

# Expedition vessels of Isla de Cedros, Baja California

*Matthew Des Lauriers*  
*University of California, Riverside*

Isla Cedros is a large island located off the Pacific coast of central Baja California. While measuring only 35 km north-to-south and 16 km east-to-west, its principal peak reaches an elevation in excess of 1,300 m. This massive uplifted rock (Kilmer 1984) was known as Huamalgua by its native inhabitants, which translates as “Island of the Fogs” (Venegas 1979(4):392), an appellation that undoubtedly refers to the thick, persistent marine layer that often envelops the island in a shroud of cloud and mist.

The current name was given by the explorer Francisco de Ulloa, captain of an expedition sent by Hernan Cortez that departed Acapulco in 1539 to explore the Pacific Coast in search of “new lands” and the nonexistent “Strait of Anian” (known to the English as the Northwest Passage) (Montané-Martí 1995). From accounts of this expedition as well as writings of the eighteenth-century Jesuit Miguel Venegas (1979), we have remarkably contemporary descriptions of both the indigenous people of the island and their watercraft.

The Cedros Islanders (or Huamalgüeños) were fully adapted maritime (Yesner 1980), and aquatic (Ames 2002) hunter-gatherers, with a subsistence strategy capable of targeting the full suite of resources that their environment presented. This striking difference between the population of Isla Cedros and many of the groups occupying the mainland of the peninsula was hinted at by Homer Aschmann (1959), but has only recently benefited from the independent line of evidence provided by recent archaeological work on the island (Des Lauriers 2003). In terms of the marine resources, Isla Cedros, with its kelp forests, rich abalone fishery, clam beds and sea mammal rookeries, bears a striking resemblance to the Channel Islands of Alta California. In terms of its terrestrial resource base, definite differences are found, but since the focus here is on watercraft, these resources can be excluded from the present discussion, pausing only to note that economically valuable plants which provided a range of food, medicine, fibers and resins are and were abundant. Though markedly arid, the island and its plant communities also support populations of endemic pygmy mule deer (*Odocoileus hemionus cerrosensis*) and pygmy brush rabbit subspecies (*Sylvilagus bachmani cerrosensis*).

These islanders, with their larger populations and more restricted mobility, formed a special population of hunter-gatherers in central Baja California, otherwise characterized by low settlement densities and highly mobile groups (Alvarado 1999; Aschmann 1959; Casteel 1979; Moore 1999). Interestingly enough, these differences in economic focus and ethnohistorically reported differences in social organization (Montané-Martí 1995; Venegas 1979) did not socially, economically or ideologically separate the Cedros Islanders from the mainland populations (for a comparable case, see both Kirch 1986 and Scalise 1994). In fact, interaction continued on both economic and social levels, with both trade and intermarriage between island and mainland being specifically noted by the Jesuit missionaries (Venegas 1979(4):390). It was only the use of reliable watercraft that allowed such sustained, consistent interaction to take

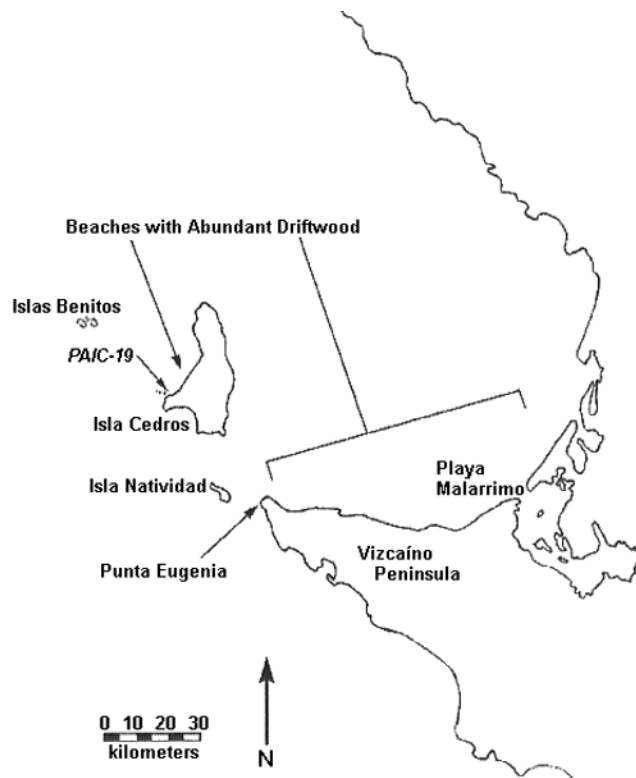


Figure 1. Isla Cedros and vicinity.

place. What were the capabilities of these previously underreported watercraft and what can we conclude about their general structural characteristics?

