



Latin American Journal of Aquatic  
Research

E-ISSN: 0718-560X

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Latin American Journal of Aquatic Research, vol. 42, núm. 4, octubre, 2014, pp. 673-689

Pontificia Universidad Católica de Valparaíso

Valparaíso, Chile

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## Review

# Ancient fishing activities developed in Easter Island

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**ABSTRACT:** Easter Island, Rapa Nui or *Te pito o te henua*, is in the middle of the Pacific Ocean halfway between South America and Oceania, constituting one of the most isolated places on the planet. It was colonized by Polynesians at the end of the first millennium of the Christian era, thus becoming one of the extremes of the Polynesian triangle. The island is of volcanic origin, has a small surface area (166 km<sup>2</sup>) and limited resources, and gave rise to a culture that is unique in the world, recognized internationally for its numerous megalithic constructions and large *moai*. Just as it was discovered and colonized by sea, the development and sustainability of the island is closely related to the ocean that surrounds it. The objective of this article is to describe the sailing and fishing techniques used by the Easter Islanders, or rapanuis, and their use of marine organisms prior to contact with Europeans, demonstrating their inventiveness and adaptation to the specific characteristics of this small territory.

**Keywords:** boats, fishing methods, sea food, Easter Island, Chile.

## Actividades pesqueras realizadas en la antigüedad en la Isla de Pascua

**RESUMEN:** La Isla de Pascua, Rapa Nui o *Te pito o te henua* se encuentra en medio del océano Pacífico a mitad de camino entre Sudamérica y Oceanía, constituyendo uno de los lugares más aislados del planeta. Fue colonizado por polinesios a finales del primer milenio de la era cristiana, conformando uno de los extremos del triángulo de la Polinesia. Esta isla de origen volcánico, de pequeña superficie (166 km<sup>2</sup>) y limitados recursos, dio origen a una cultura única en el mundo, reconocida internacionalmente por sus numerosas construcciones megalíticas y grandes *moais*. Así como fue colonizada y descubierta por mar, el desarrollo y sustentabilidad de esta isla está asociado al océano que la circunda. Este artículo tiene como objetivo describir las embarcaciones y técnicas de pesca utilizadas por los pascuenses o rapanuis, así como el uso que le daban a los organismos marinos previo a su contacto con los europeos, demostrando su inventiva y adaptación a las especiales características de ese pequeño territorio.

**Palabras clave:** embarcaciones, métodos de pesca, alimentos marinos, Isla de Pascua, Chile.

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## INTRODUCTION

Easter Island, Rapa Nui or *Te pito o te henua* (the belly-button of the world) as it is known by the natives, is in the middle of the Pacific Ocean, more than 3700 km from the coast of Chile. For this reason, it is considered one of the most isolated places in the world, which motivates the interest in its history, evolution, and the enigma of its numerous megalithic sculptures.

Advancements have been made in deciphering the secrets of the Rapa Nui culture; however, despite the constant scientific and technological advancements of modern man, there are still many unknown aspects. It

is clear that the colonization of the island represented a historic landmark. At the same time, it is now a source of pride for Chile to possess a land of such archaeological richness, with characteristics that are unique in the world, and a people who, despite all the limitations imposed by their surroundings, have preserved their culture and tradition.

To embark on a study of the ancient times of this culture is a real challenge, as its people had no writing system, and the so-called "talking tablets" or *rongorongo* are a mystery still to be deciphered. Therefore, a significant part of the available information is based mainly on the chronicles and drawings made by sailors

and travelers who sporadically visited the island in the early years after its discovery by Jakob Roggeveen in 1722. Despite the subjectivity of these records, they reflect admiration on the part of the viewer, although at that time the culture of the island was in full decline. In more recent years, innumerable studies by researchers and renowned archeologists have contributed to a gradual unveiling of this people's mysteius past (Vargas *et al.*, 2006; Ramírez, 2008; Bahn & Flenley, 2011; Mulrooney, 2013).

The island, colonized by intrepid Polynesian sailors more than a millennium ago, generated a unique culture on this small insular territory. The particular characteristics of the land, with limited means of subsistence for a large population, meant that the marine resources of the region became an important food source for the island dwellers, both in primitive times and today. This article aims to describe the sailing and fishing gear used by the old islanders, as well as their use of marine organisms prior to contact with Europeans. This will show their inventiveness and adaptation to the needs imposed by the characteristics of this small island lost in the immensity of the Pacific Ocean.

## GENERAL CHARACTERISTICS OF EASTER ISLAND

### Geographical characteristics

Easter Island is located in the middle of the Pacific Ocean (27°07'S, 109°22'W), half way between America and Polynesia. As such, it is considered one of the most isolated islands in the world. It is located approximately 400 km from the uninhabited islet of Salas y Gomez to the east, and 3700 km from the Chilean mainland. To the west there are 3200 km to the island of Mangareva in the Gambier Islands, and 3700 km to Tahiti. This island, along with New Zealand and the Hawaii archipelago are the vertices of the triangle that contains the islands of Polynesia (Fig. 1).

Easter Island is triangular in shape, with a perimeter of 35 nm and a surface area of 163.6 km<sup>2</sup>. It is of volcanic origin and represents the summit of a large underwater mountain on the East Pacific Rise. This rise is an elevation of the seabed in the central region of the Pacific Ocean, rising 2-3 km above the ocean floor. The base of the island lies on one side of the rise, approximately 530 km from its axis (Morales, 1984).

The emerged topography of the island is generally comprised of gentle slopes and hills, interrupted by flows of solidified lava from the volcanoes on the island and the close to 70 subsidiary eruptive centers identified across its surface. There are few flat or semi-flat areas on the island, all of which are of volcanic soil.

The highest point on the island is the Terevaka volcano at 560 m above sea level, followed by the volcanoes Poike (499 m) and Rano Kau (359 m).

The coastline of the island is varied and irregular. In some areas it has high cliffs, such as those near the Rano Kau volcano, where its walls reach heights of around 300 m, while on the south side of the island the coastal hillsides slope gently down into the sea. Outcrops of black lava can be seen along the coastline forming small inlets between them, dotted with rocks, against which large waves break, making it difficult and dangerous to enter those waters.

