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Underwater Archaeological Research in Lake Titicaca, Bolivia

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Abstract: *Lake Titicaca was considered one of the most sacred lakes in the Andes prior to the Spanish conquest of 1532. Tiahuanaco, the centre of a civilization that played a dominant role in South America for nearly a millennium, was located near its southern shore, and an island in the lake was of key importance in Inca religion. Numerous legends arose about treasures and even cities in the lake, but investigations resulted in few finds. In this article a recent discovery of an underwater site is described. Artifacts from both the Tiahuanaco and Inca periods were located, and systematic archaeological techniques were utilized underwater during the study. Both the site and the archaeological remains are analyzed within the context of prehispanic and current day beliefs about Lake Titicaca.*

Introduction

Lake Titicaca has long been known to be not only the largest but also the most sacred lake in the Andes. Near it arose the population and ceremonial centre of Tiahuanaco (Tiwanaku), capital of one of the most important civilizations of South America (see Figure 1). The Tiahuanaco culture began its rise around 300 A.D. and lasted until ca. 1100 A.D., extending far into Peru and northern Chile. Tiahuanaco ceremonial sites were constructed along the shores of Lake Titicaca, indicating that the lake was considered sacred nearly 2,000 years ago. At the time of the Spanish conquest in the 1500's, one of the most important religious sites of the Inca empire was located on the Island of the Sun in the lake (Figures 2 and 3). The Incas believed that they originated from Lake Titicaca and that the deity Viracocha began his acts of creation there. Clearly Lake Titicaca played a dominant role in Andean beliefs for almost two millenna.

Legends about the lake abound. Among them are several which describe underwater cities, roads and treasures. With the development of underwater diving equipment, it was inevitable that investigations of the lake began to be undertaken. The potential value of such studies not only resided in the discovery of structures and artifacts, but in the excellent state of preservation that could be expected of some types of items found underwater.

In this article I will briefly summarize underwater archaeological research in the lake and describe a site at which ritual artifacts have been found belonging to both the Tiahuanaco and Inca civilizations. The site and finds made there will then be analyzed within the context of prehispanic and current-day beliefs about Lake Titicaca.

Summary of Underwater Archaeological Research in Lake Titicaca

The legends of treasures in Lake Titicaca began nearly as soon as the Spaniards, who entered Peru in 1532, became aware of it. In 1541 Almagro the Younger accused Hernando Pizarro of having sent men to search for treasure in the lake with the result that ten men drowned (Bandelier 1910:188). In 1621 Ramos (1978:88) wrote the then already well-known story of treasure from the Temple of the Sun, on the Island of the Sun, having been thrown into the lake in order to prevent it from falling into the hands of the Spaniards. Eventually the legend

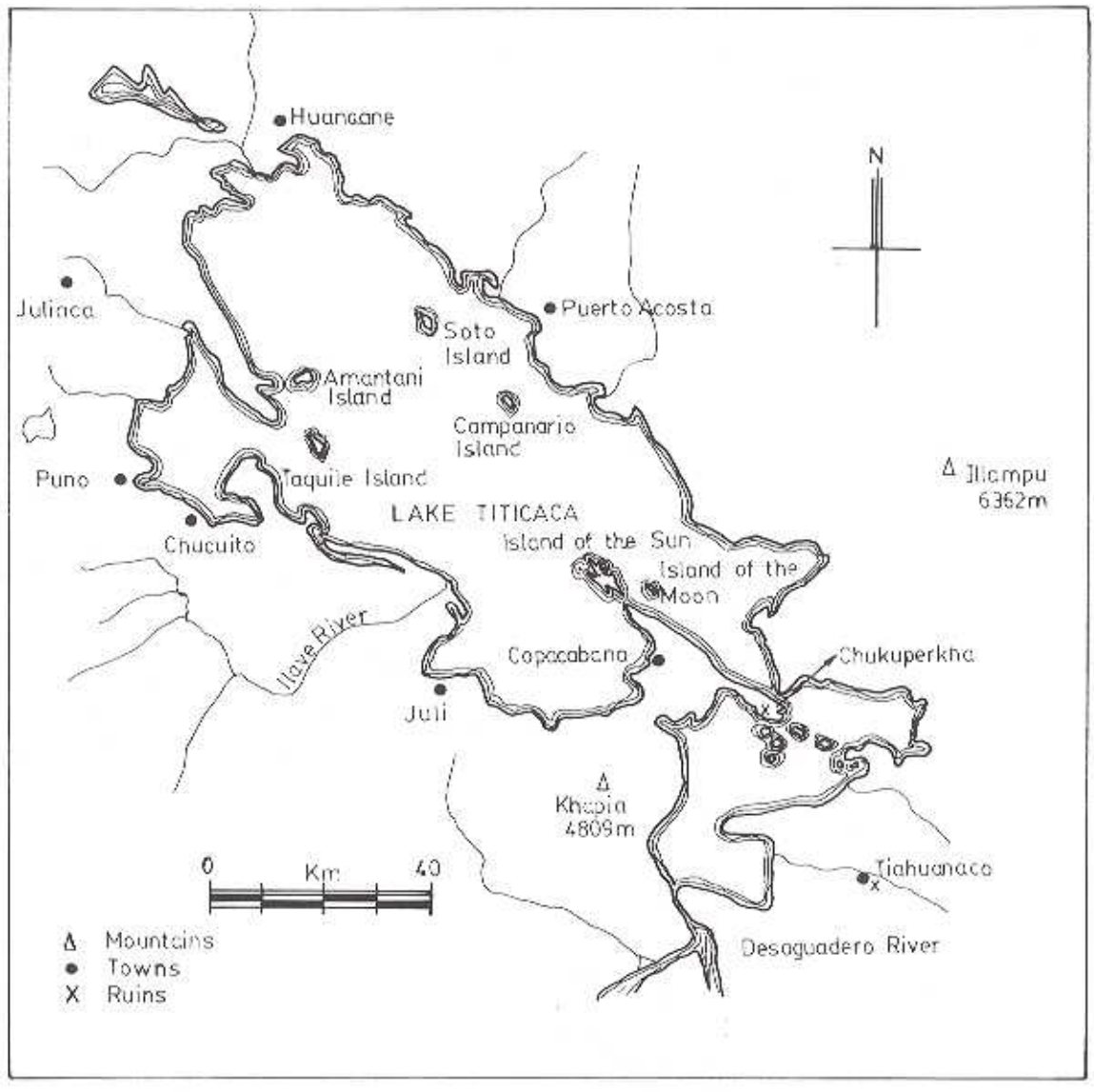

Fig. 1. *The Lake Titicaca region with principal towns and archaeological sites that appear in the text.*

arose that a chain of gold of the Incas had been thrown into Lake Titicaca. Due to the variations in the lake's level, there were periods during the following centuries when causeways, piers and other structures appeared which had been covered earlier by water, and this gave rise to many of the stories about underwater ruins, including cities.

With the development of compressed air diving equipment, it was inevitable that underwater investigations would be undertaken in the lake. One of the first people to search it for artifacts and ruins was an American, William Mardoff. Unfortunately, he did not publish a report on his expedition, and information about it comes from the secondhand source of Simone Waisbard (1975:94–100). Mardoff is said to have dived twenty-five times at various places in the lake during 1956, but to have only found some pottery. Nonetheless, according to Waisbard (1975:100), he told of having seen a city 80 meters under water. Although never verified, this story (or ones similar) eventually led to other expeditions.

One of the best known of these was undertaken by an Argentinean team in 1966 led by Ramón Avellaneda. He reported they found the remains of 30 walls, a 30 m long road and a half dozen semi-circular structures in three to eight meters of water along the coast near Puerto Acosta (northern shore of Lake Titicaca) (Avellaneda 1966) (Figure 1). Based on their plans and photographs, the Bolivian archaeologist Rubén Vela interpreted the ruins as

possibly consisting of a temple and piers belonging to the Tiahuanaco period (Avellaneda 1966; cf. Waisbard 1975:106–108). This led to news reports of an underwater city having been found.

Due in part to the report of Avellaneda, an expedition was organized by Jacques Cousteau to investigate the lake in 1968. They went together with Avellaneda to Puerto Acosta and reached the conclusion that the structures found by the Argentinean team were simply stones used to make walls to protect boats from the waves (Cousteau 1973:147).

Following a suggestion made by the Bolivian archaeologist Carlos Ponce, they also investigated the Tiahuanaco temple of Chukuperkha (Ojje) situated on the shore of Lake Titicaca (Ponce 1981b; cf. Cousteau 1973) (Figure 1). They located low walls underwater in front of the temple which likely served as breakwaters and would have extended out of the water when the lake level dropped (Ponce 1981b).

Aside from the walls noted above and a simple wall which was briefly referred to (without a location given), the only archaeological remains the expedition located were potsherds, mostly of recent origin, with a few found off the Island of the Sun possibly being Inca (Cousteau 1973).

In 1975 Carlos Ponce led a team (including two divers) to investigate the legend of an underwater stairway between the islands of Koa and Pallalla (Ponce 1989:54) (Figure 2). No sign of this was found.