At a minimum, the Cedros canoes were obviously capable of making the trip from the island to the mainland and back, with rather infrequent loss of life and/or cargo. The crossing involved either a straight line path of 23 km between the nearest respective points (Punta Eugenia on the mainland and the southeastern corner of Isla Cedros), or a 15-km passage to Isla Natividad followed by a 7.5-km trip between Natividad and the mainland at Punta Eugenia (Figure 1). This voyage was not much greater than that completed by the Seri between the various Midriff Islands, but the Cedros canoes seem to have had a much greater crew capacity and stability than the balsas of the Sea of Cortez. Francisco Preciado, one of the crew members on Ulloa's 1540 voyage, described the Cedros Islanders as "coming to see us with a *canoas* and examine us six or seven at a time, which we marveled at, since we did not think that one *canoas* could hold so many" (Montané-Martí 1995:329; all translations are those of the author unless otherwise noted).

Despite their often-reported reliability and stability, the Cedros watercraft were probably not exceedingly swift vessels. Some indication of this is the 1732 description of an ad hoc vessel, constructed quickly on the beach by some Cedros boys and neophytes from the interior. This craft required "half a day" to cross between Punta Eugenia and Natividad (Venegas 1979(4):393, 405) and most of the daylight hours to cross between Natividad and Cedros (Venegas 1979(4):395). Vessels constructed with greater care, skill and time undoubtedly displayed better speed and handling. However, speed may not have been the most important concern, since powerful storms can make channel crossings dangerously impractical for up to several weeks at a time (Venegas 1979(4):405) and the winter storm season would probably not have been the ideal

scheduling for such a trip. However, during frequent quiet intervals or during seasons of relative calm, ferrying people and supplies across the channel in repeated trips over the course of a single week is reported in the historic documents (“*Ya estaban desde el día antecedente prevenidas en la playa las dos balsas; y assi, luego que llegaron, se embarcaron en ellas, los que commodamente cupieron. Llegaron con felicidad á la Isla de los Martyres [Isla Natividad]; y prosiguiendo el trasporte en los días siguientes, en una semana ya todos estaban en dicha Isla*”; Venegas 1979(4):405). Despite their lack of speed, these craft seem to have been more than capable of maintaining consistent social and economic ties between the island population and their mainland counterparts (see Kennett and Kennett 2000). The transportation of obsidian to the island has been documented (Des Lauriers 2003), and while definitive evidence remains to be identified, sea mammal skins and other items more easily procured or processed on the island are likely candidates for reciprocal trade items. Though much of the attention here has been on the transport of people and materials, the effectiveness of the Cedros watercraft as platforms for fishing and sea mammal hunting should not be entirely ignored:

half an hour after sunrise, five balsas that each carried one and two and three and four and five men, came out from the island and the part where it seemed that the people had gathered before and went out to sea, much further from land than we were, and they were fishing without any fear, or at least it would appear from their calm demeanor, until nine or ten o’clock, and they returned to their settlement.

*medio día despues del sol salido salieron de la ysla y de la parte a do parecia que se habia recojido la gente antes, cinco balças que llevaban a uno e a dos e a tres e a quatro e a cinco hombres dentro, y se meten en la mar bien mas dentro en ella que nosotros estabamos, y se estuvieron pescando sin ningun medio y sobresalto, segund por su reposo parecia, hasta las nueve o diez horas del día, e se recogieron a su asiento [Montané-Martí 1995:236].*

All of the historic observers similarly comment on the ability of the Cedros watercraft to remain stable in high seas that the crews of European rowboats were unwilling to face in their “more elaborate” craft (Montané-Martí 1995). These craft were obviously seaworthy, stable, capable of carrying a substantial number of crew, and quantity of cargo, while still remaining effective platforms for exploiting marine resources.