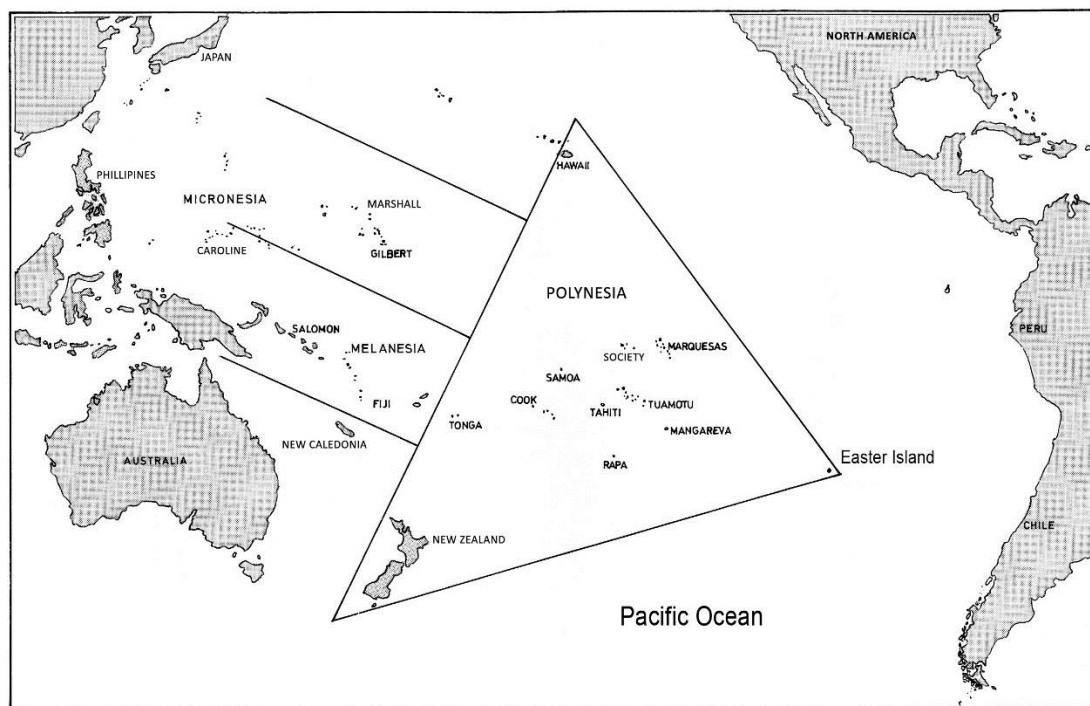
At the same time, the island lacks any protected bays for mooring larger boats and has only three small beaches with fine sand: Ovahe, La Perouse and Anakena. The latter of these is the largest, about 200 m long. As it is in the middle of the ocean, the tidal amplitude is minimal, with a range of less than 1 m between high and low tide.

As is to be expected due to the isolation of the island, there are very few species of plants and land animals. The lack of flora and fauna largely reflects the characteristics of an oceanic island of small size, low maximum height and, primarily, distant from the continents or other islands. All of this leads to a series of questions that are difficult to answer on the origin of its renewable natural resources, considering its volcanic birth as sterile land from the bottom of the ocean.

The scarce documentation available leads to the assumption that when the first aboriginal colonizers arrived, the island possessed more abundant vegetation than it does today, with areas of dense forest probably confined to the volcanic craters mentioned above. The rest of the island was an herbaceous steppe. Also, it is believed that the first Polynesian occupants introduced most of the vegetal species considered today as indigenous or naturalized, as around a quarter of them are typically tropical (CONAF, 1976).

### The Easter islanders or rapanuis

The customs, anthropological and linguistic characteristics of the rapanuis share a cultural horizon with hundreds of islands distributed to the west of this Chilean insular possession. The arrival of the first Polynesian colonizers occurred after the beginning of the Christian era. According to tradition, King Hotu Matu'a colonized Easter Island after traveling there from the legendary island that the natives called Hiva, possibly located in the Marquesas Islands. He is said to have arrived with 300 or 400 people (Jaussen, 1893), though it is also said that he travelled with only 50 subjects (Englert, 1948). The Polynesians brought with them several vegetable crops and domesticated animals,



**Figure 1.** Pacific Ocean, Easter Island and the Polynesian triangle (Buck, 1938).

such as chickens, along with different elements of their cultural heritage.

Upon the arrival of the first Europeans, the use of metals was unknown to this people, thereby clearly making them a lithic culture. Despite this, they were experts at working stone and wood, and their megalithic constructions are unique in the world. The large stone statues (*moai*), ceremonial platforms (*ahu*), etched tablets with *rongorongo* writing and petroglyphs of mythical birds, among other archeological findings, have made the island famous around the globe (Roger, 1997).

## ANCIENT FISHING

### Boats

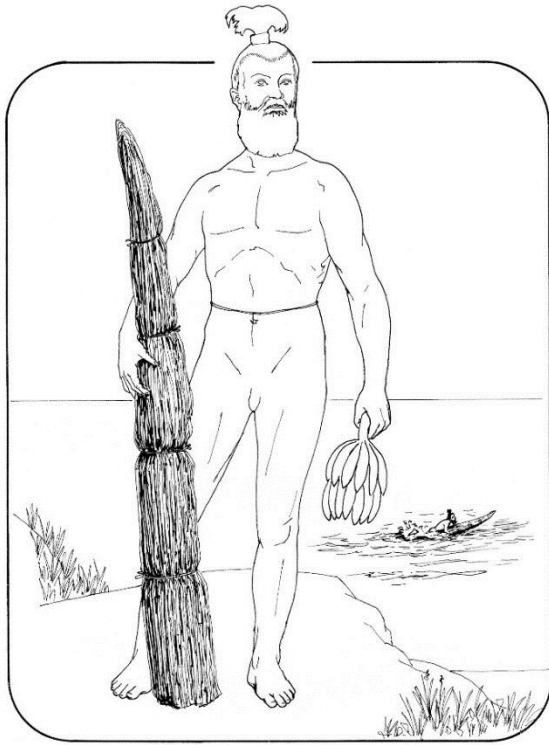
Perhaps one of the most primitive implements used by the Easter islanders was a floating device, called *pora*. They were 1.5 to 2.1 m in length and made of bundles of totora reeds (*nga'atu*) firmly tied together into a conical shape (Métraux, 1940). These floats were used by one or two swimmers who would hold on to or lie on them to aid swimming and fishing in coastal areas. The first mention of these totora reed floats is in Lisyansky (1814), who described them as “a beam of totora reeds used as a support for swimming”.

The *pora* drawn by Du Petit-Thouars (1841) is approximately 1.5 m long and made of totora reed

branches piled in a conical shape, slightly curved and tied in four places with rope made of the same material (Fig. 2). Due to its shape, Palmer (1870) compares this floating device with “a long elephant tusk built out of totora reeds”. According to Campbell (1987) there were examples of varying size, individual and group versions and they were used for both fishing and travelling to the neighboring islets and along the coast.

It is possible that these floats also allowed the islanders to rest during diving expeditions and to transport their fishing implements and food, as well as to deposit any catches made during the day's fishing. According to MacMillan-Brown (1924), these operations were carried out in caravans, without moving far from the coast. Similarly, smaller *poras* were used by athletes searching for eggs of the sacred bird or *manutara* (*Onychoprion lunatus*); either lying on or sitting astride them, the men sailed to the islets where the birds nested by paddling with their hands and feet.

A variation on these floats had the form of a dense thick woven rectangle made of the same material, called a *papa*. It was used for the popular sport of “running the waves” or *ngaru* (Cea, 1979-1981). According to this author, the sport was similar to a primitive form of surfing and was originally practiced without any additional implements, with only the bare chest or *haka-honu*, meaning “do the turtle”, taking



**Figure 2.** Native of Easter Island with a totora float or *pora* (based on a drawing by Radiguet, in Du Petit-Thouars, 1841).

advantage of the particular conditions of the Hanga Roa Bay.

According to Dransfield (2013) and Green (2001), trunks of Easter Island palms (*Paschalococos dispersa*) would have been used to make canoes, enabling the islanders to go further into the sea to fish in deeper waters. Once the palm trees disappeared, it was no longer possible to use this material to make boats, limiting all fishing activities to coastal areas.