In 1977 a group of Japanese divers was caught conducting illegal underwater archaeological investigations. They had principally been diving near the Island of the Sun (Figures 2 and 3). In their possession were found a piece of pottery in the shape of a puma's head, four carved stone boxes, a stone plug for one of the boxes, and five figurines made of spondylus (spiny oyster) shell (cf. Huidobro 1983:41 Shapiro 1978:19). Three of the stone boxes were rounded (circular in cross section, but narrowing slightly from base to top), and one was rectangular (as seen in a cross section) in shape, being approximately between 18–24 cm high and 16–22 cm wide, weighing ca. 8–10 kg. They all had carved depressions in their centres and rims indicating that lids had covered them. They appeared to have been used for ritual

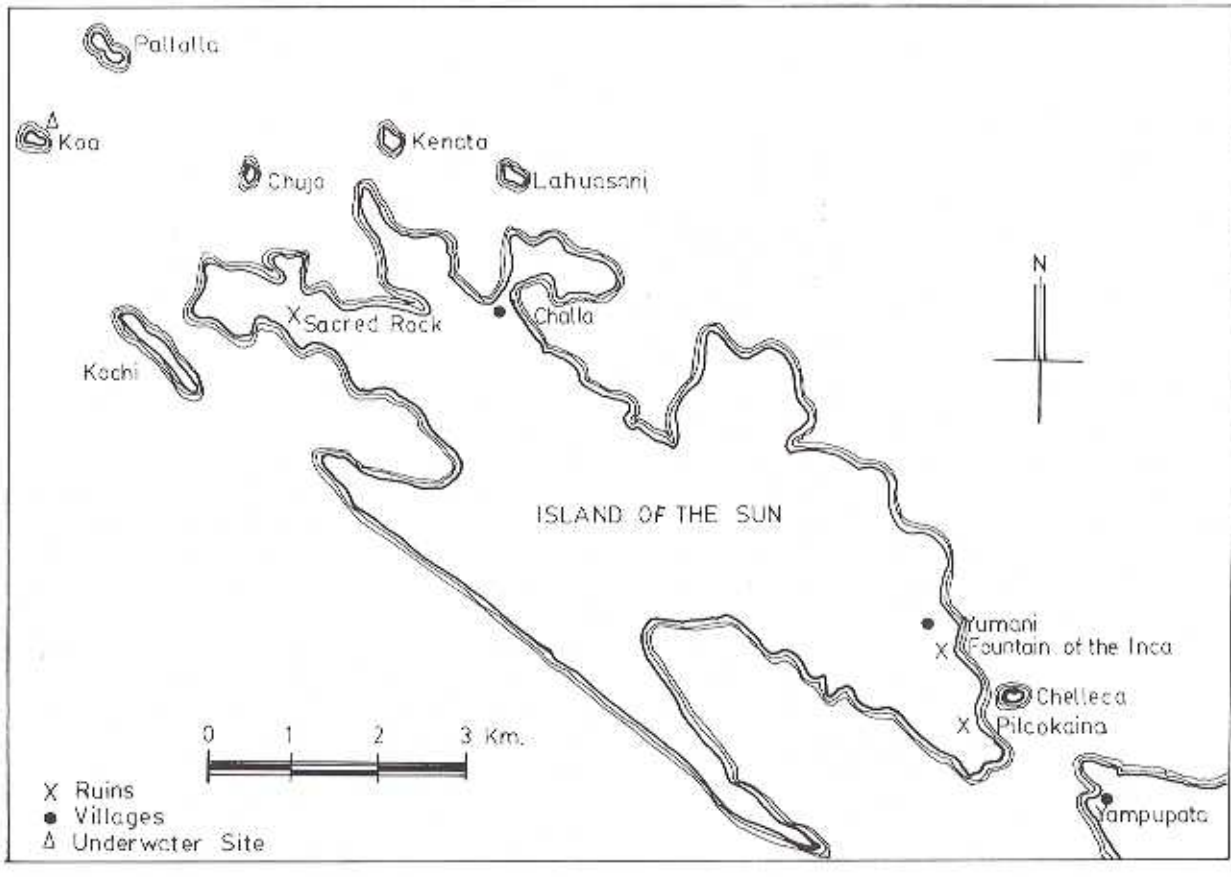

Fig. 2. The Island of the Sun and surrounding islands with the location of the underwater site noted.

purposes. The puma head was of Tiahuanaco origin and had formed part of a ritual incense burner. Based on their exterior condition, it was clear that the boxes and puma head had been extracted from the lake. Four of the figurines were of humans (two males and two females) and one of a llama, all being typical ritual offerings made during the Inca period.

The Japanese did not inform the Bolivian authorities where they had found these items. However, they did tell a Peruvian acquaintance that they had discovered an underwater city with rows of standing columns and hundreds of pots and other artifacts (Shapiro 1978:17).

In 1980 a similar claim appeared in the newspapers based on discoveries by a team of Bolivian film-makers and American divers (Huidobro 1983:5). They noted an underwater city, roads, tunnels made by man, temples, and carved stones such as at Tiahuanaco. Most of these finds related to ones noted previously, e.g. at Puerto Acosta, Chukuperkha, and a cave partly underwater on the island of Koa described by Bandelier (1910:54) (cf. Boero and Boero 1987:92, 99; Ponce 1981b, 1981c). In addition, they described finding, underwater, off the shore of Koa, stones carved similarly to the Inca carved rocks at Copacabana (Boero and Boero 1987:92–93).

During 1980 and 1981 Carlos Ponce led teams, which included divers, to investigate these sites (Ponce 1981b, 1981c, 1989). At Puerto Acosta they verified Cousteau's conclusion that the ruins were those of piers and/or breakwaters, adding that they were probably constructed at the turn of the century (Huidobro 1983:7). A detailed study of Chukuperkha was made and the walls noted as being underwater were also established as breakwaters (Ponce 1981b, 1981c). At Koa the cave was proven not to be manmade and the carved stones to have been formed by natural breakage of the rocks (Ponce 1989:58). Of interest for what was to follow later, a ridge was located underwater about 130 m from Koa towards the island of Pallalla by a diver, who identified it as being a natural formation (Ponce 1989:56). Together with Carlos Ponce and a team of Argentineans and Japanese, I visited all of the areas (with the exception of the underwater ridge) in 1981 and agreed with these findings (Reinhard 1981).

Fig. 3. View to the northwest over the Island of the Sun.

In January 1988 a Japanese team, including two divers, came to Bolivia to conduct underwater investigations. They were accompanied during part of their expedition by the archaeologist Max Portugal as representative of the Bolivian National Institute of Archaeology. It is clear that the team had obtained information on the site found by the Japanese in 1977, because they went immediately to search for the underwater ridge near Koa and had a map with the site precisely marked (Rodolfo Carbajal, personal communication 1989). They also had been told that there was a large flat stone at the site which appeared to be part of a tomb. Since the ridge is in open water about 130 m from Koa and underwater, it is difficult to find even with knowledge of its general location. Nonetheless, it was not long before the divers encountered the same types of carved stone boxes as were recovered in 1977.

There were eight carved stone boxes found during this expedition (Portugal 1988a). Four of the boxes were rounded. The dimensions of the boxes did not vary substantially from those discovered by the Japanese in 1977 (cf. Portugal 1988a and Shapiro 1978). The remaining four boxes were of similar size but of a squared shape, two having stone lids intact. In one of the square-shaped boxes three miniature golden shawl pins (tupus) of probable Inca origin were found. No pottery was recovered. All of the boxes were located at a depth of about 8 m around a naturally formed ridge (Portugal 1988a:4).

The Japanese returned in July 1988 to undertake further research in the area of Koa, once again accompanied by Max Portugal and also by Tarao Mozai, a Japanese engineer with experience in underwater archaeology (Portugal 1988c). The divers utilized archaeological techniques, measuring distances underwater and taking compass bearings from the central meeting point of lines (formed naturally) on a boulder to items found on the south side of the ridge (R. Carbajal, personal comm. 1989; cf. Portugal 1988b). For items on the north side they used the natural northwest end point of the ridge. Depths were taken using lines tied to floats at the surface. In addition, they made a detailed plan of the ridge itself.

During this expedition, they located seven pieces of pottery from different types of incense burners made during the Tiahuanaco period. They also found six stone boxes, four rounded and two rectangular (or roughly square) shaped, all with dimensions similar to those noted above. Two stones were recovered, which may have been partially worked by-man (see Portugal 1988b).

The divers described what they thought might be a section of a road or structure at a depth of 12 m consisting of two parallel rows of stones. Although a plan of the site and the measurements taken underwater have not yet been made available, it is clear that this was the first time that true underwater archaeology was conducted in Lake Titicaca.

Koa Island

As we have seen, the waters around Koa have been examined by several expeditions. A detailed study of the island, especially relating to investigations of it and its geology, has been made by Carlos Ponce (1989). It is located about 2.5 km to the northwest of the northwestern tip of the Island of the Sun at 69° 18' W longitude and 15° 57' S latitude (see Figures 2 and 4). The island is only about 300 m long and a maximum of 120 m wide (Ponce 1989:51).