There seems to be an especially pronounced level of confusion among the chroniclers about whether the Cedros watercraft should more correctly be called canoes or balsas. In fact, in the facsimile copy of Venegas’ handwritten manuscript *Obras californianas* (Venegas 1979(4):394), Venegas actually wrote “*canoa*” first, then crossed it out and wrote in “*balza*.” On the next page of the account, he quoted a correspondence from the missionary Taraval: “The vessel had no sail, nor was it capable of carrying one, it had the appearance of both balsa and canoe, since it had the bottom of a boat and two planks as freeboard” (emphasis added; “*Vela no había, ni era capaz de ella la dicha balza, ô canoa: que ambos vissos tenía, por tener el fondo de barco, y dos tablas de bordo*”; Venegas 1979(4):395). Notwithstanding this semantic confusion, the descriptions that are available from these sixteenth- and eighteenth-century accounts are remarkable in their detail and directness. The descriptions of these craft by Ulloa and Preciado (Montané-Martí 1995; Wagner 1929) were first-hand accounts, while Venegas’s commentary was based on information related to him by Taraval, who sent neophytes from San Ignacio to the island in 1732.

All of the chroniclers are in agreement that the main body of the craft was formed from large driftwood logs of cedar or redwood, and that they were composite affairs, formed of a several segments and compound elements. (The word “redwood” is not used by the chroniclers, since they had not yet encountered these mighty trees. However, the modern presence of such logs, combined with other elements in the historic commentaries, leads the author to strongly infer the use of this wood alongside the specifically mentioned “cedar” and “pine.”) Preciado’s descriptions are nowhere near as complete or clear as Ulloa’s, though the crew member wrote, “The vessels or *canoas* that they have are some logs of large cedars, some of which are the thickness [?] of two men and three fathoms of width [?], and they have no cavity, but running quickly and all together they launch them to sea, and they are not well planed or smoothed” (“*Los bajeles o canoas que tenían éstos eran algunos leños de cedros grandes, algunos de ellos del grosor de dos hombres [width] y de tres brazas de anchura [length] y no tenían ninguna cavidad, sino que así tendidos, unidos, los botaban al mar y no estaban bien aplanados*”; Montané-Martí 1995:334).

It is from Preciado’s account that we receive some of the strongest, if not most clearly stated comments about the Cedros watercraft, including the following: “we were surprised [by the island] being so populated by these Indians and having so many *canoas* of wood, from what we could see, and not platforms or balsas, for so are called those that are made flat with canes” (emphasis added; “*nos asombramos ... por ser tan poblada por estos indios y tener tantas canoas que eran de madera por lo que podíamos ver y no plataformas o balsas, llamadas así por ellos aquellas que son todas de caña extendida*”; Montané-Martí 1995:329). Preciado explicitly stated that the Cedros watercraft were not tule balsas nor flat log rafts as suggested by Heizer and Massey (1953) and Durham (1960). If we turn to the account of the admirably professional Capitan Ulloa, we obtain a much more specific description of the structural characteristics of these craft:

They had five or six balsas that they used for fishing, of pine or cedar wood, as long as twelve or fifteen feet, and so big that one could hardly get one’s arms around them; they are cylindrical in the part that is beneath the water, and flat where those that go inside sit, without any hollowed part; they carry on either side, so that they have support, several (curved/hooked bundles) of cedar poles, many and very well bound each to the others, and as long as the same canoas; they row them with some poles as long as two or three hand spans [~ 9 in.], and as fat as three fingers, with a triangular, three-pointed blade at the end of each one of them, of this figure that measures from point to point five or six fingers.

*Tenian cinco o seis balças de que servian en sus pesquerias, de maderos de pino e de cedro, tan largas como doze o quinze pies, y tan gordas que apenas se podian abarcar con un abraço; son rollizas lo que andan en el agua, e llanas a do se ponen los que andan dentro, sin ninguna cosa güeca; traenlas a cada lado, para que tengan sosten, unos ganchos de palillos de cedros, muchos y muy bien atados unos con otros, e tan largos como las mismas canoas; remabanlas con unos palillos tan largos como dos o tres palmos, e tan gordos como tres dedos, e con una palilla a cabo de cada uno de ellos con tres picos y en triangulo, desta figura que ternan de pico a pico cinco o seis dedos [Montané-Martí 1995:238-239].*