Englert (1948) states that early islanders had two types of boats. One of them large and shaped like a barge, called *vaka poe-poe*. According to this author, it is possible that these boats were used only at certain times, due to the lack of materials required for their construction. This would explain why they were not mentioned in the accounts of the first sailors to arrive on the island, and why the memory of them is preserved only in oral tradition. The other design used on the island, and which still remained upon the arrival of the first Europeans, is the *vaka ama*, which means “boat with balance board”, a characteristic element of boats used in Polynesia. The use of this implement gives better stability, either as a floating device, when submerged in the water as the boat leans to the side where it is installed or as a counterweight when the boat leans to the other side.

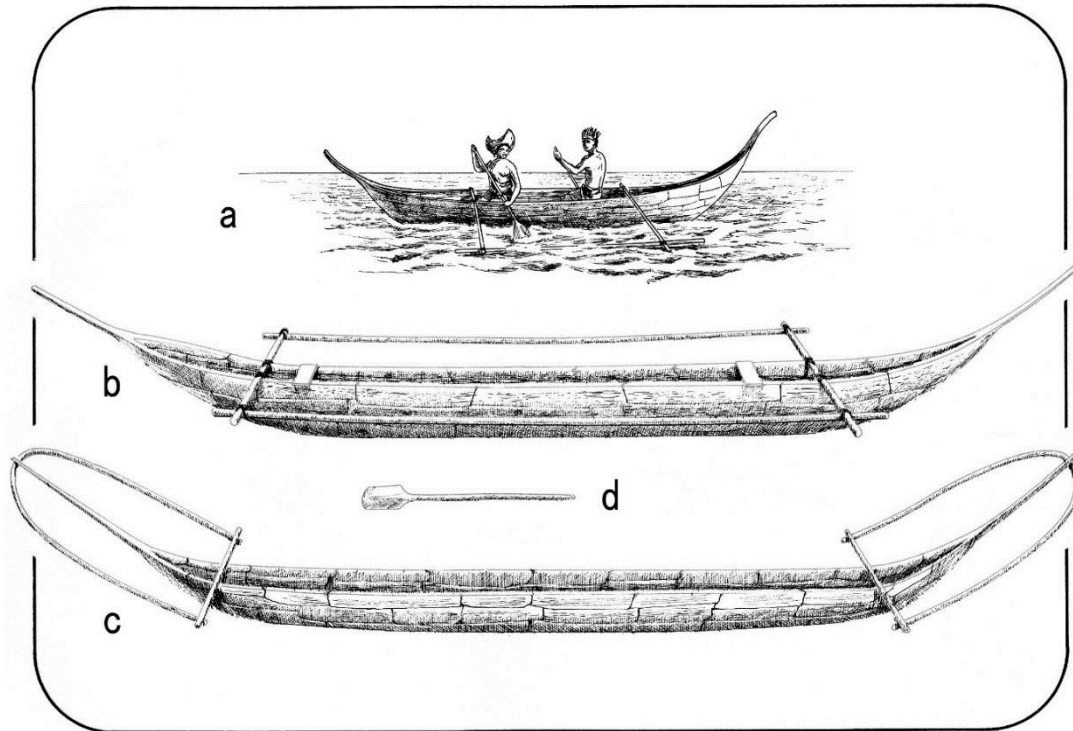
Stephen-Chauvet (1945) also mentions the existence of boats or canoes without balance boards. Graphical testimonies of the presence of the canoes used at the end of the XVIII and beginning of the XIX century, when the designs can still be considered as original or without foreign influence, arise from two scholars. The first is a drawing by Blondella (Fig. 3a), made when visiting the island in 1786, as part of the La Pérouse expedition (La Pérouse, 1797). This drawing shows a boat made of wooden trunks, pushed along by two islanders rowing with *pagayas* (Fig. 3d). An equally detailed sketch of the Easter Island boats was published by Choris (1826), a painter who was part of the crew of the Russian ship “Rurick”, which arrived on the island in 1816. Though they could not set foot on land, as they were stopped by the natives, from the deck of the ship he managed to capture in his drawings several indigenous scenes and customs. One drawing shows the two types of canoes in use at that time, which correspond, respectively, to boats with and without a balance board (Fig. 3b, 3c).

These canoes were between 3.0 to 5.5 m in length, excluding the elongations on the prow and the stern. They were just wide enough to fit the crew kneeling down, with their legs together, in order to be able to row (Roggeveen, 1908). Cook (1842) states that, based on their size and structure, they could not have been manned by more than four people.

Possibly, canoes without balance boards were used to sail close to shore, while those with balance board were used to sail further out to sea. According to Stephen-Chauvet (1945), though they were built under the general principles used for boats on other Polynesian islands, they were not as solid or as big as their counterparts. The technique used was similar to that employed on the islands of Tuamotu and Gambier since there are similar limitations on the supply of materials used to build the boats both on those islands and on Easter Island.

Perhaps the most notable characteristic of these boats was the way they were built by assembling or “sowing” together several pieces of wood (Fig. 4). The first description of these boats mentions this peculiarity, stating that it gave them the appearance of being “poorly built and weak” (Roggeveen, 1908). According to Cea (1979-1981), the vital technique for assembling wood discovered by the primitive islanders, or taken there from some other place, was later used by stonemasons to assemble stones. However, it should also be asked whether this process was in fact developed the other way around.

Those who have studied the marine aspects of the Easter Island culture have wondered whether double canoes were used in this island, since it is presumed that



**Figure 3.** Boats used by early Easter islanders. a) Drawing by Blondella, in La Pérouse (1797), b-c) boats with and without a balance board, drawings by Choris (1826), d) paddle to row.

these were the boats used by the discoverers and colonizers of the island, and the reasons they did not persist through time. According to Hornell (1936), the presence of such canoes has not been noted east of Tuamotu and the Marquesas Islands. However, this question was partly answered in 1975 with the discovery of a petroglyph at the Orongo ceremonial center that depicts a double canoe (Mulloy, 1975; Van Tilburg, 1999). This figure is a view from the starboard bow which clearly shows the two prows strongly arching upwards and a lateen sail on the deck (Fig. 5). According to Mulloy (1980), it is curious that this is the only petroglyph, among the thousands found on the island that shows a double canoe. Though the age of this discovery cannot be identified, it provides tentative evidence of the presence of double canoes on the island. Although it can be assumed that they were used in early times, their use was discontinued, probably due to a lack of raw materials, which is especially problematic with this design as it requires twice the amount of wood.