Ponce (1989:51–52) noted that the name of the island has been variously spelled as Coa, Koa and Khoa, the latter name now being the one used on recent official maps. The most common pronunciation by local inhabitants today is said to be q'oa, although less frequently kowa may be used (Simon Arias, personal communication 1990). The island's name is generally believed to be derived from the word k'oa (or q'oa, see Tschopik 1951:246). In Aymara (the language still spoken in this region, as it was at the time the Spaniards arrived) koa meant a plant used as a condiment and as a medicine, as noted in a dictionary of 1612 (Bertonio 1984b:56, 154).

There is some confusion as to this plant's identification because, according to Girault (1988:168–171), the name has been used for two plants which give off a similar odour. One, Mentha pulegium, is of the mint family and is a domesticated plant introduced by the Spanish which is used by the Aymara people today as a condiment and in medicines. The other, Senecio mathewsii, is a wild native plant and the one most commonly used in Aymara rituals, often as incense (Girault 1988:168). It is probably the plant, wira-koa (or ko-ua), which Bandelier (1910:95–97) noted was used in rituals in 1895 on Island of the Sun (Girault 1988:170). Interestingly, k'oa is also the name used for a plant burned in incense burners during rituals in northern Chile, albeit in this case the plant is Fabiana bryoides (Aldunate, et al 1981:209). The common thread running through this definition is that of a plant used as incense in traditional ceremonies. It may be more than mere

coincidence, therefore, that several Tiahuanaco incense burners were found at the underwater site of Koa.

There is a further possibility which has not been examined by other authors. The name q'oa (also qoa, ccoa, qowa, k'owa) is the Quechua name used for a mythological feline which is directly associated with weather and water (cf. Mishkin 1946:464; Earls and Silverblatt 1978: 322). The name Titicaca (which was what the Sacred Rock was called when the Spanish arrived) is generally derived from the words rock (caca, a Quechua word) and titi (mountain cat in Aymara). The q'oa and titi could have been seen as forms of the same feline associated with weather (Reinhard 1987:37). This identification was in fact made by a man on the island of Taquile in Lake Titicaca (Luis Barreda, personal communication 1988). As we have seen, Koa is situated close to the Sacred Rock (Figure 4), and later in this article I will be examining the underwater site in terms of a weather/water cult.

Finally, in the language Puquina (Pukina), which was spoken near Lake Titicaca until becoming virtually extinct, the name coa meant serpent (Bouysse-Cassagne 1988: 67). Interestingly, Cobo (1964: 198) noted in 1652 that there was a legend of a serpent guarding the Island of the Sun, and Bandelier (1910: 48) told of the inhabitants belief during recent times in a large water snake, evidence of which has never been found. Serpents are widely depicted in the prehispanic iconography of the region and have generally been interpreted as being symbols of deities associated with water (cf. Ramos 1976: 103; Reinhard 1990: 171–172). Thus, although no definite origin can be given for the island's name, it held connotations in languages of the area that made it semantically appropriate for a ritual site used as part of a water cult.

Underwater Archaeological Research at Koa in 1989 and 1990

Underwater archaeological investigations were undertaken by a team of the National Institute of Archaeology (Bolivia), the Bolivian Navy, and local divers at the ridge site near Koa during June and July 1989 and June and August 1990 (see also Appendix). As we have seen, previous

Fig. 4. *The northwest end of the Island of the Sun with the Sacred Rock located above the western bay of the peninsula, the island of koa furthest to the left, and Pallalla next to the right.*

expeditions did research at the site, but no reports were provided which described in detail the methodology utilized or the context of the finds, only approximate locations being noted (cf. Portugal 1988b). A study of the site seemed essential both as a background within which to place the objects previously located and in order to carry out a systematic archaeological investigation for artifacts and possible structures as yet undiscovered. Such a project had as an additional goal the formation of a team in Bolivia with experience in underwater archaeology.

Diving at the ridge was undertaken during four periods, totalling more than two weeks. The procedure followed consisted in reconnoitring the area to find places to establish base lines, their placement, searches made for objects, the measuring and photographing of them in place, their removal and treatment out of water, and a plan made of the site.

Equipment consisted of compressed air tanks, a compressor for filling tanks, a compressor (hookah system) for supplying air from the surface directly to a diver, wet suits and other standard diving equipment, including underwater compasses, slates for writing, tape measurers, etc. An underwater camera, the Nikonos II, with a 15 mm lens was utilized for photography. Due to the altitude (3,808 m), especially adapted diving tables had to be employed. For example, at a depth of 12 m (the normal maximum depth reached) a first dive could be, made of up to 50 minutes followed three hours later with a dive of 30 minutes.

The equivalent ocean depth (in terms of diving tables) of 12 m at this altitude is 21 m. Water temperature at a depth of 8 m was 13°C in June, 1989.

The site is located an estimated 130–140 m to the northeast of Koa in the direction of the nearby island of Pallalla (Figure 2). The ridge was only roughly measured, but was approximately 45 m long, running northeast-northwest for about 15 m (including a gap in the ridge) then east-west for ca. 15 m, and once again southeast-northwest for about 15 m (Figure 5). It was separated by a natural channel about seven meters wide and four meters deep which occurred after ca. 7 meters when starting from the southeast. The top of the ridge varied in width, being perhaps four meters

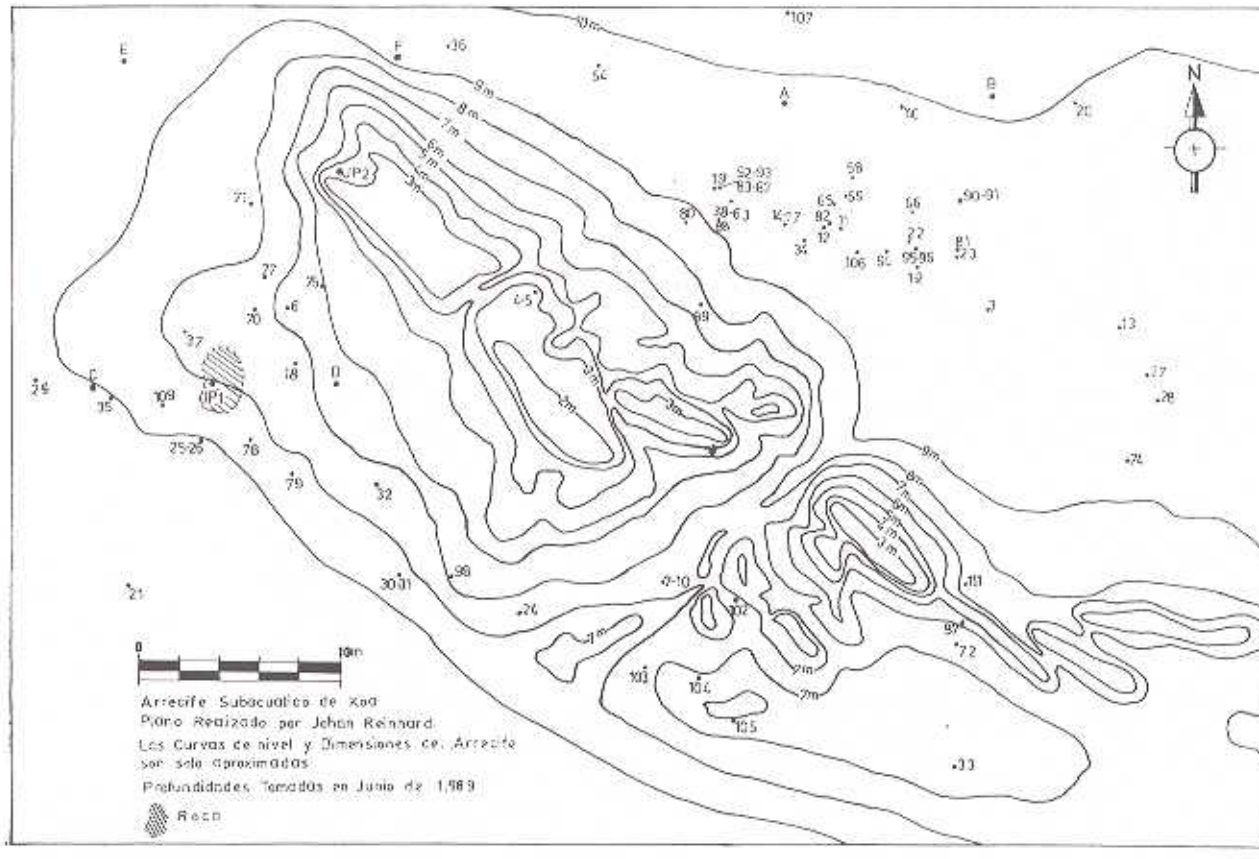

Fig. 5. Plan of the underwater ridge and location of finds made during June-July 1989 and June & August 1990. The contour lines and dimensions of the ridge are only approximate.

across at its widest, and in no place was it even roughly level. The slopes of the ridge generally dropped off steeply' until reaching about six meters depth on the south side and eight meters on the north side. After that the slope gradually descended, being fairly flat for over fifty meters out around the ridge.