(Translation note: “*atado*”, translated above as “bound,” can also mean “bundle.” Also, a “*palm*,” translated above as “hand span” is a unit of measurement defined by the distance

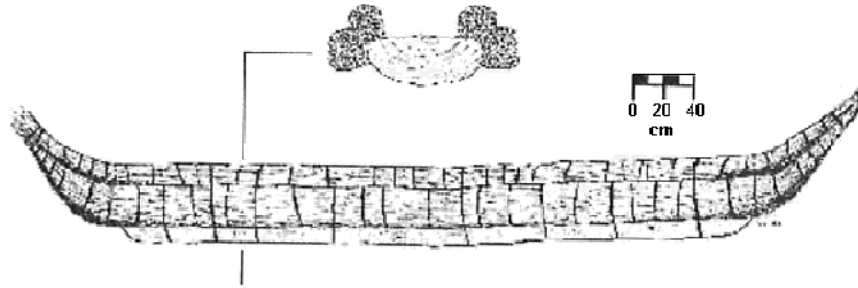


Figure 2. Artist's reconstruction of a Cedro watercraft.

between the outstretched thumb and little fingers. It averages about 9 in., or around 23 cm.)

The Cedros watercraft, from the above passages and others, seem to have been craft resembling the following amalgamated description and artist's reconstruction (Figure 2). The "foundation" of the craft was a large central element made from a large cedar or redwood driftwood log split roughly in half longitudinally. This element was then smoothed and regularized, with knots or branches chopped or chiseled down to make the exterior surface of the log more symmetrical and even. This roughed-out piece was then thinned somewhat, mostly through working the split surface of the log. Once the central element was finished, bundles of poles, flexible staves, or branches were formed and laid alongside the central element. These bundles were as long as the canoe itself and were bent to match the outer margin of the craft. They would almost certainly have been affixed to the central element primarily by agave fiber cordage, due to an intense use of this plant throughout indigenous Baja California, and specific reference to its importance on Cedros in Taraval's account (Venegas 1979(4):397). The exact number of bundles or their precise size is unclear from the documents, but what is clear is that they were very well lashed to each other and to the central element or hull. These bundles provided both stabilization of the hull as well as gunwales of a sort, as evidenced by Taraval's (Venegas 1979(4):395) comment regarding the "freeboard" of these craft. These gunwales ran alongside the central hull and were likely curved upward, at least at the front end. In this they would have resembled most craft launched through surf, whose upcurved prows allow them to ride up and over breakers and swell, while providing a certain amount of shielding from spray and swamping.

The rounded bottom of the craft would actually have improved its "seaworthiness," since the large and heavy central element would have resulted in a very low center of gravity, requiring no ballasting and displaying a very strong tendency to return to and/or remain in a level position. In this the Cedros craft recall the Haida and Coast Salish canoes, which had rounded bottoms and were extremely stable and seaworthy (Durham 1960:46, 53; Holm 1994:260-261; Rousselot 1994:246). The lack of a dugout cavity in the split log forming the central hull would have all but eliminated the potential for swamping, since the buoyancy of this primary element would not be adversely affected by small amounts of water inside the craft. In any case, it is likely that any water which did enter the interior of the craft would have soon percolated out through the bundle elements forming the gunwales.

These watercraft, while sharing functional capacities as platforms for the exploitation of marine resources and the effective and reliable transport of people and materials, are morphologically distinct from other watercraft documented for the Pacific coast of North America. The Isla Cedros watercraft demonstrate both the existence and the seaworthiness of a watercraft type other than those more frequently cited in the literature. The reconstruction



Figure 3. Cedar log from watercraft found on Isla Cedros.

presented above is bolstered by an unusual archaeological find on Isla Cedros, which likely is one of the central hull elements from an indigenous watercraft (Figure 3).