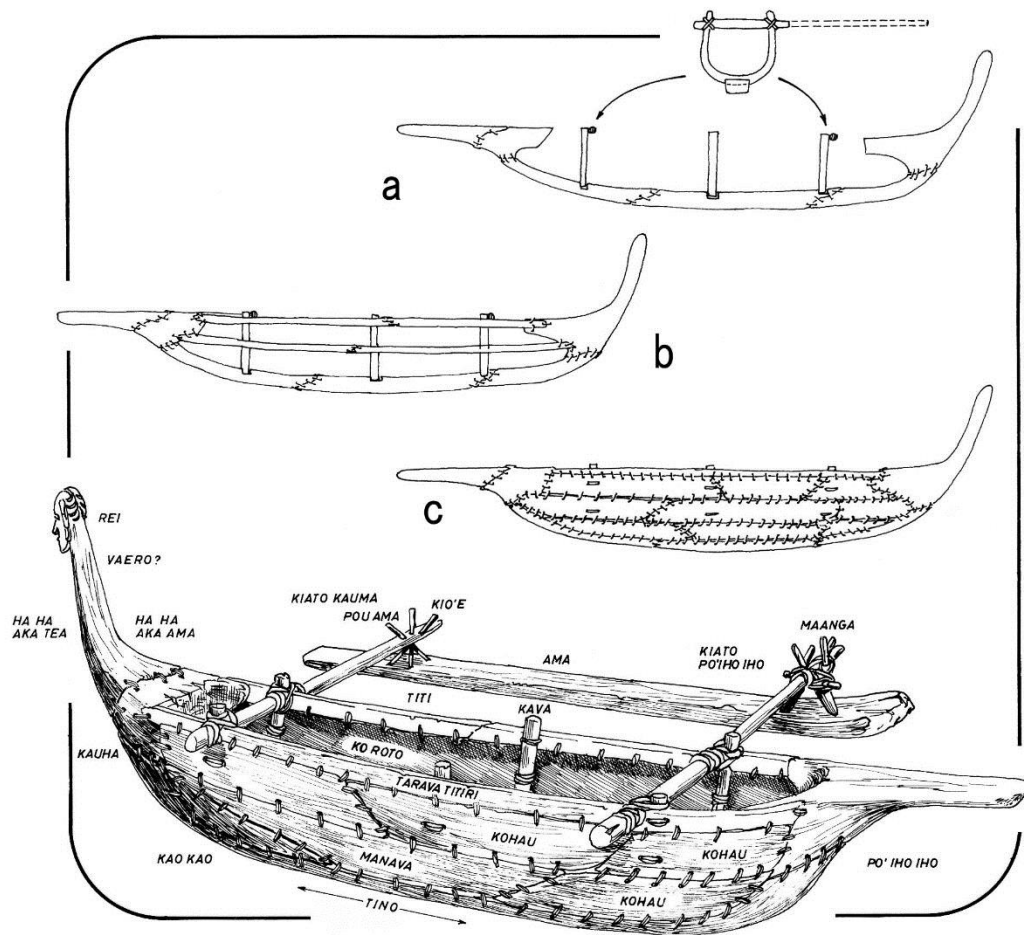
The lack of adequate beaches for coming ashore was also a problem for landing large boats. At the sides of several coastal ceremonial centers (*e.g.*, Tahai, Mahatua, Hangakouri, etc.) there are paved stone ramps going down into the sea, which were apparently used by the

first islanders to facilitate this process (Thomson, 1889; Mulloy, 1980).

### Prehistoric boats in Easter Island art

On several occasions there has been discussion on whether the first islanders knew about and/or used sails on their canoes. According to accounts from the first European travelers, there were not sails visible on the boats they saw. However, several small statues have been found showing what have been interpreted as representations of sails.

During the work carried out by a Norwegian archeological expedition on Easter Island and other islands of the eastern Pacific (1955-1956), a surprising petroglyph was discovered on the chest of a *moai* buried in the Rano Raraku quarry (Fig. 6). The lines that form it were made by incision or bas-relief, and were possibly performed using a sharp instrument. The figure represents a primitive boat with three high masts, and seven rectangular sails unfurled: three on the center mast and two on each of the others. Nevertheless, vague lines on the surface of the rock show that the original drawing may have had nine sails in total, three on each mast. According to the account of Skjolsvold (1961), the ship was not of European design, as it had a flat



**Figure 4.** Stages of the construction of boats made of pieces of wood sown together, shortly before the discovery of the island by Roggeveen in 1722 (based on Cea, 1979-1981).

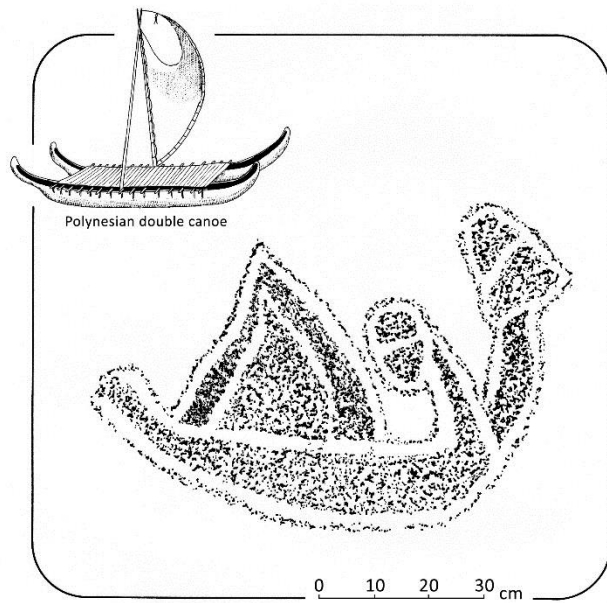
stern and a pointed prow. On the deck there are 28 points that would represent the crew. This large number of sailors and the large masts are evidence of the intention to show a ship of considerable size.

From the ship's prow there is a long line towards the stomach of the *moai*, where there is a second figure with an oval shape and four short extensions (Fig. 6). The latter may represent an anchor, or perhaps a sea turtle. In this case the curved lines would be the head, tail and four fins of the animal, while the line connecting it with the ship may possibly be the rope used to capture it.

### Fishing

At present, it is difficult to have a concrete idea of the real importance of fishing on this island before the arrival of Europeans. It is equally impossible to know with certainty whether its importance, from the arrival

of the first settlers to its discovery by Roggeveen in 1722, was time-varying or constant. Despite this, it is logical to consider that a substantial part of the protein needs of the Easter islanders must have been satisfied by marine resources, which are naturally renewable and continuously available. This is supported by the numbers of fish hooks found in caves and archeological excavations, the abundant representation of marine animals in petroglyphs, and the frequent inclusion of sea-related themes in the island's folklore. There are also many small stone statues with representations related to this subject. Some of them have been described by Heyerdahl (1958), e.g., a woman with a fish on her back, and another of a whale with a straw hut on its back, a typical earth oven on its tail and six balls under its stomach (Fig. 7). Equally famous throughout the world are the wooden sculptures representing the bird-man or *tangata manu* and the bas-reliefs seen on the Orongo village, linked to life by the sea.



**Figure 5.** Double canoe petroglyph at Orongo (Mulloy, 1975).

We cannot fail to mention the large number of petroglyphs that contain representations of marine organisms that inhabit the waters around the island. For example, it is common to see figures of large fish, such as tuna, as well as sea turtles and marine mammals, possibly dolphins, whales and orcas. Some of these are seen as bas-relief carved on rocks at ground level, such as those found around the area of Ahu Tongariki and on the shore by the bay of La Pérouse. However, in the middle and late periods, due to the limited number of boats that seem to have been available, it may be deduced that the contribution of fishing both on the coast and at sea began to decline gradually. It can also be assumed that coastal fishing, and the collection of seaweed, shellfish and shoreline and shallow-water organisms was greatly developed, forcing the natives to innovate in the face of their reduced means in order to make full use of the foodstuffs provided by the ocean. Cook (1842) account discusses this subject, mentioning the lack of fish on the island, as they were unable to catch any from several attempts using line-fishing. He also noted the lack of fish they saw among the natives.