Three stakes (labelled A, B and F) were placed on the northern side, two (labelled C and D) on the southern side, and one (labelled E) on the northwestern end of the ridge in order to provide base lines for triangulation to objects found (see Figures 5 and 6). The base lines were located in the flatter area (from 6–11 m deep) out from the base of the ridge. These base lines were in turn measured to the two points utilized by the Japanese for their measurements (see Figure 5).

Two types of search techniques were used. One involved a cord with knots tied at two meter intervals. The diver would make a circle at each two meter length from one of the stakes to which it was attached by a metal ring. The other technique simply involved searching in logical places, such as along the bottom of the ridge, along its top and sides, and in the channel. Visibility varied between eight and fourteen meters depending upon the wave action on the surface, but generally exceeded ten meters.

When items were located, they were usually marked with a buoy. Measurements would be taken with a tape measure or in a couple of cases with a knot in a cord which was later measured (cf. Figure 7). The depths were taken by measuring a cord tied to a float.

During our investigation of the ridge site, we located five rounded stone "boxes", one of which had a lid in place, and one rectangular stone box (all being similar to those found by previous expeditions) (cf. Figures 8 and 9). Unfortunately, the box with the lid had been tampered with, and nothing was found inside.

A unique discovery was made of a large stone container shaped quite differently from the other "boxes," and weighing considerably more (64.5 kg). This had a square base (21 cm thick) and then rose up in the shape of a truncated cone, reaching 48 cm at the top (Figure 10). Rather than a simple lid, a stone plug sealed the container. Although the lid had been tampered with, inside we found fish bones and a figurine of a male llama made of silver (Figure 11).

This container was found under an overhang of a boulder and blocked from being moved by a large rock. We could move this only by having

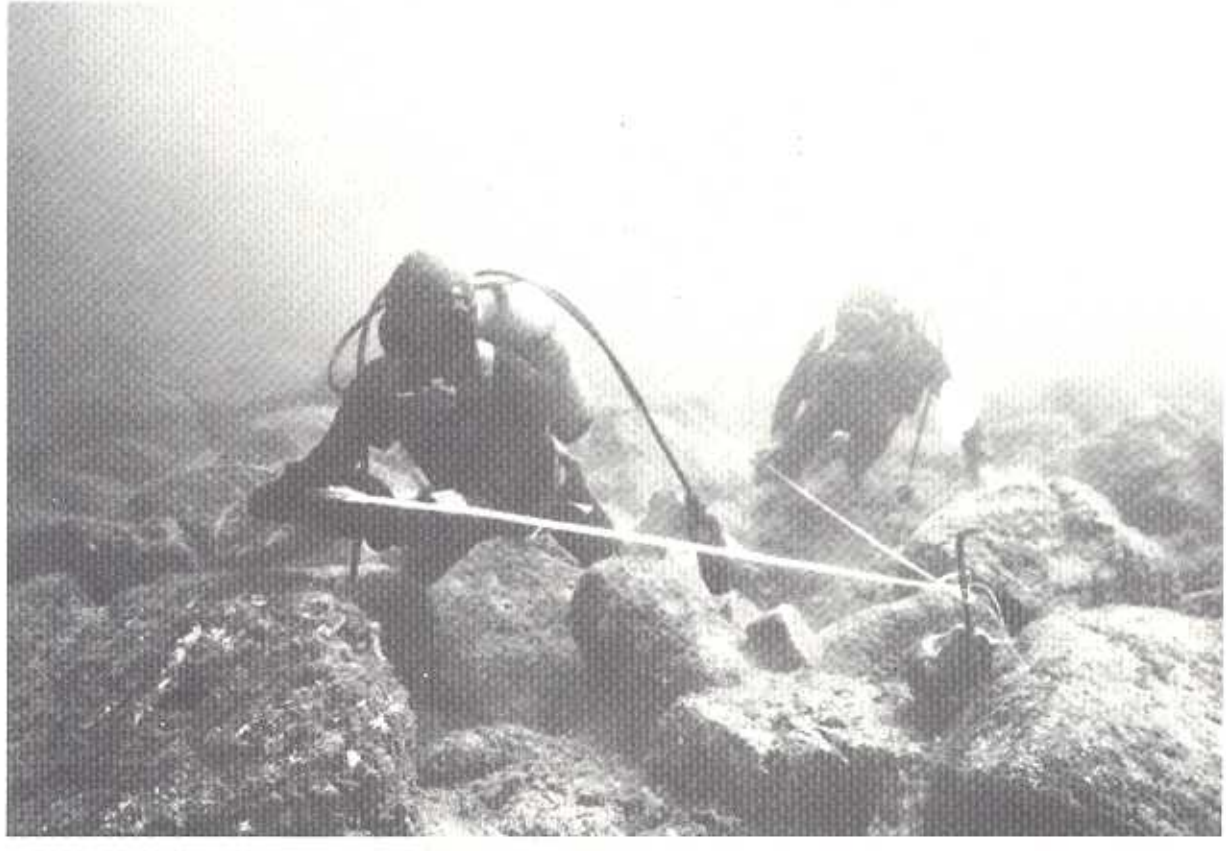

Fig. 6. Measuring from the endpoint B of the A–B baseline.

Fig. 7. *Measuring to a stone box (No. 4) with a metric tape.*

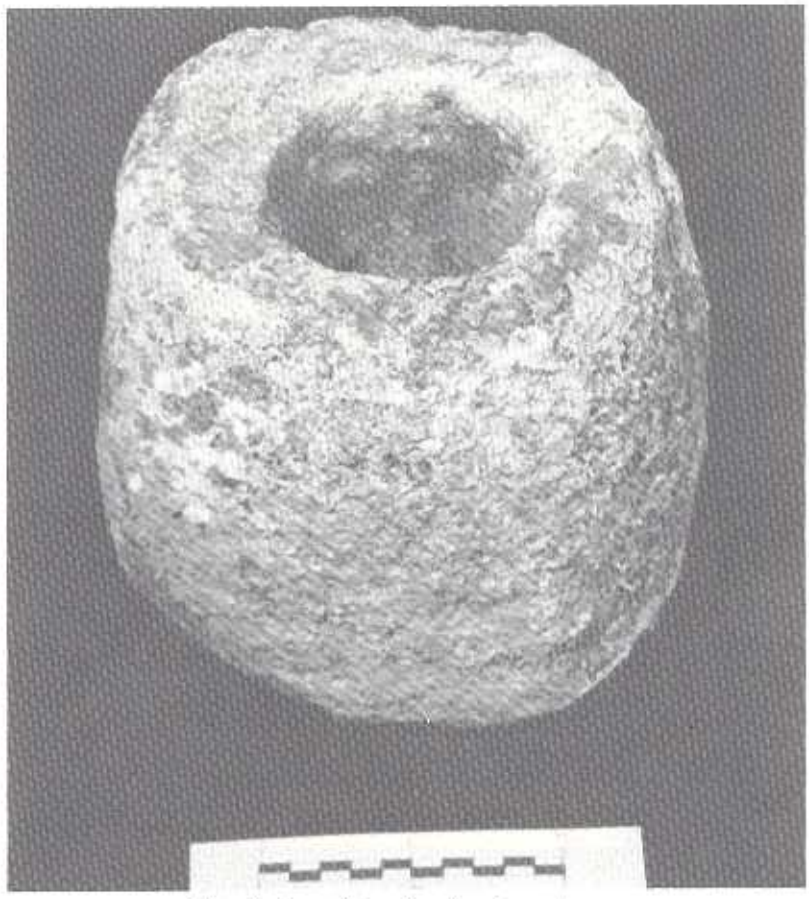

Fig. 8. *One of the circular stone boxes.*

the launch pull it aside by a rope. It seems apparent that this rock fell off the ridge after the container had itself fallen or been lowered to the spot.

According to Rodolfo Carbajal (personal communication 1989), the Japanese found the majority of the stone boxes on the southern side of the ridge, especially near the western end. Our expedition located one box on the north side, two on the summit of the ridge, and four (including the large stone container) on the south side (see Figure 5). In the case of the two boxes on the ridge's summit, they were found together in a crevice and appeared to have been there for a considerable time (cf. Figure 7).

We also located several pieces of Tiahuanaco pottery belonging to different types of incense burners and at least one vessel for holding liquids (see Figures 12 and 13). Bones of birds and of llamas and/or alpacas were generally found in association with the Tiahuanaco ceramics.[1] The pottery, including the ceramics found by the Japanese (Portugal 1988b), probably belonged to the Classic Tiahuanaco phase, i.e. dating between 374–724 A.D. (Ponce 1969:34). The majority of pottery pieces and bones were found along the base of the north side of the ridge (cf. Figure 5). (For a detailed description of the objects recovered, see Pareja 1990.)

The pieces of ceramics found by the Japanese in July 1988 were said to have been located in a 2 x 2 m square area 7.3–7.7 m deep along the same side of the ridge in the area where we also uncovered them (Portugal 1988b). This is beneath the higher part of the ridge and, therefore, the part which would have extended most out of the water when the lake level

Fig. 9. One of the rectangular stone boxes located by the Japanese.

dropped. Since we do not know the exact locations where the Japanese recovered the pottery, we cannot be sure just how widely scattered all of the pieces recovered were, i.e. including our own, but it appears that all were found in an area which did not extend beyond 10 m long and 4 m wide. Given that they were located close to the base of the ridge, it would appear that they fell off the top, presumably due to wave action once the ridge was covered by water. That they fell primarily on the north side may be due to their having been placed on a flatter area on that side of the ridge. No ceramic pieces were found on the top of the ridge itself.

