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BETWEEN FIRE AND ICE: 5.000 KILOMETERS OF MARINE ADAPTATION BY CHILEAN COASTAL NOMADS

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RESUMEN

En Chile, la estrechez de la precordillera andina ha determinado una predisposición hacia adaptaciones culturales marítimas en épocas prehistóricas. La mayor parte de las investigaciones se han centrado en el desierto del norte, donde existen condiciones óptimas para la preservación. En contraste, los sitios costeros del centro y del sur de Chile han recibido escasa atención o no se ha diseñado estrategia de investigación alguna para cuantificar la influencia marina. Sin embargo, surge un claro panorama de nomadismo de grupos costeros específicos (changos por el norte, fueguinos por el sur).

Las técnicas de explotación de los recursos marítimos no cambian de manera radical a lo largo de esta área de estudio, y las especies utilizadas son prácticamente las mismas en todas partes (mejillones, erizos, lobos de mar).

Aun no se conoce a ciencia cierta el grado en el cual se desarrollaron los patrones de complementaridad e interacción entre los grupos de la costa y del interior.

Chile's unusual topography alone is sufficient to suggest it created a strong attraction toward prehistoric maritime adaptation from northern desert to southern fiordland. Along the entire length of Chile it is only a short distance (max. 160 km.) from the highest Andean peaks, down through chaotic foothills, to ramparts of rockbound coastline. In the far north there are extensive dried lake beds of evaporites separating the Andes from precipitous cliffs of the Coastal Range. This is the famous Atacama Desert, barren beyond belief, apparently lifeless, and blasted by the most intense sunshine found anywhere on earth.

Central Chile changes abruptly from heavily glaciated alps to a brief steppeland before steep headlands plunge into the sea. Below 42º S latitude, the crest of the Andes is lowered together with the snowline and we find a rainy, dismal environment where active glaciers still reach the sea. In spite of these severe conditions, aboriginal exploitation of the increasingly rich marine resources continued uninterrupted southward to the maze of fiords in Magallanes and Tierra del Fuego.

To facilitate this survey of the status of research along such an extensive coast, I have divided Chile into three major environmental zones: (1) The Desert North, (2) Central Forests, and (3) The Boreal South. In each zone there were distinct problems faced by the prehistoric inhabitants and their response was varied. We can also detect certain unifying themes, among which, nomadism is outstanding.

The Desert North

Rarely do we find Nature so parsimonious in terrestrial resources as in the example of northern Chile. But in sharp contrast, the marine environment offers an abundance of food sources readily available on a year around basis. For the small bands of Paleo-Indians who first ventured into the desolation of the Atacama, this narrow coastal corridor was attractive, and perhaps their most practical alternative subsistence base, once the Andean megafauna became extinct. For many hundreds of kilometers along the shore they found not a single tree, and scarcely a shrub or blade of grass. Their first exploratory wanderings must have been extremely cautious, circumscribed as they were by the constant threat of dehydration. In spite of these conditions, Early Man spread slowly down the coastline, camping on very narrow marine terraces formed at the base of coastal cliffs where it was possible to find an occasional seep of fossil ground water (Nuñez and Varela, 1967-8;

Craig, 1982). We also assume they frequented the mouths of the Azapa, Camarones and Loa rivers where they crossed the desert and reached the sea (Fig. 1). These deeply incised gorges were the sallyports for prehistoric coastal exploration. However, only one Paleo-Indian coastal site has been found so far where faunal remains include locally extinct fishes (Llagostera, 1979a; 1979b). Although no lithic material other than the curious "geometric stones" (Fig. 2) have been found associated with the Quebrada Las Conchas site, radiocarbon dating suggests the inhabitants were already in transition from specialized hunters to a more generalized subsistence pattern.