Under the influence of European customs, the introduction of domesticated animals and farming of foreign species, fishing continued to decline. At present, the old traditions have been lost and fishing is now more of a complementary contribution to the diet of island dwellers, simply allowing them to vary their daily menu, which is mainly based on land produce.

### Fishing zones

According to the account by Englert (1948), the early Easter islanders differentiated several fishing zones or *kainga* around the island, a system that is still used by fishermen today (Fig. 8). The following areas were established according to their location and distance to open sea:

*Hakaranga*: this is the coastal area bordering the island's shoreline, where smaller fish are caught using nets and small hooks.

*Rua*: this is the coastal area of deeper water, including the small pools by the coast, or where larger fish, such as the *nanue*, are caught.

*Hanga*: this includes the bays, inlets and coves where net fishing (*kupenga viri*) of *nanue*, maito and *mahaki* shoals, among others, is practiced.

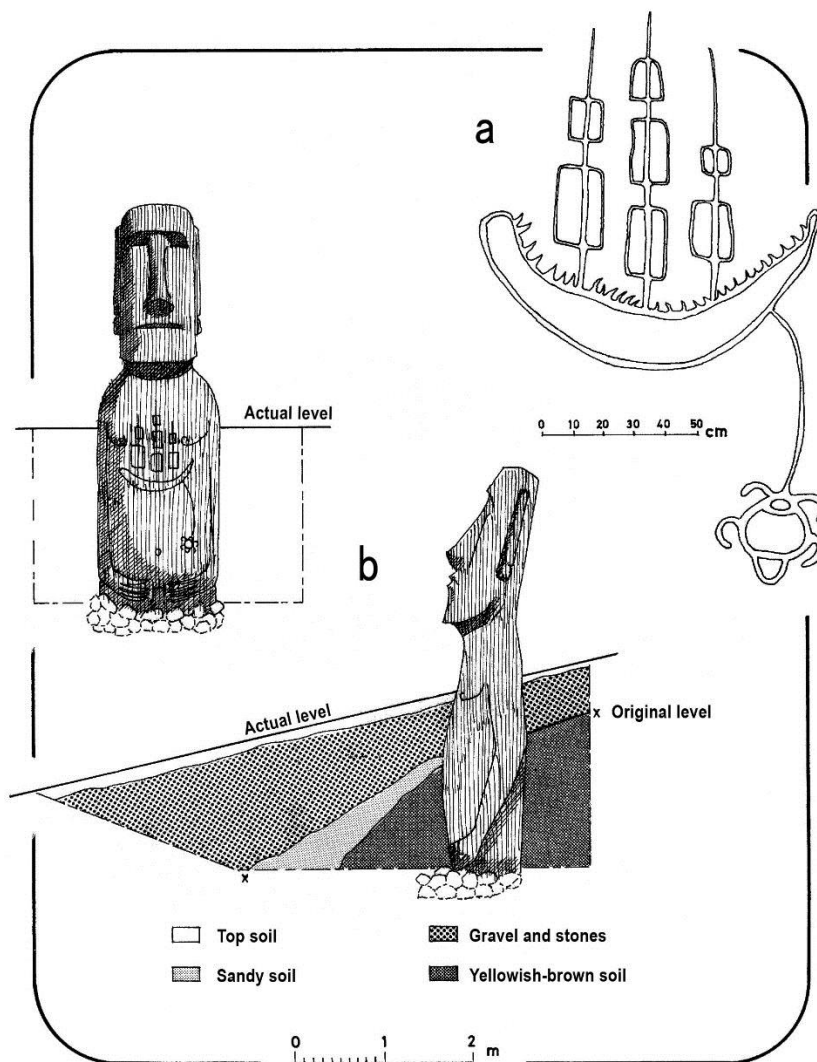
*Toka*: coastal zone no more than 100 m from the coast where there is a large variety of fish, such as *nanue*, *pua*, *mahaki*, and others. This area is divided into subzones for fishing with nets (*kupenga tukutuku*), known as *kona tukutuku*, and where free diving (*rukuruku*) was practiced, known as *kona rukuruku*.

*Hakakainga*: this is the area beyond the *toka* and it extends up to approximately one mile from the coast. Fishing done here uses large hooks to catch sharks, *poo po*, *kokiri* and sometimes tuna. The *ature* is also caught here using dredging nets.

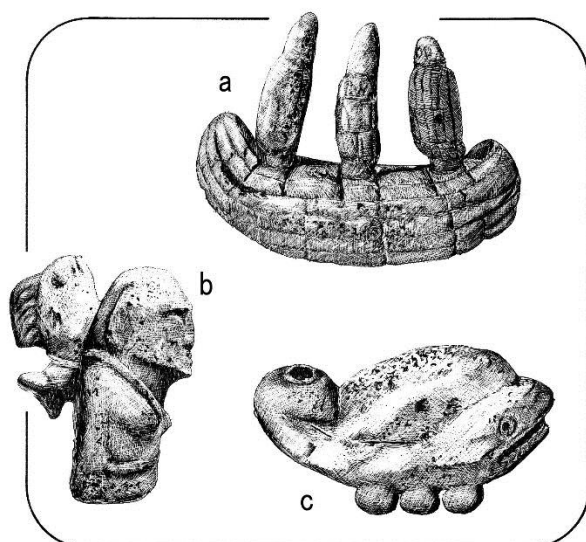
*Hakanononga*: this is the area located more than a mile from the coast and is divided into 17 subzones around the island. The fishing technique used here was mainly line-fishing, close to the surface, catching large fish such as the swordfish or *ivi heheu*, tuna, shark and, at greater depths, other species typical to the area.

In order to identify their position while at sea, the early islanders used a visual alignment and triangulation technique. They used notable points on the island such as an *ahu*, *moai*, bushes and any rock distinguishable at a distance for reference. According to Englert (1948), the islanders used a marking that was perpendicular to the coast or *pou* and another marking that was oblique to the coast called *atuatapa*. A similar technique is currently used by artisanal fishermen on the Juan Fernandez archipelago (Arana & Ziller, 1985) and by some fishermen in the north of Chile. At some points on the coast of the island there are constructions that have been called observation towers or *tupa*, generally located close to the populated areas of the time. They were made on a base of regular-sized stones; they have a diameter of around 7 m at the base, which is oval or circular in shape, and a flat top of variable height. According to Campbell (1987), one of them is

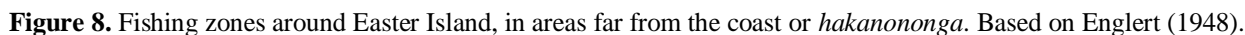




**Figure 6.** Petroglyphs with the shapes of boat and turtle (a), carved into the chest of a *moai* (b), buried at the quarry on the Rano Raraku volcano, found in 1955-1956 (based on Skjolsvold, 1961).