A small Inca female gold statue was found on the surface to the south of the ridge and had likely been dropped by a diver from a previous expedition (Figure 14). It was recovered well away from the area in which artifacts had been located. Finally, two pieces of unworked spondylus shell were recovered on opposite sides of the ridge (Figure 5).

The larger artifacts, such as the stone boxes, were generally placed in a basket which was then pulled to the surface while guided by a diver (cf. Figures 15 and 16). Small items, such as the bones and some ceramic pieces, were carried up in mesh bags. The heavy stone container had to be hauled to the surface in a large sack. Once out of the water, the ceramic pieces and the contents of the closed stone containers were treated chemically (see Pareja 1990).

Interpretation of the Koa Site and Archaeological Remains

The archaeological finds made at the ridge near Koa indicate that it was a ceremonial site. An

Fig. 10. *The unusual stone container (no. 8) found to the south of the ridge. Inside it were a silver llama figurine and fish bones.*

examination of the objects will now be undertaken in order to establish their cultural affiliation and an attempt will be made to provide an explanation as to why the ridge at Koa became important in religious terms prior to the Spanish conquest.

The boxes were made of andesite, which apparently does not naturally occur on the islands (cf. Bandelier 1910:218), but is available on the Copacabana peninsula. They were clearly for ritual use. A few had small rectangular-shaped openings in their sides with holes that reached the central hollow part of the boxes. These may have been used to pour out liquids from inside them (Portugal 1988a) or as channels for the offerings to enter the lake water when the boxes were placed at the site.

Fig. 11. *The silver llama (no. 7) was found inside the stone container (no. 8).*

The boxes were most likely made during the Inca period, because the gold female statue, silver llama figurine, and miniature tupus (shawl pins) of gold (probably used along with miniature clothing to cover a statuette) were of likely Inca origin and the latter objects were found in two of them. In addition, five Inca figurines made of spondylus shell were recovered along with the stone boxes found by Japanese divers in 1977. According to information obtained by Max Portugal (1988a:5), the figurines had been found inside the boxes. Since the figurines are small (ca. 4 cm high and thus difficult to detect underwater) and well preserved (they presumably would have been in worse condition if unprotected in open water), this information is probably correct.

Would the boxes have been placed on the dry surface when the island extended beyond the surface of the water or lowered or dropped on to it when it was submerged? It seems probable that the boxes were made to be lowered onto the submerged reef. The types of stone boxes found are not typical of stone recepticals and vases made on land, and they were constructed with lids. They might have been placed on the top of the dry ridge with the realization that the lake would eventually cover them. However, some of the boxes have groves along their sides which indicate that they were made to hold ropes for lowering them (cf. Portugal 1988a). In addition, if the Incas had made offerings while the ridge extended out of the water, we would expect to find some ceramics, yet this was not the case. Finally, there is reference in a text of 1621 (Ramos 1976:95–97) to stone boxes having been made in order to be lowered into the water. This account should be summarized because of its potential to shed light on the offerings at Koa.

According to this story, the Inca emperor Huayna Capac decided that only one deity, Yatiri (which Ramos wrote meant "he who knows all"), should be worshipped in the realm. When the idol did not respond to his requests, Huayna Capac thought that this might be due to its being placed in the temple dedicated to the Sun (i.e. on Island of the Sun) with whom Yatiri was irritated. He decided to move Yatiri's place of worship to another island, called Apingüela in ancient times, that was visible from the Island of the Sun in the direction of Huancane (to the northwest in Peru). In the 1600's this island was called Vilacota, which Ramos stated meant "lake of blood".

Nonetheless, due to the command of an oracle, sacrifices began to be made not on the island Vilacota, but rather on a small one near it called Paapiti. This island had the peculiarity of being very serene and for this reason became especially important to Huayna Capac, who was proud of the multitude of people that would visit the place of worship he established, despite the difficult navigation and risks involved.

However, after the first winter the level of the lake rose to such an extent that water completely covered the island hiding it from view. Huayna Capac ordered that the island be found and that there be made small boxes, well carved and with lids, in which they put the offering and with ropes let them be dropped onto the place, where, before, they had made sacrifices on dry land

Fig. 12. *A piece of Tiahuanaco incense burner (a, top left) (no. 3) found at the site with a complete one (b, top right) beside for comparison. The ceramic shown in (b) is similar to the one in (a), the feet only being slightly less pronounced. A complete incense burner (c, bottom) (no. 39) found in 1990. Photo (b) Eduardo Pareja from a ceramic piece at the Museo Nacional de Arqueología, La Paz.*

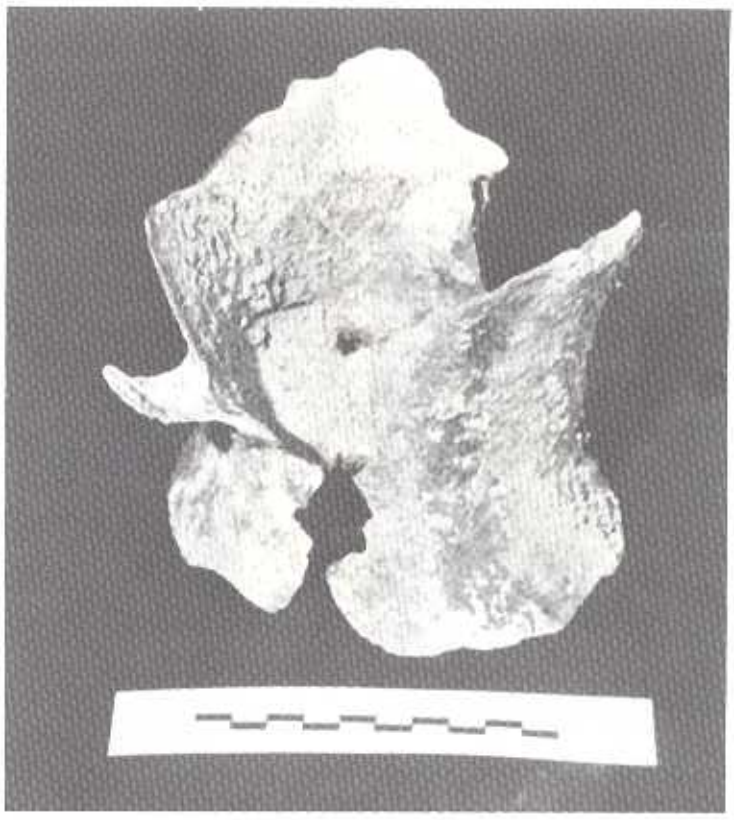

Fig. 13. *A piece of a Tiahuanaco vase-like incense burner (a, top) (no. 1) with a complete one (b, bottom), approximately similar in form, beside it for comparison. Photo (b) by Eduardo Pareja from a ceramic piece in the Museo Nacional de Arqueología, La Paz.*

(Ramos 1976:97), the neighbouring island of Vilacota got its name from the blood placed in the small boxes of the children and animals that were sacrificed.

Fig. 14. The gold female Inca statue (no. 21).

The reign of Huayna Capac is generally accepted as having been from 1498 until 1525 (Rowe 1946:205). Results of a study of ice cores made in a glacier about 230 km to the northwest of Lake Titicaca indicate that a wet period began in 1500 and extended until 1720 (Thompson, et al 1985). The authors claim that their results would be valid for much of southern Peru. Since the mountain range in which the cores were taken is the source for some of the rivers which feed into Lake Titicaca, increased precipitation would certainly have caused an increase in the water level of Lake Titicaca. Of course, even short-term climatic changes could cause a substantial rise in the lake's level, as was clearly demonstrated when two years of heavy rains caused an increase of 2.81 m above normal (with the zero point established as 3,808.272 m) in 1986 (Peñaherrera del Aguila 1989: 292).

The ice core study found that there was a dry period between 570 and 610 A.D. This was during the Classic Period of Tiahuanaco to which some of the identifiable ceramic pieces found at Koa belong. In any event we know that the lake level did not rise more than it does in modern times, because a Tiahuanaco temple was built on a low island in the mouth of the Desaguadero River (flooded over in 1988) and another was near the shore of the lake (Ponce 1981a:131; Bennett 1936:500). Based on studies done in this century, short-term climatic changes could cause a significant drop in the lake's level (e.g. 3.695 m in December 1943) (Antuñez 1983: 33).

However, it would seem to be too much of a coincidence that offerings were placed in Inca carved stone boxes (with the probable intention of being lowered into water) during a wet period and Tiahuanaco incense burners and vessels (which would seem only appropriate for a dry place) were deposited during a dry period. Both the type of offerings and periods in which they were made point to the ridge at Koa having extended – at least for a short time – above the lake's level during the Tiahuanaco period and below it during the Inca period.