### **Archaeological example**

In July 2002, on the west coast of Isla Cedros, a large worked piece of cedar was found eroding out of a midden deposit cut through by narrow gullies (Des Lauriers 2003). One surface of this log was extensively worked by rough chopping and chiseling, with no saw, nail or hammer marks. It is parallel-sided, with the natural grain of the wood running the full length of the piece. The natural rings of the log are invaded by the rough work on the dorsal surface, with the lateral margins produced by splitting the wood across the rings but parallel to the overall grain of the piece. Certain portions of the log display linear crushing where cord or line was once in very tight contact, particularly along the lateral and ventral surfaces. The underside is rounded, with slight working present only at locations that presented an irregular surface. The ends of the log are somewhat eroded, but at least one end seems to have been rounded and slightly thinned in relation to the rest of the mass. Overall it is 3.16 m long, and 0.5 m wide; which is slightly smaller than the boats described by Ulloa above. It averages 22 cm thick, though the underside at one end of the piece is less extensively worked, and measures 28 cm thick.

Radiocarbon analysis of the wood at the AMS laboratory at the University of California,

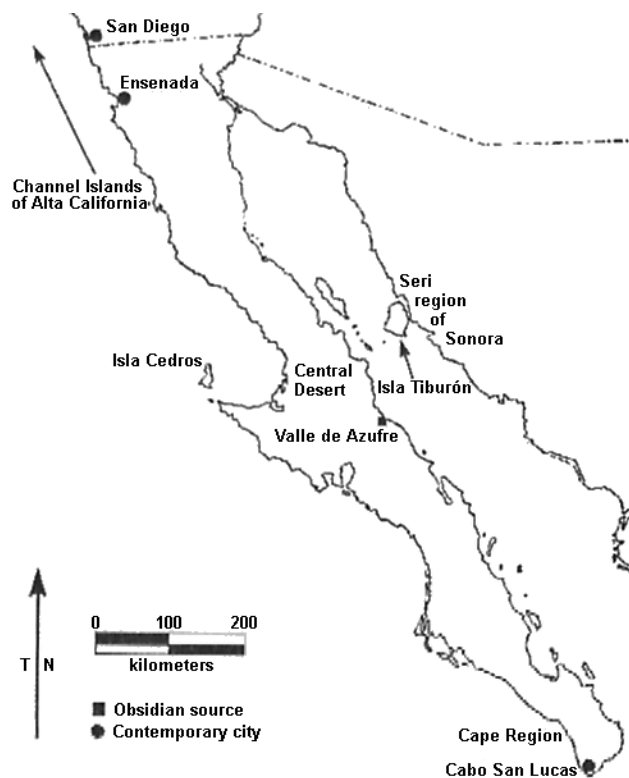


Figure 4. Wider context of Isla Cedros.

Irvine returned results of  $205 \pm 20$  radiocarbon years before present (~1725-1765 C.E.). This result indicates a very late date for this artifact, since the last islanders were removed to Mission San Ignacio on the peninsular mainland in 1732. Whether this artifact represents a remnant central element of a complete Cedros watercraft or an unfinished piece that was intended to become part of such a boat, the chronological placement at the very end of the indigenous occupation of the island allows both as valid suggestions.

## Discussion

The Huamalgüeño watercraft may represent a form of composite watercraft morphologically intermediate between the almost ubiquitous tule bundle balsa and the more elaborate, labor-intensive composite canoes such as the *tomol* and the *dalca*. Cedros Island in particular, and insular contexts all along the greater California Bight, lack both large stands of tule and living trees of a size suitable for the manufacture of dugouts. The one buoyant material that is available, and in vast quantities, for the Isla Cedros-Malarrimo-Punta Eugenia zone is driftwood. Brine-soaked and naturally seasoned logs of redwood and cedar are common along north- and northwest-facing beaches in this area (see Figure 4). Isla Cedros and the Alta California islands share this basic raw material for the construction of watercraft, as well as a set of functional requirements, with large fish, sea bird rookeries, pinnipeds, and small delphinids exploited by means of watercraft in both areas (Des Lauriers 2003; Erlandson 1994; Porcasi and Fujita 2000; Raab and Larson 1997; Raab et al. 1995). What the indigenous populations of Isla Cedros lacked in comparison to their northern counterparts was access to tar or asphaltum. Without this material, the manufacture of a *tomol* is not possible. It may be the lack of this

material that resulted in the different configuration of the Cedros watercraft, since a remarkable passage from Venegas's manuscript, again quoting correspondence from Taraval, demonstrates that the Cedros Islanders had almost certainly seen *tomols* first hand.