**Figure 7.** Sculptures in volcanic rock, made by the Easter Islanders (Heyerdahl, 1958). a) Totoria reed boat with three masts and sails, b) woman with fish on back, c) sculpture representing a whale, with a hut and an oven or *umu* on its tail.



reference points to help fishermen discern their position when out at sea (Wilhelm & Hulot, 1957).

Common fishermen were called *rava-ika*, while those who were considered experts were called *maori* or *rava-ika-ma'a* (fishermen with knowledge). According to the calculations of Englert (1948), the high-seas fishermen numbered around two hundred. It is also assumed that after weapons, fishing implements were the most valuable objects among the islanders.

The Easter Islanders used several different techniques and instruments for their fishing activities. These ranged from simple tasks such as gathering the resources present in the intertidal and coastal areas to elaborate techniques and devices for deep-water and ocean fishing. In most cases, the tactics and methods used bear close relation to the systems of other Polynesian islands, showing a notable adaptation to the character-



were pulled out by the antennas these crustaceans often extend out of their hiding holes. This technique, as with many others, was practiced by a group of specialized fishermen, known as the *hare hangu nuinui* (families with long breathing).

Another alternative for catching lobster and other species was to fish at night attracting them with bait. They would chew a small fish and spit it out onto the rocks or into shallow water. When the organisms left the caves where they sheltered they were caught with nets or spears, tipped with sharpened stones (*matta*). They would light the area using torches made of dried banana leaves soaked in fish oil, to which they gave the Tahitian name of *rama*. This fishing technique is known by the generic name of *puhi* and if they were catching lobster, *ura-rama*. Crabs (*pikea*) were also caught by night by the light of torches and in groups of two. The crabs were attracted to the light, then the fisherman carrying the torch would put his foot on the crab and his partner would grab it and put it in a bag. According to Métraux (1940), the best time for catching crabs was when the wind was beginning to blow, or when it changed direction, as these organisms would be pushed towards the beaches.

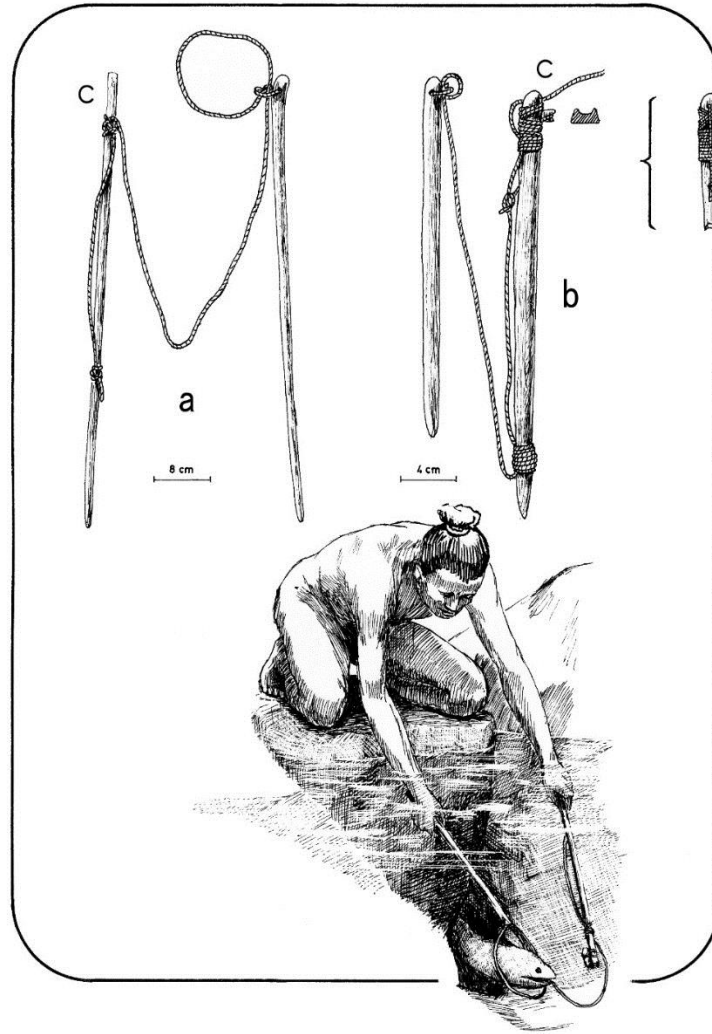
One curious technique used on the island to catch moray eels was the use of lassos. This was called *here koreha* if it was done from the shore and *here ruku* if the fisherman was submerged under the water. The first record of this fishing gear was made by Geiseler (1883), who obtained ethnographic evidence, as “at that time they were used to an especially high degree” to catch these fish. The method consisted of using two sticks, one called *hakatari* which would have a piece of bait on the end to attract the eel and guide it towards the other stick, known as the *here*, which was already set up with the lasso (Fig. 10).

Another form of fishing used by the early islanders consisted of catching fish using line-fishing or *hau hi*. These were made up of lines of varying thickness, in some cases with stone weights, and hooks or *mangai* of numerous shapes and materials. The hooks were made of wood, polished stone (*mangai-kihi*) and bones, either from birds or humans (*mangai-ivi*). Some were small, for the coastal fishing mainly carried out by women, and others were larger, to be used by the men in deep waters or far from the coast (Ayres, 1979).

As a common feature, most of the hooks have a sharp curve, complete absence of roughness and a point in the same plain as the rest of the structure. Simple hooks and double pointed hooks have also been found (Fig. 11a). However, the latter are considered by Beasley (1928) to have been solely for decorative purposes, as they are not apt for use in fishing, while Métraux (1940) believes that they are a relatively

modern invention for commercial purposes. The large number of hooks found at digs carried out on Easter Island show that the most common were those made of bone (70%), from humans, mammals (whales, dolphins) and birds (marine and domesticated). The second most common type is stone hooks (25%), and the least common are those made of wood (5%). Stone hooks and some bone ones were made from a single piece, and were generally around 1.5 to 8 cm in height and 4 to 5 cm in width (Figs. 11b, 11c, 11f), though some found by Heyerdahl & Ferdon (1961) are larger. Englert (1948) states that the islanders possessed smaller, almost straight hooks ending in a barb with almost no curvature, which were used to catch small fish close to the shoreline. He also mentions that early Easter islanders used hooks made of two pieces which were large in size (Figs. 11d, 11e). They had a foot and a point and were made from a combination of stone, wood and bone, tied together. Their relevance lies in that they are unique to this island and no similar examples have been found anywhere else in Polynesia. It is interesting to highlight that the analysis of the hooks of the island has raised interest from many specialists, who have studied their shape, characteristics, materials and their resemblance to hooks of other Polynesian islands, trying to establish comparisons and possible similarities that tell of their origin and evolution (*e.g.*, Brown, 1924; Beasley, 1928; Métraux, 1940; Englert, 1948; Golson, 1965a, 1965b; Heyerdahl, 1961a, 1978; Ayres, 1979). Unlike other parts of the world, here seashells were practically never used to make hooks due to the lack of large mollusks; this material was replaced by stone, though it required considerably more work.