The legend of the island of Paapiti does not agree in several respects with the facts regarding the underwater ridge near Koa. It is difficult to imagine the ridge ever having been "serene," and it is too narrow for a "multitude" of people to visit it. Although 6–8 m below the ridge it begins to slope more gradually, there is no evidence that the lake level dropped so low during either the Tiahuanaco or Inca periods. Both Tiahuanaco and Inca artifacts were found only near the bottom of the ridge or on it, indicating that offerings were most likely made originally along the ridgetop.

The action of waves was probably responsible for many artifacts being found scattered along the sides and slightly out from the base of the ridge. Another possibility is that when the lake level dropped local inhabitants found some of the boxes and threw or knocked them off the top, perhaps first emptying them of their contents. This would explain why some of the boxes had no lids and why nothing was found in some of those which did have them. However, since statues were found in some boxes and a couple of boxes were found along the top of the ridge, it seems likely that wave action was largely responsible for the present situation, although divers doubtless extracted statues from boxes in a few cases.

The island of Vilacota (Apingüela) was identified in a map prepared in 1573 for the

Fig. 15. *A ceramic piece brought up in a basket.*

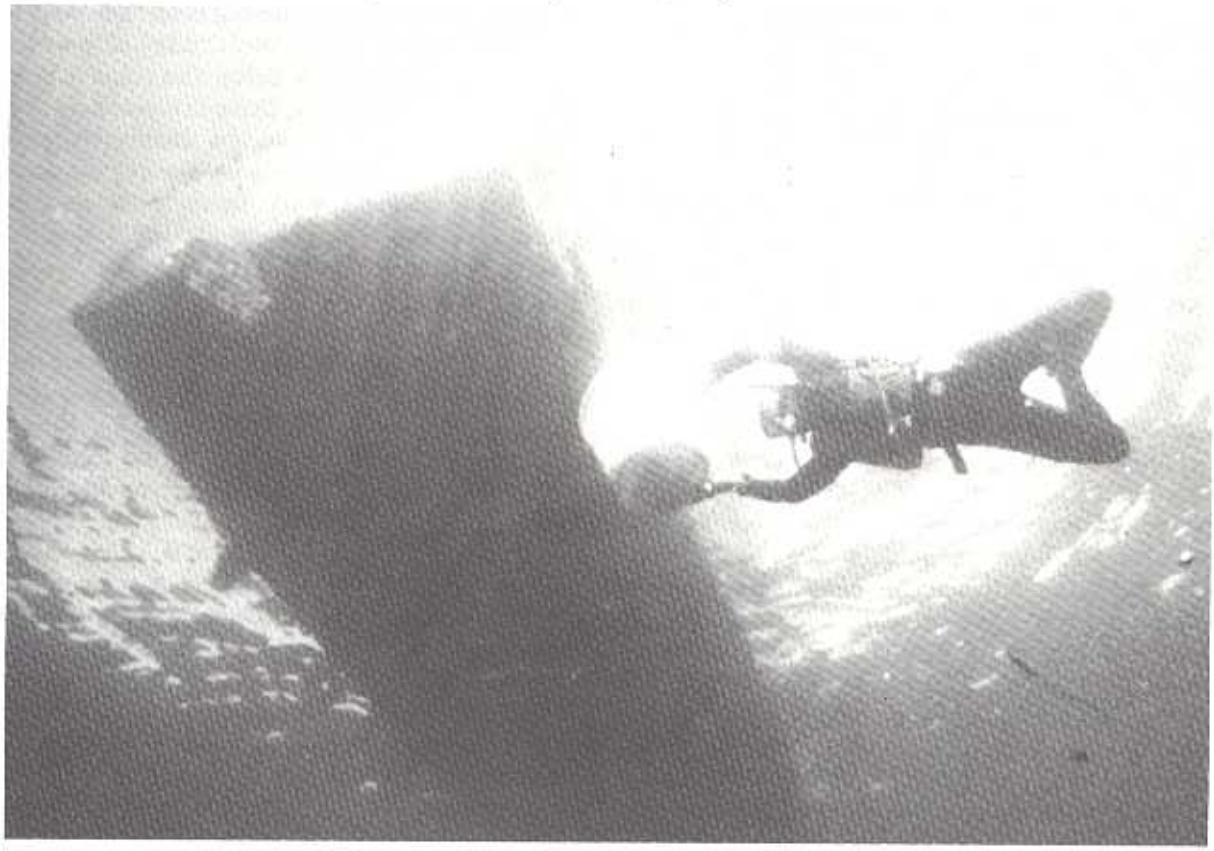

Fig. 16. *A diver assisting the basket as it is hauled to the surface near the launch.*

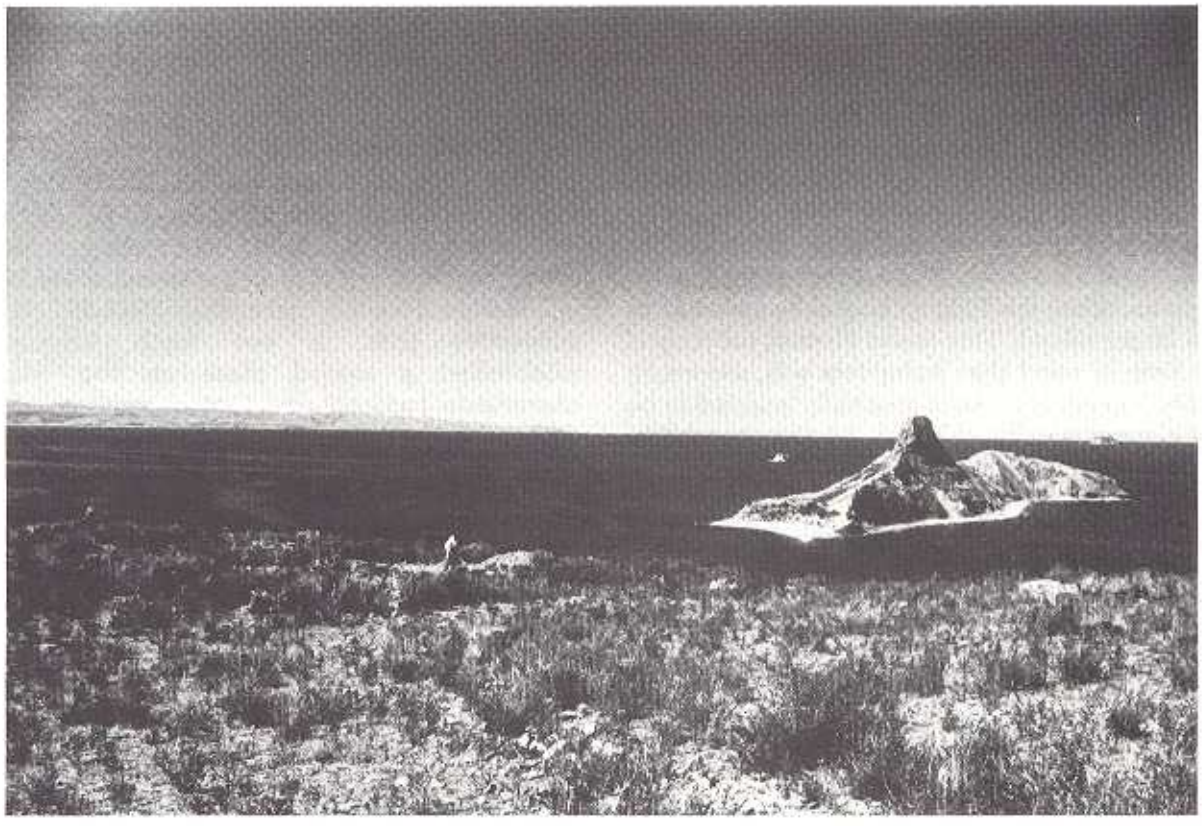

Fig. 17. *The island of Campanario with Bendita just beyond to the left and Choquella in the distance to the right.*

Viceroy Don Francisco de Toledo (see Bandelier 1910) as the one called Campanario today (cf. Figure 1). Not all maps agree with this, however. A map drawn by Antonio Raimondi in the late 1800's places Apingüela to the southeast of Campanario (see Bandelier 1910). This latter island is called Choquella on most current maps. Both Campanario and Choquella are in the direction of Huancane as seen from Island of the Sun, and a reasonably sized islet is near Campanario and named Bendita.

Bandelier (1910:251) noted that in the late 1800's Apingüela was sometimes called the "island of the devil." He lists (1910:18) Campanario and Apingüela separately, but from his description (1910:228) it appears that Apingüela is the same as Campanario and Paapiti is the island of Choquella. Bandelier (1910:251) pointed out that the legend of Apingüela was mentioned only by three chroniclers: Ramos, Calancha and Nicolas. They were all Augustines, and Calancha and Nicolas borrowed their material from Ramos. He viewed the story with suspicion.

In 1990 we investigated, both on land and underwater, Campanario, Bendita (and a ridge between it and the main island) and Choquella (cf. Figure 17). Only at Choquella were artifacts seen underwater and none were observed on land. The objects underwater consisted of a dozen rectangularly carved stone blocks and one partially completed circular stone anchor of uncertain date. The islet of Bendita was small and steep, rising about 16 m out of the water, while Campanario reaches about 80 m above water level and Choquella about 50 m. The only possible candidate for having been covered by water would have been the ridge between Campanario and Bendita, a small part of which extended about a meter above the water during our visit. A careful search around this ridge (and along it to Bendita) provided no indication of artifacts having been deposited on it.

