the Pitcairn group. Could the declines in Marquesan and Pitcairn voyaging also have been linked to developments in the Societies? Although there is limited evidence for prehistoric post-colonization contact between the Marquesas and the Societies (Weisler 1998), the Marquesas are located around 1300 km from Tahiti and they clearly lie outside the well-defined region of mutual accessibility that centers on the Societies (Irwin 1992:199, Figs. 79, 80). Mangareva and the Pitcairn group are even more distant from Tahiti. It seems probable that changes in Marquesan and Pitcairn voyaging patterns would have been comparatively independent from internal developments in the Societies. As argued by Weisler (1997), the deforestation of Mangareva may have been a key stimulus for declines in voyaging between this island and the Pitcairn group. But deforestation could not have been an equally important factor in the Marquesas. Here the islands are comparatively large, most of them generate orographic rain, and the principal valleys were well forested even at the time of European contact (Stewart 1831:225, 227, 341). Instead, it appears that social factors were at the forefront. Ethnohistoric sources reveal that communication among separate Marquesan chiefdoms was highly constrained by intergroup hostility and the risks associated with venturing into enemy territory (e.g., Robarts 1974). Inter-chiefdom hostility accentuated the isolation of islands and even created barriers between neighboring valleys, producing marked regional differences in language and certain aspects of culture. Marquesan inter-island voyaging seems to have been primarily for amicable interaction and exchange. Thus if the archaeological evidence for inter-island movement of lithic resources is interpreted as amicable exchange, declining access to these resources suggests a breakdown in the exchange network, perhaps due to a shift toward hostile intergroup relations, beginning around A.D. 1450.

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ABSTRACT

The origins of East Polynesian culture are traced to a regional homeland that was centered on the Society Islands but which also included neighboring archipelagoes. Archaeological evidence suggests a fall-off through time in the frequency of open-sea voyaging within this homeland, with marked declines in voyaging and interaction after A.D. 1450. A range of social and environmental factors may have contributed to these declines. The regional distribution of terrestrial resources is significant because the smallest islands often suffered the most acute consequences of human-induced environmental change. Tahiti, in the Society Islands, is unique in terms of the unparalleled scale of its resource base and its high degree of voyaging accessibility. If Tahiti and the Societies played the role of a regional hub in early interaction spheres, developments in Tahiti may have influenced inhabitants of the outer archipelagoes. Specifically, if circumstances restricted the flow of timber and canoes from the Societies to outlying archipelagoes, and this coincided with the depletion of forest reserves on the smaller outlying islands, these developments could help explain the contraction of early central East Polynesian interaction spheres. It is likely that voyaging patterns in the Marquesas and the Pitcairn Islands, comparatively isolated archipelagoes, were little affected by internal developments in the Societies. KEYWORDS: East Polynesia, ancient voyaging, interaction spheres.