But those of the other islands [to the north] in the diversity, as well as in the ingeniousness of their manufacturing, reveal their ability and their more cultivated skill. The same is manifested in their balzas, which have no comparison with the rest of Californias [in the 1730s this meant the southern two-thirds of Baja California], nor even with those of [Isla Cedros]. These balzas, that they [neophytes from San Ignacio Mission] found washed up on the coast and on the second island [Isla Cedros], are formed of very flat, long planks, very smooth and planed. They are so well united and joined together, and caulked with a tar so tough that it seems the convex of a ship. They substitute for the nails a kind of twine so thin, that it causes admiration to see, they assure me of its being of a quite thin type: well, together with the tar, it joins the planks in such a manner that they seem like inlay work. From all this it is inferred, not only that there are inhabitants on these islands [to the north], but also that they are very industrious, and capable in their works

*Pero los de las otras Islas (to the north) assi en la diversidad, como en lo ingenioso de su fabrica, descubren su habilidad, y su ingenio mas cultivado. Esto mismo se manifesta en sus balzas ; las quales no tienen comparacion con las mejores de Californias, ni aun con las de la Isla de la Trinidad. Son las dichas balzas, que encontraron varadas en la costa, y en la segunda Isla, formadas de unas tablas mui parejas, y largas, mui lisas y acepilladas. Estan tan bien unidas, y travadas entre si, y calafateadas con un betun tan tenaz, que parece el convexo de una nave. Substituye por los clavos un genero de bramante tan delgado, que causa admiracion veer, lo que aseguran, siendo el genero tan delgado: pues juntamente con el betún une las tablas de manera, que parecen embutidas. De todo lo dicho se infiere, no solo, que hai habitadores en dichas Islas; sino que son ellos mui industriosos, y hábiles en sus obras [Venegas 1979(4):402].*

This account dates to about 1732 and is a very clear description of a southern Alta California planked canoe well over 400 mi. (640 km) beyond its most southerly known distribution. The native people themselves recognized both the canoes and other wooden items such as paddles, bows, arrows, harpoon shafts, etc., as being of a style and manufacture different from theirs (Venegas 1979(4):401). Finally, it is noteworthy that even from an obviously accurate and clear description of the *tomol*, Venegas still chose to use the word “balzas” to refer to craft that we would absolutely refer to as “canoes.”

### **The social dimensions of Cedros watercraft**

There are tantalizing suggestions in the ethnohistoric records that some level of social hierarchy existed on Isla Cedros and that it was at least occasionally expressed through the use of watercraft. In many ranked societies, individuals of higher status are often provided with transportation, be it on litters, drawn in carriages, or in an automobile driven by a chauffeur. On Cedros, Ulloa observed at least one instance of such deferential transport: “in the boat that the four men came in, there came one man older than the others, and he did not paddle, but rather



was given all the things that we gave to the other men; it seemed to us that he must be something more than the others” [emphasis added; “*en la barca que venian los quatro hombres venia uno de mas edad que los otros, e no remaba, sino antes les mandaban lo que les dabamos; parezieron que debia ser mas cosa que los otros*”; Montané-Martí 1995:240].

Other suggestions of a social hierarchy are found in Taraval’s description of Isla Cedros customs and traditions (Venegas 1979(4):407-409), though only in Ulloa’s account (Montané-Martí 1995) do we have clear indications of the direct incorporation of watercraft into the expressions of status differentiation. It should be clearly stated that many of the descriptions of the use of these watercraft do not highlight any distinction between crew members. Especially in the descriptions of their use for fishing, crew members are counted but no ranking is inferred. Therefore, it seems that the context of the activities and purpose behind the use of the craft determined whether the crew would include an individual acting in the capacity of a non-paddling passenger. This line of evidence is not sufficient to infer the presence on Isla Cedros of full-time nonproducing elites, though other discussions in Venegas’s manuscript (1979) may support this notion.