We were told by an old inhabitant of Campanario that the main island used to be called Chikipa, its southern end (with a steep hill on it) was separated from it by a narrow isthmus (under a meter of water in June 1990) and called Apinguila, and the islet of Bendita had been named Campanario because there was the legend of a bell (campana) existing underwater nearby.

Given our findings at the outer islands, and aspects of the story which do seem to apply to the ridge near Koa, it would seem likely that this was the islet of Paapiti. Perhaps through time there had been some mixing of the names of the

islands and/or certain elements of the legend. Apingüela may have been originally used for the island of Campanario, which is indeed a "serene" island (and requiring difficult navigation to reach it from the Island of the Sun) and on which numerous pilgrims could have landed. However, in that case it was not close to Paapiti (assuming the one at Koa deserves this distinction), and we would also have to hypothesize that some characteristics noted for Paapiti originally referred to the larger island. This is not all that unlikely if we keep in mind that Apingüela was, according to the legend, the island originally selected to be the place of worship of Yatiri. Another possibility is that Apingüela may have applied originally to Koa and had later been used for Campanario, perhaps as a way to divert the attention of the Spaniards, who heard that there was a large amount of gold on Paapiti (Ramos 1976: 97).

As for identifying Paapiti with the underwater ridge of Koa, it should be noted that Koa is in the direction of Huancane as seen from the Island of the Sun. The highest part of the ridge must have extended out of the water during dry periods even in recent times, e.g. in 1948, since it was 2 m below the surface in June 1989. It could easily have been covered again by water within a single season, as the legend states. Most importantly, the description of the "small boxes" noted by Ramos fits the Inca boxes which have been recovered from the ridge.

People on the Island of the Sun still refer to the ridge as the "altar of Viracocha" and avoid passing over it in their boats. Viracocha is the name of the Inca creator deity who was closely associated with water cults in general and with Lake Titicaca in particular (cf. Cobo 1964:63; Polo 1916:110). In some accounts he is believed to have dwelt in the lake (Acosta 1962: 63). In Quechua his name has been translated as "foam of the sea" (Cieza 1977:20). Another possibility is that the name is of Aymara origin and has as one meaning "one who knows" (Bertonio 1984a: 226). This is the same meaning of the word yatiri (cf. Ramos 1976:95; Berg 1985:211), which was the name that Ramos listed for the deity that Huayna Capac worshipped on the island.

Rowe (1960:411–412) noted the possibility that Vilacota may be an Aymara loan translation of Viracocha. Cota and cocha both mean "lake", while vila means "blood" in Aymara, and vira means "grease" or "foam" in Quechua. The semantic connotation of vira goes beyond its literal translation, however, having a meaning in ritual contexts closer to "energy principle", "essence", or "vital force" (cf. Bastien 1978:45). This is similar to the connotation of blood, which also is conceptually linked with water in Andean beliefs, both providing the life force (Randall 1987:72).

Assuming some validity to the legend, it may be that Huayna Capac was actually trying to establish a special place of worship for Viracocha, who in some early accounts was noted as having done his acts of creation at the Island of the Sun (cf. Molina 1959:13; Sarmiento 1943:39). It is suggestive that in one myth Viracocha established a sacred place on the island (Sarmiento 1943:40) and that in another myth Tunupa, an Aymara weather god often assimilated to Viracocha, is said to have resided at the Sacred Rock (Santacruz 1968:284). It might be recalled that the Sacred Rock (Titicaca) was thought to have been named for a feline which was in turn linked with weather. Perhaps the later emphasis on the sun cult at the Sacred Rock led to the search for a place more in keeping with a deity from the Inca pantheon who was associated directly with Lake Titicaca.

There was considerable religious interest during the Tiahuanaco period in the lake, as demonstrated by the majority of Tiahuanaco temples having been built near it (cf. Ponce 1981a:129–133). The important temples at Pajchiri and Lucarmata were built on high land that became virtual islands when the lake level rose. Indeed, one temple was even established on the island of Simillake in the Desaguadero River near Lake Titicaca (Bennett 1936:500).

The Tiahuanaco temple at Chukuperkha was constructed with a precise knowledge of, and thus concern with, the variations in the lake's water level. It has been interpreted as having been used to examine such fluctuations in order to determine the coming year's rainfall and thus the success of crops (Ponce 1981c). It is possible that the ridge at Koa, which clearly demonstrated changes in water levels, may have been utilized in this way as well. In the altiplano, people still check the levels of water in pools and lakes to predict the coming year's weather. Of course, any change in the level of Lake Titicaca would have been attributed to the action of a god (or gods).

Tiahuanaco ritual items have been found on the Island of the Moon at the same place where the Incas subsequently built the temple of the Moon (Bandelier 1910:270; Plates 78, 81; cf. Ponce 1981a:129). Also at this location were uncovered a Tiahuanaco canal and pottery (Eduardo Pareja, personal communication 1989). Tiahuanaco ritual objects were found on the

Island of the Sun (Bandelier 1910:173, 185; Plates 21, 31, 49; cf. Ponce 1981a:130 and 1969:34–39), including near the Sacred Rock (Eduardo Pareja, personal communication 1989). Members of our expedition in June 1990 found parts of Tiahuanaco incense burners and other pottery near the village of Challa Pampa, at the lake's edge not far from the Sacred Rock. At the Pumapunku temple at Tiahuanaco the Incas made structures and offerings (Cobo 1964:198), and they also did this at the Tiahuanaco ceremonial site of Pajchiri (Bennett 1936: 456–467). It is, therefore, clear that the ridge at Koa was within the sphere of Tiahuanaco religious interests as they related to Lake Titicaca and that the Incas respected ritual sites associated with the Tiahuanaco culture. Since in the Andes it was not possible to separate religion from politics and economics, the continued worship at sites pre-dating the Incas must have had political and economic functions as well (cf. MacCormack 1984).

Important elements of Tiahuanaco were built with stone taken from the shores of Lake Titicaca (Ponce and Mogrovejo 1970), and Tiahuanaco was linked to it via a river. Tiahuanaco's location has been interpreted as related to some extent with its position relative to Lake Titicaca and its function as part of a water/fertility/mountain cult (Reinhard 1990). The control of water played a crucial role in Tiahuanaco culture as can be seen in its use in a highly sophisticated system of raised field agriculture that allowed for a population of over 40,000 to be fed (Kolata 1986:780).

Although I am primarily concerned here with Tiahuanaco and Inca influences in the region of Lake Titicaca, it should be pointed out that during the period between the Tiahuanaco and Inca cultures there was no lack of religious interest in the Island of the Sun near Koa. Historical sources refer to the Sacred Rock as having been an important place of worship prior to the Incas (of. Ramos 1976:20–21; Bandelier 1910:65): and archaeological remains demonstrate that the island was continuously occupied during that time (Bandelier 1910).

Koa, and thus the location of the ridge, is visible from the northern end of the Island of the Sun, which itself was one of the most sacred places in the Inca empire (Ramos 1976: 20). As noted above, Tiahuanaco ritual items have been found on the Island of the Sun (Bandelier 1910; Ponce 1969 and 1981a) (cf. Figures 2 and 4). It may have been of importance that the ridge has the approximate shape and size of the Sacred Rock, where the Incas worshipped the birth of the Sun and near which Viracocha and the Weather God were also worshipped (Cobo 1964: 193). Even with the ridge below water, it is visible from the surface, and it would have been a simple matter to have taken soundings in order to determine its size.

Interestingly, there is a current belief that a spirit resides on a mountain in the bottom of Lake Titicaca (Berg 1985:46). Its name, Chuqilla, may be derived from Chuquiilla, one of the names of the Inca Weather God, Illapa (Cobo 1964:160). This deity controlled meteorological phenomena and thus, of course, the circulation of water. Illapa shared many similarities with the weather god of the Aymaras in the Titicaca region, who was called Tunupa, and often their names were used interchangeably (cf. LaBarre 1948:170; Ponce, 1969:163, 184).

Ponce (1969:37–39) noted that the majority of anthropomorphic statues of the Tiahuanaco period found on the Island of the Sun were hunchbacked. He added that these were closely related to a deity which controlled lightning (probably Tunupa) whose principal centre of worship during the Tiahuanaco period was on the Island of the Sun (Ponce 1969:38, 1851). The relationship between Viracocha and Tunupa/Illapa is still unclear (cf. Ponce 1969; Demarest 1981; LaBarre 1948; Santacruz 1968), but they were all closely linked with water, weather, mountains, fertility and with Lake Titicaca (cf. Reinhard 1990).