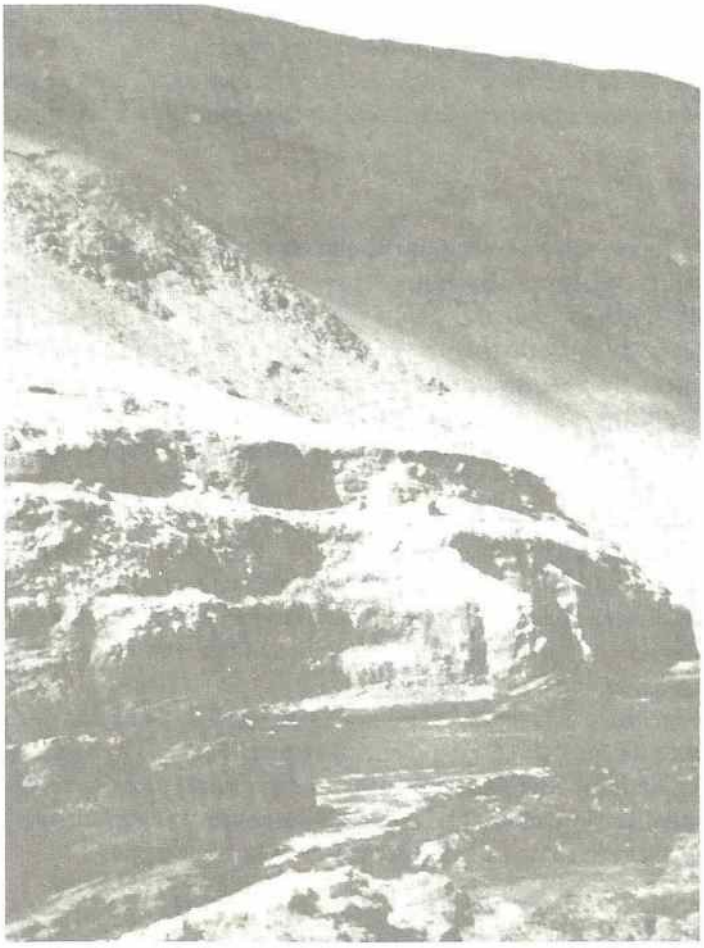

Fig. 1. Marine sediments and terraces at the mouth of Quebrada Camarones (Lat. 19º 10' S). Photograph by R. Lagos A.

By comparison, the coastal desert of Peru was a veritable Garden of Eden with numerous, relatively well-watered rivers reaching the sea at intervals of about 40-50 kms. These river mouths were the avenues for cultural advance from earlier maritime foundations (Moseley, 1975) to an agriculturally supported high civilization. Hyperaridity of the Atacama never permitted this transition to take place in Chile. Instead, the Desert North became the stage for experiments in maritime cultural adaptations that soon evolved into a high degree of dependence upon the sea.