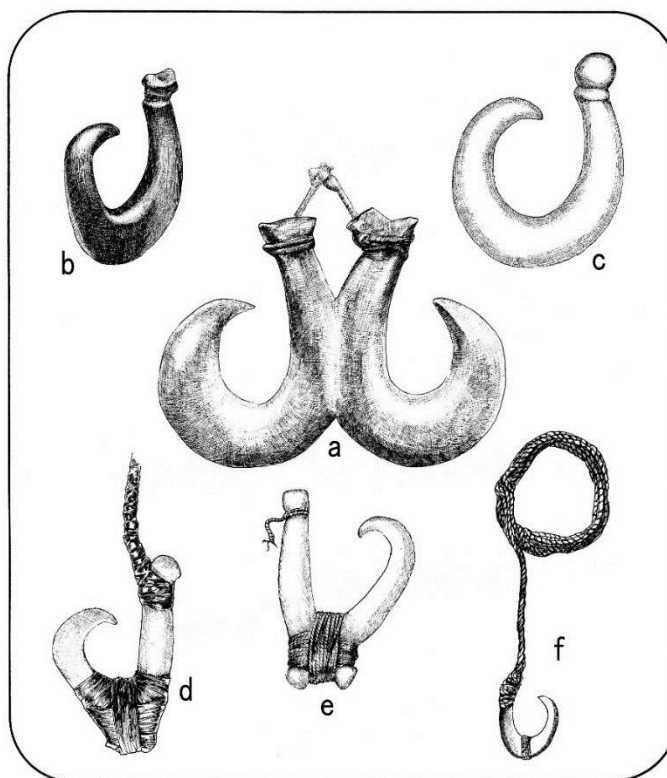
It has also been noted that early Easter Islanders also used nets or *kupenga*, which were used both for fighting and fishing. They had large weave nets or *kupenga maito*, medium weave nets or *kupenga ature* and small weave nets or *kupenga koreva*. Microscopic analysis of ancient nets preserved in museums shows that they were mainly made of fibers obtained from the bark of the *hauhau*, a tree of which only very few examples remain today. The bark was left to soak in water until it was soft, after which the fibers were separated. Usually two strands were used for making the threads, a task performed by women by twisting them on their thighs. These threads were then woven to make the nets. The latter task was reserved exclusively for the men, who used needles called *hika*. These needles could be both long and short, with one or two holes, straight or curved and carved from *toromiro* wood (*Sophora toromiro*) or bone. Some of them, up to 30 cm long, were slightly thicker at both ends than in the central portion (Heyerdahl, 1961b; Métraux, 1940). According to Englert (1948) the manufacture of the net followed a



**Figure 10.** Lasso or *here koreha* used to catch moray eels (based on Métraux, 1940). a) Stick for the bait, b) stick for the lasso, c) location of the bait.

certain ceremony or *tapu*, which still holds to this day. The nets were made only by experts, one of whom would make the first weave or *matu'a* or *te kupenga*, before the sunrise. Once this was done, a “curanto” (type of stew) was prepared for him, and only then would the other experts begin work; and it must also be them who finished the work. Women were prohibited from approaching the area while the nets were being made, and children could only watch from a distance to learn how they were made. If this ceremony was not followed, the net was considered useless for fishing or *kupenga moko tito*. Once the net was finished, it had to be used immediately, and the weavers themselves, known as *te kupenga* or net servers, fished with it for three consecutive days. Only after this ceremonial stage would the net be available for the open use of those who had ordered its confection. The resulting nets were

perfectly made, with regular meshes, denoting great skill in the construction technique developed by the islanders. On this subject in particular, Chamisso (1821) stated that the nets they saw and acquired during their visit to the island in 1816 were “exquisitely woven”. Similarly, Geiseler (1883) said, regarding their manufacture, “there is nothing comparable in all Polynesia.” An example of these nets is preserved in the National Natural History Museum (Quinta Normal, Santiago). Some of the nets used by the Easter islanders had basalt stones to weight them down (*maea rengorengo*) and help them sink faster. The stones were wrapped in pieces of net or tied on with rope using natural or perforated holes in the stones, or using notches carved into their surface. Examples found of these fishing implements weight between 10 and 900 g (Métraux, 1940). Some of these nets also used ropes or



**Figure 11.** Traditional hooks used on Easter Island (based on Thomson, 1889 and Stephen-Chauvet, 1945). a) Decorative hook, b-c) stone hooks, d-e) two pieces hooks made of human bone, f) curved shell hook.

cords as a headline, allowing their operation at sea. According to Thomson (1889), these ropes were made with hibiscus fibers (*Hibiscus* sp.) braided in the same way as the threads used to make the net material. It has been said that similar ropes were also used to drag the colossal sculptures from the quarries to the places they were erected.

It should be noted that excavations carried out on the island frequently found abundant remains of dolphin bones, especially in the deeper or older layers, which suggests that these animals were commonly hunted. To catch them it is possible that the natives sailed far away from the coast in canoes or boats with balance boards, and used jagged spears or harpoons to hold them down and kill them. Nevertheless, no remains have been found of the tips of these implements, and the way in which dolphins would have been hunted is therefore left to the imagination.

Finally, it should be noted that several depressions carved into the rock were discovered in the northern part of the Hanga Roa bay. Some of them have an elliptical shape and others are perfectly circular, of around 1 m in diameter and 0.6 m in depth. Most of them are at sea level and others are at exactly the height reached by high tide. The only explanation found by

Thomson (1889) for these depressions, made with considerable effort on the part of the builders, is that they were used as artificial ponds or nurseries to keep fish and other resources alive until they were to be eaten.

## FOOD AND CUSTOMS

An important aspect to consider is that the availability of food, in terms of amount and type, must have varied notably in the period between the arrival of the first colonizers and the discovery of the island by Europeans (Ayres, 1985). This conclusion is based primarily on the increase in the population and the use of resources, among other factors. This has been partly proven by archeological digs, where the remains differ depending on the depth of excavation, as does the age of the food remains. Nevertheless, it should be noted that due to the humid climate of the island, which makes the preservation of fish bone remains difficult; these are scarcely found in archeological digs. Among the few remains, fish have been identified as belonging to the Serranidae (probably *Trachypoma macracanthum*), Holocentridae, Belonidae, Scropaenidae, Carcharhinidae and shark families (Mulloy, 1961).

It is estimated that in the first years mainly marine birds and dolphins were consumed, while in the intermediate phase fish and vegetables predominated, and in the later stage, prior to discovery by Europeans in 1722, domesticated birds, sweet potato and other crops. Some researchers have postulated that in those later years, anthropophagy was a habitual practice on the island.