## Conclusions

Beyond the variance in manufacturing and specific morphology, the Cedros Island watercraft fulfilled many of the same roles as the southern Alta California plank canoes. Perhaps most significant was the necessity of cross-channel travel in both regions, which was accomplished by the Cedros Islanders with regular frequency. From ethnohistoric accounts, it is clear that though this contact was geographically constricted, it still played a significant role in the social life of Cedros Islanders. Ethnohistoric accounts indicate “commerce and kinship” with neighboring mainland groups of the Vizcaíno Peninsula, as well as describing the presence of “families of islanders” at the rancheria at Punta Eugenia (Venegas 1979(4):390). In addition, news from the peninsula seems to have reached Isla Cedros with great speed, which is consistent with regular contacts and kin-reinforced social ties between the island and the mainland. Such cooperative interaction combined with competition over limited resources is suggested by Kennett and Kennett (2000) to have been central in the development of social complexity in southern Alta California between A.D. 500 and 1100.

For the moment, archaeological evidence of such dynamic interaction on Isla Cedros remains less extensive, though work is underway to remedy this lacuna. What is known already however, is that obsidian is not local to Isla Cedros, and yet many hundreds of obsidian artifacts and small flakes have been observed on dozens of sites on Isla Cedros. In fact, 27 samples of obsidian from 14 different island sites were analyzed at UC Berkeley by Dr. Steven Shackley, and all 27 were sourced to the Valle de Azufre source south of San Ignacio on the Gulf of California coast of the peninsula (see Figure 4). The exact nature of the exchange involving the transport of mainland obsidian to the island remains poorly understood, though some initial observations are possible. First of all, the broad distribution of the material in later-period sites across the island and its moderately light but consistent frequency are probably indicative of a regular exchange of the material, rather than rare-event arrival of an exotic, unfamiliar item. Secondly, even if the exchange occurred as part of the maintenance of kin and social relations (Blackburn 1976; King 1976; Malinowski 1922; Mauss 1950), some reciprocal gifts would have been expected, though the precise contribution(s) of the Cedros Islanders to the transaction is still unknown.

Isla Cedros is technically only 23 km from the mainland, but those 23 km are measured from the tip of a single narrow finger of land pointing towards Isla Cedros (see Figure 1). If navigational errors or uncorrected current drift force a watercraft off course by even a relatively small amount on either an outbound or homeward-bound trip, land may be a long way off and coasting to a final destination not an option. It was metaphorically a narrow road that these navigators had to run, since currents in the channel are tricky and fog so common in the area that the native name for Isla Cedros was Huamalgua, Island of the Fogs. From these circumstantial points, it is fairly certain that the Cedros watercraft, in addition to having great stability and utility in fishing and marine hunting, were seaworthy craft, capable of crossing the channel with good navigational precision and assurance of a safe arrival.

The goal of this discussion has been to demonstrate that there was more than one form of watercraft along the Pacific Coast of the Californias that would have been capable of performing roundtrip channel crossings and all of the other roles that watercraft play in aquatic (maritime) hunter-gatherers' daily lives. Another goal has been to suggest that as incredibly useful as ethnohistoric and ethnographic data can be to our attempts at interpretation, to begin understanding variability, we must expand our perspectives outside the culture areas and modern political borders that have bounded our research. Only when we can place our data within the context of a range of variation and explain the factors underlying such diversity will our explanations, be they ecological, social or ideological, achieve integration and relevance beyond their particularistic origins. In the specific case dealt with here, it is claimed that the artificial division between Alta and Baja California has resulted in the exclusion of relevant and valuable data for understanding the lives and material culture of maritime, insular hunter-gatherers of Pacific North America. Finally, it has been the intent of this discourse to establish Baja California as both a geographic space and an arena of research that has an abundance of resources and enormous potential for enlightening both the archaeology of California as well as our understanding of hunter-gatherers in general.

## References cited

Alvarado Bravo, Alfonso

1999 *Arqueología en Baja California: estudio de patrón de asentamiento de cazadores-recolectores-pescadores en el arroyo San José de Gracia, Sierra de Guadalupe (Baja California Sur, México)*, Páginas Mesoamericanas 1, Ediciones Euroamericanas, México.

Ames, Kenneth M.

2002 "Going by boat: the forager-collector continuum at sea", in *Beyond foraging and collecting: evolutionary change in hunter-gatherer settlement systems*, Ben Fitzhugh and Junko Habu, eds., pp. 19-52, Kluwer Academic, New York.