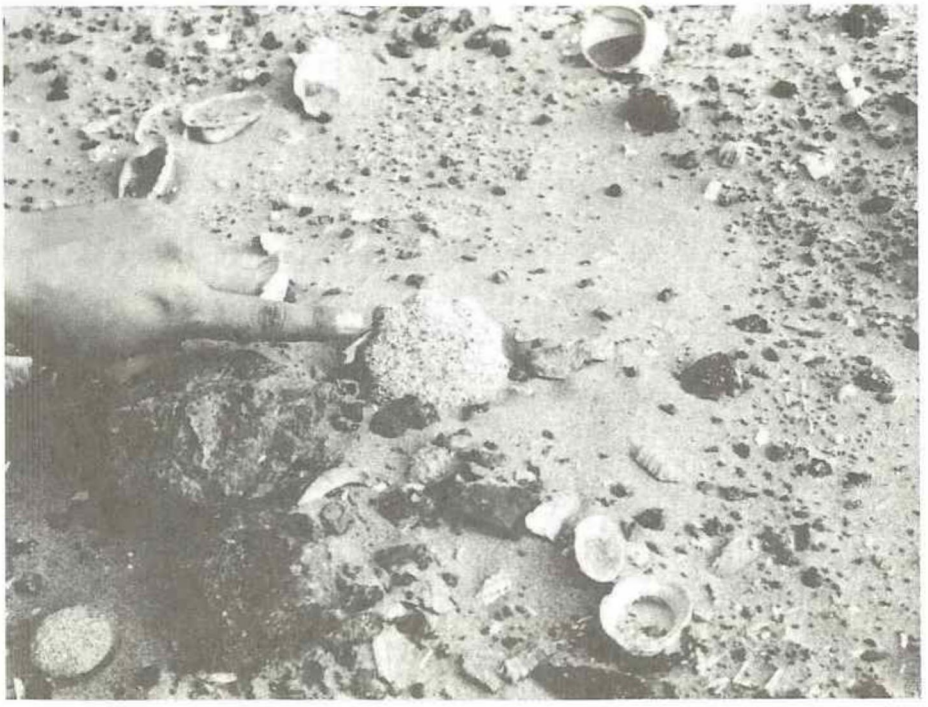

Fig. 2. Scalloped "geometric stone" of soft sandstone in situ at Paleo-Indian coastal site of Quebrada Las Conchas (Lat. 23º 30' S).

The pioneer work on Chilean prehistory was first published by Jose Toribio Medina (Toribio Medina, 1950) in 1882 when the author was 30 years old. At that time the recently captured province of Tarapacá was not yet fully incorporated into the Republic and Toribio Medina felt "El Norte Grande estaba fuera del foco de... preocupación científica". However, there were notices of the mysterious *Changos* or *Camanchacas* who were clearly the most thoroughly sea-oriented of all northern Chilean aborigines. Recently this group has become a major research interest of Bittmann (1981, 1980, 1977, 1976) whose excavations at Cobija (Fig. 3) have revealed an astonishingly long time spread of sequent occupance at this important coastal site.

Fortunately, D.L. True (1975) has provided an excellent overall inventory of maritime adaptation as found by investigators working in northern Chile prior to about 1971. For this area it only remains to update his summary and speak to certain points that perhaps were not so clear at that time, particularly details of food gathering.

Shoreline Ecology

For more than 10,000 years a single mollusk has dominated the aboriginal marine food spectrum of coastal Chile and continues to this day as a near-staple in Chilean diet. The "loco" (*Concholepus concholepus*), closely related to the genus *Murex*, but by convergent evolution, superficially similar to the abalones in appearance, constitutes the bulk of may northern shellmounds. It is found intertidally out to 8 fathoms wherever rocky substrates occur. Today only the adhesive foot muscle is eaten but the entire animal may have been consumed in the past. Chilean specimens (Fig. 4) grow much larger than those found in central Peru. Regardless of size, only a simple prying tool is needed to dislodge these

Fig. 3. Excavation by Prof. B. Bittmann at the Cobija midden (Lat. 22º 30' S).