The biggest problems would not have been the supply of food, but rather the monotony of their preparation, which would have been carried out only twice a day. Cooking natural products was difficult for the natives as they had not discovered pottery, although the Lapita culture, a precursor to several different cultures of Oceania and Polynesia, was proficient in the technique. The lack of receptacles meant that some foods, such as sweet potato or *kumara* (*Ipomoea batatas*) were cooked in calabashes (*Lagenaria siceraria*). More commonly, foods were cooked in the *umu*, which is a type of improvised oven in the ground and, when it was permanent, it was denominated the *umu pae*. These consisted of a hole dug in the ground, in which a circle of five or six rectangular carved stones were half buried, in a construction similar to the “curanto” prepared by the indigenous population in the south of continental Chile (Englert, 1948). Some *umu pae* had rudimentary roofs made of straw to protect the oven from rain, and were then given the name of *umu paepae*. A fire was lit in the center of the *umu* and some fist-sized stones were placed over it to form a dome. Once these stones had heated up they were taken from the hole using wooden sticks as tongs. A layer of stones was placed at the bottom of the hole and then purple yams (*Dioscorea alata*), taros (*Caladium* sp.) and sweet potatoes were placed on top of these, followed by some of the hot stones and banana leaves. More food was then placed on top of this, red meat, fish or shellfish, all wrapped in the same leaves. The hole was then covered with more banana leaves, hot stones and finally a thick and dense layer of grass, leaves and soil. Two or three hours later, the oven was opened and the food that had cooked in its own juices was taken out. The portions were served on leaves or on small reed mats. According to Métraux (1941), the flavor of the food cooked in this way was excellent, despite the lack of salt, which was not used by the islanders. They obtained the necessary salt for their bodies from the salty air or from the seaweed that they liked to eat raw.

In general, the islanders ate without a set timetable, eating when they were hungry and/or when food was available. When they did eat, they ate in large quantities, as they did during festivals or group ceremonies (Campbell, 1987).

The supplies of fresh water were obtained from rainwater that accumulated on rocks, in natural underground tanks or in the craters of the Rano Kau, Rano Raraku and Terevaka volcanoes. In the past, stone tanks, called *manavai*, were equally common for storing rainwater (Campbell, 1987). It is likely that the original population also depended on rainwater filtered by the island's porous soil that accumulates at sea level on naturally impermeable layers. Thus, when the fresh water mixed with the sea water, it would be common to find brackish water there. Some of these places, which form natural springs on the coast of more or less fresh water, were known by the natives, who built dikes to separate the fresh water and the sea water. In other cases, the underground water network was intercepted before it mixed with sea water by digging wells that later had stone walls built around them (Heyerdahl, 1961a).

The meat eaten by the Easter island natives mainly came from the Pacific rat or *kio'e* (*Rattus exulans*), a rodent of a dark blue/grey color with a chubby body, shiny fur and a short tail (Englert, 1948), as well as chickens (*Gallus gallus*) and marine birds. Chicken breeding was a flourishing activity during this early era and were the only domesticated animals possessed by the islanders when the Europeans arrived. They were kept in coops (*hare moa*), the remains of which can still be found on the island. They were made of stones carefully piled, with a fully covered central chamber and a single rectangular door in the lower section on ground level (Wilhelm, 1957).

Marine birds also represented a significant source of protein for the islanders. They nested in large numbers on the cliffs along the coast and on the islets surrounding the main island, especially in the area facing Orongo. Their meat has a large amount of fat under the skin and a rancid taste, even when fresh. For this reason, it was usually cooked wrapped in the seaweed called *auke* (*Dictyopteris repens*), which seasoned the meat and gave it a better flavor. One of these birds, the spectacled tern, known locally as *manutara* (*Onychoprion lunatus*), was an important part of their culture and tradition. In the spring and the first half of the summer (September to February), the islanders would swim to their nesting sites to collect their eggs in large quantities, which they ate raw or cooked in “curanto”.

It is also easy to deduce that another permanent source of protein must have been the sea. However, some authors state that fishing was never an important source of supply, given the lack of coral reefs or atolls, unlike the majority of other Polynesian islands, which possess these characteristics making their waters highly productive. Fishing also depended on the availability of

boats, which are assumed to have been many in number during the early period, but which gradually declined due to a lack of adequate wood for their construction, thus making it impossible to travel very far from the coast to obtain resources far out at sea or from deep waters. The natives were eventually limited to fishing and collecting organisms in coastal areas.

The most popular fish among the islanders was the tuna, which tastes wonderful when cooked in “curanto” and if it is cooked several times, acquires the taste of smoked fish and can be kept for many days. These fish were caught from November to April. It was prohibited to eat tuna at other times of the year as it was believed that “the person would get sick with asthma” (Englert, 1948). The only people who could eat tuna during this time of year without suffering any harm were kings and broad-chested men or *tagnata uma nuinui*. On special occasions, when a large amount of fish was required, they turned to catching moray eels. To cook them, they were first scorched in flames and then cooked in “curanto”. This method gave the fish a nice smoky flavor, and it could then be kept for a long period of time. In the old Easter Island culture, after fishing or diving expeditions it was typical to prepare *tunuahe* or seafood barbeque. It was also common to wrap fish innards around sticks and cook them by the heat of the fire (*kokoma*), thus preserving their delicate flavor. All of this would be accompanied by seaweed and island fruit.

The rapanuis also used other marine resources to vary their daily diet. According to Englert (1948), the main types of shellfish they ate were the following:

- a) *pipi*: sea snail that was cooked in “curanto”, and the meat was then picked out of the shell using bone needles.
- b) *pure* (*Cypraea caputdraconis*): snails larger than the *pipi*.
- c) *pikē*: small crabs that were eaten raw, a practice they called *po'opo'o*, which meant eating something by sucking and making a noise with the lips. These were accompanied by fresh *auke* and cooked sweet potato.
- d) *hatuke* and *vana*: small and large sea urchins, respectively, which were eaten raw.
- e) *heke*: octopus.
- f) *takatore*: black round anemones collected from shoreline rocks.

Finally, it is notable that the marrow of the spinal column of tuna and other large fish was reserved for children. They were also given shark liver cooked in “curanto,” thus giving the infants the vitamins and minerals needed to effectively combat rickets.

## CONCLUSIONS

The Polynesians showed enormous ability in navigating the Pacific, which led them to discover Easter Island during one of their journeys. They settled there and developed a culture that, while reminiscent of other places in Polynesia, is unequivocally distinguished from any other place in the world by on the unique stamp of years of isolation. It is also notable for the process of adaptation that its inhabitants must have gone through to accommodate the particular characteristics of the island, with limited natural resources and rudimentary means, as they did not use pottery or metallurgy. Even so, the population managed to maintain and grow; giving rise to a lithic culture of monumental proportions that has survived through the ages.

Even though they were heirs of a maritime tradition from their ancestors, who lived in close relationship with the sea, Easter Islanders or rapanui people faced a new reality on this island, where there were no coral atolls, nor the calm waters of lagoons surrounding them, nor the richness of fish species that characterize other Polynesian islands. This, in addition to the lack of material, forced them to seek out new ways to build boats. They also had to adapt their fishing techniques to make the most of the marine resources available in those waters.

These marine resources must undoubtedly have been a significant source of food for the first inhabitants due to the relative ease of obtaining necessary proteins from the surrounding ocean. As the population increased and the abundance of coastal organisms dropped, they were obligated to develop new techniques for fishing pelagic and deeper water species. The remnants that are still present today show that various different methods were used to exploit marine resources. Also, their artistic expressions on sculptures, petroglyphs and rock paintings, as well as the bird-man cult, prove that the sea and its life were important to the islanders. This inclination towards the sea and fishing is still alive in the inhabitants today, and if it has not grown, it is due to the technical limitations that impede its development on a larger scale and the distance of the island from places of consumption.

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*Received: 10 March 2014; Accepted: 8 May 2014*