Aschmann, Homer

1959 *The central desert of Baja California: demography and ecology*, Iberoamericana 42, University of California, Berkeley.

Blackburn, Thomas

1976 "Ceremonial integration and social interaction in aboriginal California", in *Native Californians: a theoretical retrospective*, Lowell John Bean and Thomas C. Blackburn, eds., pp. 225-244, Ballena Press, Ramona, California.

- Casteel, Richard W.  
 1979 "Human population estimates for hunting and gathering groups based upon net primary production data: examples from the Central Desert of Baja California", *Journal of Anthropological Research* 35:85-92.
- Des Lauriers, Matthew R.  
 2003 *Informe: Proyecto Arqueológico Isla de Cedros (fase I)*, Instituto Nacional de Antropología e Historia, Mexico City.
- Durham, Bill  
 1960 *Canoes and kayaks of western America*, Copper Canoe Press, Seattle, Washington.
- Erlandson, Jon M.  
 1994 *Early hunter-gatherers of the California coast*, Plenum, New York.
- Heizer, Robert F. and William C. Massey  
 1953 "Aboriginal navigation of the coasts of upper and Baja California", *Bulletin of the Bureau of American Ethnology* 151:285-312.
- Holm, Bill  
 1994 "Canoes of the Northwest Coast", in *Anthropology of the north Pacific rim*, William W. Fitzhugh and Valérie Chaussonnet, eds., pp. 259-264, Smithsonian Institution Press, Washington, D.C.
- Kennett, Douglas J. and James P. Kennett  
 2000 "Competitive and cooperative responses to climatic instability in coastal southern California", *American Antiquity* 65:379-395.
- Kilmer, Frank H.  
 1984 *Geology of Cedros Island, Baja California, Mexico*, thesis, California State University, Humboldt.
- King, Chester  
 1976 "Chumash inter-village economic exchange", in *Native Californians: a theoretical retrospective*, Lowell John Bean and Thomas C. Blackburn, eds., pp. 289-318, Ballena Press, Ramona, California.
- Kirch, Patrick V.  
 1986 *Island societies: archaeological approaches to evolution and transformation*, Cambridge University Press.
- Malinowski, Bronislaw  
 1922 *Argonauts of the western Pacific: an account of native enterprise and adventure in the archipelagoes of Melanesian New Guinea*, G. Routledge & Sons, London.
- Mauss, Marcel  
 1950 *Essai sur la don*, Presses Universitaires de France, Paris.
- Montané-Martí, Julio C.  
 1995 *Francisco de Ulloa: explorador de ilusiones*, Universidad de Sonora, Hermosillo.
- Moore, Jerry D.  
 1999 "Archaeology in the forgotten peninsula: prehistoric settlement and subsistence strategies in northern Baja California", *Journal of California and Great Basin Anthropology* 21:17-44.
- Porcasi, Judith F. and Harumi Fujita  
 2000 "The dolphin hunters: a specialized prehistoric maritime adaptation in the southern California Channel Islands and Baja California", *American Antiquity* 65:543-566.

- Raab, L. Mark, Katherine Bradford, Judith F. Porcasi and William J. Howard  
1995 "Return to Little Harbor, Santa Catalina Island, California: a critique of the marine paleotemperature model", *American Antiquity* 60:287-308.
- Raab, L. Mark and Daniel O. Larson  
1997 "Medieval Climatic Anomaly and punctuated cultural evolution in coastal southern California", *American Antiquity* 62:319-336.
- Rousselot, Jean-Loup  
1994 "Watercraft in the north Pacific: a comparative view", in *Anthropology of the north Pacific rim*, William W. Fitzhugh and Valérie Chaussonnet, eds., pp. 243-258, Smithsonian Institution Press, Washington, D.C.
- Venegas, Miguel  
1979 *Obras californianas del padre Miguel Venegas, S.J.*, W. Michael Mathes, Vivian C. Fisher y Eligio Moisés Coronado, eds., 5 vols., Universidad Autónoma de Baja California Sur, La Paz.
- Wagner, Henry R.  
1929 *Spanish voyages to the northwest coast of America in the sixteenth century*, California Historical Society, San Francisco.
- Yesner, David R.  
1980 "Maritime hunter-gatherers: ecology and prehistory", *Current Anthropology* 21:727-750.