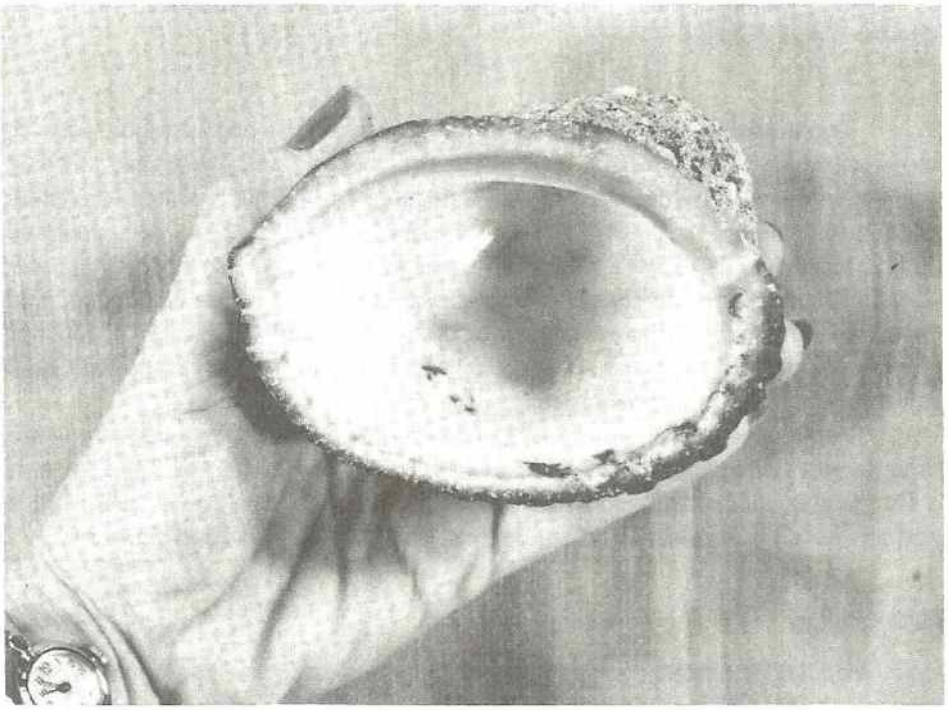

Fig. 4. Typical specimen of the Chilean "loco" (**Concholepus concholepus**).

shellfish. As a result, it is present in hundreds of shellmounds scattered along the northern coastline. These shells represent a ubiquitous paleoenvironmental indicator and important research opportunity using techniques already applied to similar species.

Almost equally important as an abundant food item were the mussels that were simply plucked from clusters exposed on rocks by the tide. The largest of these mussels is the giant "choro zapato" (*Choromytilis chorus*), formerly widespread if not abundant, and available intertidally. Today it has been severly overfished to the point of extermination in the northern part of its range, but specimens are often found in the earlier shellmounds. The choro zapato valve formed the raw material for shell fischhooks used as a basis for Bird's (1946) earliest cultural classification. Familiarity with this eminently edible mussel was carried southward by groups ancestral to canoe Indians and Fuegians. There it became the principal constituent of even more extensive shellmounds that remain virtually unstudied.

Seasonal Pacific storms generate oceanic swells that lash the coast of northern Chile. During these "bravezas" (Araya, 1980) waves cast up on pocket beaches large quantities of "machas" (*Mesodesma donacium*) and "ostiones" (*Chlamys purpurata*). These surf clams and scallops were easily added to the inventory of aboriginal beachcombers. Wading and shallow diving in selected localities gave them access to entire banks of these seasonally abundant seafoods. But excavations in Cobija show many other shellfish were gathered and eaten. No special skills were needed to collect "erizos" (*Loxechinus albus*), "lapas" (*Fissurella* sp.), "picorocos" (*Balanus* sp.), or "piures" (*Pyura prepucialis*), remains of which occur in varying amounts in almost all coastal shellmounds in accordance with local changes in habitat.

Although the entire panoply of prehistoric shellfish resources could be collected with minimal skills and without specialized tools of any kind (Craig, in press), just the opposite is true for marine birds and mammals that were from the beginning a key component of maritime subsistence. For the capture of these animals, specialized hunting tools skillfully applied were essential and we see the eventual evolution of elaborate composite harpoons for which the target species was the sea lion (*Otaria* sp.). The best illustrations of these manifestations of maritime adaptations are found in Bird (1945) as result of his work at Playa Chinchorro, Quiani, Playa de los Gringos, and Punta Pichalo.

Nomadism in the North

Since the report by True (1975) considerable work has been done on coastal and riparian sites by Chilean investigators concerned with problems of incipient agriculture, sedentism, and most recently, vertical complementarity (Niemeyer and Schiappacasse, 1977; Muñoz, 1980, 1981; Focacci, 1974, 1980; Erices, 1974; Núñez, 1971, 1974; Muñoz and Chacama, 1981; Dauelsberg, 1974; Núñez and Zlatar, 1978; Larrain, 1974; Bittmann, 1981). They have long recognized that major quebradas crossing the Atacama were natural corridors for exchange between groups living along the coast and inland agro-pastoralists living at altitudes where significant precipitation occurs. Every coastal habitation site shows some evidence of access to vegetative products in quantities and diversities not likely to have been obtained locally. Guanaco remains and, later, those of domesticated camelids are commonly found in coastal sites, especially in the lower Azapa Valley where there is strong evidence for protohistoric commerce with the altiplano.

Seasonal vertical transhumance between Coast and Highland has not yet been clearly demostrated for any period in Chilean prehistory although it can be demonstrated as a contemporary strategy in southern Peru (Masuda, 1981) that has antecedentes in the colonial era (Pease, 1981). Some form of transhumance was almost certainly practiced by

Chilean aborigines prior to 3,500 B.C. when middens containing shell fishhooks and other fishing gear indicate specialization and semi-sedentary occupation ocurred.

What has become clear from recent investigations (Bittmann, 1980; Craig, 1981) is the former existence of a *horizontal nomadism* along the shoreline between widely separated coastal oases where dependable water supplies existed (e.g. Quiani, Punta Pichalo, Cobija, Taltal). Hundreds of temporary rock shelters in sea caves, tafoni, and simple outcrops, show fishermen and shellfish gatherers wandered the shore considerable distances from permanent settlements. In addition, we know from various ethnohistoric studies that this nomadic lifestyle was maintained well into the historic period by the Changos who frequented sectors of the coast where fish (especially the "congrio" (*Genypterus chilensis*) were seasonally abundant.

Central Forests

Most of central Chile today has been deforested and the impression traveling southward is that of an imperceptible change from absolute desert, to steppeland, and finally a chaparral or mediterranean type of vegetation. Native forests are patchy at best until the southern lake district is reached. The contemporary vegetation of central Chile is to some extent a cultural artifact created by thousands of years of aboriginal fire drives and hundreds of years of Spanish livestock grazing. As in the Mediterranean example, goats have been especially destructive.

Consequently, we are mistaken if we project our impressions of pastoral nomadism as a lifestyle into the prehistory of this area. In the northern half, the Diaguita culture originated and flourished (ca. 1400) on an agricultural foundation, having little need to exploit marine resources. Nevertheless, they were not without contact with coastal groups of fisherman and shellfish gatherers (proto-Changos ?). Results of studies from this important sector have been published in a long-standing series of bulletins produced by the regional museums at La Serena and Copiapo.

Santiago remains the primary center for scientific research in Chile but comparatively little is known of the prehistory of this area, particularly with regard to the Diaguita-Mapuche interaction sphere which remains enigmatic. Dillehay (1981) has stimulated interest in Early Man studies but there has been no assessment of the degree of maritime adaptation at any level.

All we can say with certainty is that "Changos" were again historically active along this coast and may have maintained reciprocal relationships with forest tribes of the interior. In any event, they were seen navigating the mouths of the Maipo, Rapel, Mataquito, and Maule rivers in seal-skin rafts, and there are shell mounds around the Bahía de Concepción.

The Boreal South

Research on earth science and natural history of southern Chile has always lagged behind other areas of the country. Between the Río Bio-Bio and Patagonia, there were dense rain forests similar to those found in the Pacific Northwest of North America. The degree of maritime adaptation that existed among the forest oriented Araucanians is not clear. Although there have been numerous ethnohistoric, and anthropological studies of Mapuche-speakers, almost no excavation of coastal sites has taken place. In part this is due to the rugged coastal mountains, difficult to penetrate from the interior central valley, which stretch from the mouth of the Río Bio-Bio to the island of Chiloe. Shellmounds, particularly where rivers enter the sea, have been reported along this coast but they are essentially

unexcavated and likely to pre-date the arrival of Araucanians (ca. 1000) in this area. However, surface studies indicate some Araucanian influence was present when these sites were abandoned and it may be that they represent the most southerly presence of specialized Chango fishermen.

Below Chiloe, inaccessability and severe weather patterns have discouraged investigation of what we know was the historic heartland of canoe nomads such as the Chono, Alacaluf, and Yagan. It remains to be seen whether these groups have long inhabited these areas. For example, the Chono were encountered by early Spanish explorers between the Guafo entrance and the Tres Montes Peninsula where they lived much of the time on board their distinctive 3-plank "dalca" canoes (Lothrop, 1932). As water nomads they used fish nets, dressed in dog wool clothing, but also maintained a limited potato horticulture. Evidently the Chono were never numerous. Soon after contact with the Spanish, they were exterminated and their territory quickly invaded by Chilotes from the north and Alacaluf who crossed the narrow Isthmus of Ofqui from the south. Keller (in Medina, 1952:xxi) believes Chonos were the aborigines of Chiloe, evicted by more aggressive araucanian Huilliches who in turn had been forced southward by the incursions of Mapuches.

Generally speaking, the Chono, Alacaluf, and Yagan all have strong maritime culture traits indicating a basic southward migration along the Pacific coastline, whereas Selknam and Tehelches were clearly specialized hunters who appeared out of Patagonia from the Atlantic side. Other scenarios have been proposed but they are unsubstantiated.

Patagonia and Tierra del Fuego

Since Darwin's explorations, Patagonians and Fuegians have excited the curiosity of Europeans. The next hundred years were given over to ethnographic studies of which Gusinde's work remains outstanding. The pioneer archeological investigator is Junius Bird (1938) whose invaluable contributions to Chilean prehistory come from both extremes of the country. Since 1957 the momentum in research has been provided by a number of French investigators, particularly Emperaire (1961) and Laming (1972). More recently, Ortiz-Troncoso (1973, 1975, 1977-78) has provided the principal initiative through the Instituto de la Patagonia located in Punta Arenas.

Ortiz-Troncoso reports (1977-78:246) that his work at Bahia Buena and Punta Santa Ana discloses an unusually high percentage of marine animal remains in the lower levels together with diagnostic bone harpoons. His middle and upper strata contain abundant bird and molluscan remains as well as evidence of massive seasonal sea urchin gathering.

Very little research has occurred in eastern Chilean Patagonia in recent years. Instead, emphasis has been directed toward the more accessible parts of Skyring and Otway Sounds (the Posonby and Isla Englefield sites), the Strait of Magellan, and the western archipelago with its fiord coastline where maritime nomadism was most prevalent.

Evidently the Marazzi site (Laming-Emperaire, *et al.*, 1972) on the shore of Bahia Inútil is the most promising settlement studied to date (and the scene of the bizarre fatal accident). Strangely enough, its earliest level (9,600 B.P.) lacks marine remains. At Marazzi, marine resources were not exploited until about 5,600 B.P. when the adjacent glacial lake was breached and entered by the sea.

Although coastal sites in Patagonia and Fuegia are conspicuous for their surface accumulation of mussel shells, it is now clear that land animals were definitely important to these coastal nomads. All sites to some degree contain remains of guanacos and huemules. The latter is a cervid extremely difficult to stalk and is indicative of a strong hunting tradition distinct from that needed to capture the guanaco. Conditions of preservation

in these damp sites do not favor the preservation of fragile fish bones, vegetable material, or fibre netting, so it is not yet possible to give exact estimates of marine resource exploitation other than to say they predominated.

Conclusions

No research project in Chile has been designed from the beginning to demostrate quantitatively the extent of maritime adaptation nor the degree to which such influence extends inland. From the vast quantity of material on display at the regional museum "R.P. Gustavo Le Paige" at San Pedro de Atacama, one might conclude that Kunsa agriculturalists had very little contact with coastal Chango fishermen. Yet from early ethnohistorical accounts we know a considerable trade in dried fish and shellfish took place in exchange for vegetable foods grown in irrigated desert oases. While the perishable seafoods have not survived at San Pedro de Atacama, the inland trade items are common enough in coastal sites.

Evolution of fishhook design over a few thousand years using shell, cactus thorn, and metal as the raw materials does not convey an impression of extreme cultural conservatism usually associated with subsistence fishing societies. Also, complex hafted and socketed harpoons appeared made from ingenious combinations of wood, stone, bone, and sinew. But nearshore watercraft are perhaps the most diagnostic indication of maritime adaptation. In the treeless North they were made from inflated sea lion skin, sewn and pinned together. In the South dugouts and watertight planked canoes supported a truly nomadic lifestyle for some tribes.

Wherever they may have been located, Chilean aborigines found some form of nomadism or seasonal gathering necessary in spite of the abundant marine resources initially available at any given location. Effects of overfishing on slower growing boreal sea life, human dietary requirements, and ecology of target species are likely to have been three of the major causes for these pancoastal movements. In the final analysis, Chilean coastal nomads have been unable to survive into the modern era; in spite of their flexibility and skills in exploitation of drastically different littoral habitats, they are now all extinct.

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