The role played by the water of Lake Titicaca in agriculture can be seen in the belief that it is part of the hydrological cycle that brings rain to the earth for crops (cf. LaBarre 1948:183), and this belief was held in Inca times as well (Earls and Silverblatt 1978;304). One example of such a belief was noted by Paredes (1978:75), in which a deity which controlled weather would sometimes reside in Lake Titicaca and take its waters into the sky to then let fall as rain in order to fertilize his consort Pachamama (the Earth Mother). Tschopik (1951:197) wrote of the lake water being used in a rite to provoke rain, and on the Island of the Sun frogs and water from the lake are still used in ceremonies to invoke rain (Eduardo Pareja, personal communication 1989).

Prehispanic tombs were found on the nearby island of Pallalla (Ponce 1989:53), indicating an association of the area with ancestors and the afterlife. One of the most important Inca cemeteries on the Island of the Sun was at its northern tip, which is the part nearest to Koa

(Bandelier 1910:228). It included stone cists of a type which Bandelier (1910:228, 209–210) interpreted as having been utilized for human sacrifices. We were told by people from the Island of the Sun that about 50 years ago tombs had been uncovered on Koa and objects of Inca origin discovered in them. In the 1600's Lake Titicaca was believed to be a place where souls of the dead resided (Marzal 1988:238). If human sacrifices were made at the ridge, as the story noted by Ramos suggests, this would have further reinforced the link between the lake (or at least this section of it) and the dead. Lakes in general were often seen as "doors" to the Underworld (cf. Flores 1988:238) and associated with the dead (cf. Cieza 1984:222).

It may not just be coincidence, therefore, that the only boxes I have seen similar in construction to those found at Koa consisted of one found while ploughing a field on the Island of the Sun (the context was not reported, but it may simply have been one taken from the site at nearby Koa and abandoned later), one discovered in a funerary tower near Puno on the western shore of Lake Titicaca (Wiener 1880:698), and one from a burial site in the central Andes of the Cordillera Blanca (Reichlen 1961). The latter was especially like the rounded boxes at Koa, but was much larger, being used as a funerary urn. Thus at both places where they were found in context, the boxes were associated with funerary practices. Although not dated, it appears that all of these boxes were from the Inca period or slightly before it.

An interesting interpretation by a ritual specialist on the Island of the Sun was that the boxes from Koa had been used to trap the souls of the dead who were being punished by being placed in the lake. Whether or not intended for funerary use, the boxes were clearly utilized for ritual sacrificial offerings, and, given the evidence, it would seem possible that some may have served as containers for human blood offerings as well.

Koa has itself been viewed in recent times with some fear. An aquatic animal was believed to reside in a cave on its east side (Bandelier 1910:54, 57). Koa also had the reputation of being surrounded by the deepest waters of Lake Titicaca (Bandelier 1910:54), and this would have added to the reverence in which it was held and increased its association with a deity believed to reside in the lake.

In a current legend, a submerged city, called Markha Phampa, is said have existed between the islands of Koa and Pallalla (Boero and Boero

Fig. 18. *A view to the east over the Chinkana ruins in the foreground and the Sacred Rock beyond it. Ancohuma (of the Illampu massif) of the Cordillera Real is in the background.*

1987:55), i.e. in the area where the submerged ridge lies today. It existed before there was a lake, and in the city was a temple into which only women dedicated to the Sun could enter. Each day these women would go to fill their water jars at a spring located in the Chinkana ruins near the Sacred Rock (see Figure 18). One day two men followed the women and surprised one of them who dropped her water jar. This broke, and due to the power of Viracocha the water continued to flow out of it until it created Lake Titicaca. The two men were turned into ducks as a punishment.

Two aspects of this myth appear of interest. One is the belief that there was a temple located between Koa and pallalla, and the other is that it was associated with a change in the level of water. Although in general terms the story is only a legend, it nonetheless appears to have some basis in the facts as they relate to the ridge near Koa.

The above data may help to answer the question as to why this particular place was of ceremonial importance during both the Tiahuanaco and Inca periods. As an island that could appear and disappear beneath the lake waters, it must have provoked some awe on the part of the local inhabitants, who would probably have attributed this to the powers of a deity associated with the lake. This continues to be the case to date, and local inhabitants also noted that the ridge appeared to move. We found that this is an illusion which is easily understandable, because it is not easy to locate the ridge even when a person has been to it recently. Reference points and distances are difficult to judge when in open water.

This may also account for the story about a stairway existing between Koa and Pallalla noted earlier. Since the ridge is visible beneath the water, and a part of it must have appeared above water during the drought of the early 1940's, local inhabitants possibly mistook its broken and narrow aspect as a stairway. It should be noted that we did not find remains of any structures at the site, nor of the large stone slabs which the Japanese in 1977 reportedly saw. The rows of stones which the Japanese in 1988 thought might be a road or part of a structure proved to be part of a natural rock formation.

There are no records of archaeological remains having been found on Koa (Ponce 1989), although stones have been reported as possibly being from prehispanic walls (Portugal 1988c) and we have already seen that tombs were reportedly found there. We were also told that a hole in the northern end of the summit ridge on the island of Koa (now blocked with stones) was originally connected to the cave below by a stairway, a story we consider doubtful.

In recent times the island was visited by inhabitants of the Island of the Sun in order to take eggs of the cormorants that nested there (Bandelier 1910:64). and as a place of rest for fishermen. Perhaps its being a major nesting place for a bird so closely linked with water added to beliefs that Koa was associated with a water deity.

Since artifacts associated with rituals make up the vast majority of those found at the underwater ridge (a grinding stone taken from the Japanese in 1977 may not have been from the site), it seems clear that the site was used exclusively for making offerings to a deity (or possibly several deities). Given its characteristics, it is reasonable to assume that the offerings were primarily for a deity associated with the lake. This worship was probably for economic production, especially for fishing, and for rain for agriculture and pastoralism, just as is the case today (cf. Tschopik 1951:200; Berg 1985:50). In the Inca period it was common for offerings to a lake to be thrown into it (cf. Guaman Poma 1956:192).

For example, offerings are widely made to lakes for the fertility of llama and alpaca herds because they are believed to have originated from them (cf. Duviols 1974–78:283). We have seen that llama or alpaca bones (associated with Tiahuanaco ceramics) and Inca llama figurines were found at the site, one of them being in an unusual carved stone container. Such figurines, which we know were offered to lakes and springs during the Inca period (cf. Cobo 1964:178), have been widely interpreted as being utilized in rites for increasing the fertility of herds (cf. Arriaga 1968:29: Reinhard 1985:313; Tschopik 1951:277). Llamas were often sacrificed as offerings at these and other fertility rites (cf. Arriaga 1968:42), and still are on Island of the Sun (Huidobro 1984).

One of the llama figurines was made of silver and one of spondylus, the spiny oyster shell found only in the warm waters outside of the Humboldt current, i.e. off the coast of Ecuador and further north. Spondylus was not only used for a llama figurine, but also for two female and two male statues from the site. In addition, two pieces of unworked spondylus shell were recovered. Spondylus shell was highly valued by the Incas who considered it essential for rituals for rain due to its association with the ocean, mother of all waters, and believed connected to Lake Titicaca (Earls and Silverblatt 1978:304).

In the case of the anthropomorphic figurines, spondylus shells were presumably used to represent deities associated with water and fertility (Reinhard 1985: 313). Lake Titicaca was believed to be linked with Mamacocha, Mother of Water (Cobo 1964: 161), but also was associated with the male deity, Viracocha, and with male mountain deities (Reinhard 1990: 168). This might explain why both male and female figurines were offered.

Silver and gold as precious metals were often used for making statues, independent of the sex and type of deity being represented. Silver has been conceptually associated with lakes in the central Andes in recent times (Favre 1967:138), and this was apparently also the case during the Inca period (cf. Cobo 1964:178).

Three miniature gold shawl pins (tupus) were found in one of the stone boxes, and they were undoubtedly utilized to hold the clothing of a female gold statue. Unfortunately, this figurine was not in the box when it was taken out of the water. The clothing would have decomposed in the water long ago. As noted above, we found an Inca female gold figurine on the surface in about 8 m of water, and, if not the same, it was surely nearly identical to the missing figurine, because the Incas rarely varied significantly the basic model used for such statues.

Several pieces of different types of Tiahuanaco incense burners were found and these, obviously, were used for making offerings. Today Aymara Indians still go by boat to selected places in the lake where they then burn incense to the lake spirit in rites which invoke rain (Berg 1990:109).

Many of the incense burners were decorated with the heads of felines, presumably pumas. LaBarre (1948:203) stated that the puma was one of the major symbols of a deity in the region of Lake Titicaca which controlled weather. The association of felines with weather deities is widespread in the Andes (cf. Reinhard 1990: 170–171). Indeed, the very name of the Sacred Rock, Titicaca, has generally been translated as the rock (caca) of the mountain cat (titi), and the titi was closely linked with a weather deity (Reinhard 1990:176, ftn 11). As Bandelier (1910:238) noted, it was the rock that was worshipped prior to the arrival of the Incas.

Bird bones were found in association with Tiahuanaco ceramics. Water birds were widely associated with water/fertility cults in the Andes (cf. Reinhard 1988:42).[2]

Fish bones were found along with the silver llama figurine and were also likely offerings to a deity of the lake. Fish were thrown into lakes as offerings in the Inca period (cf. Guaman Poma 1958:102). People still ritually burn fish bones as offerings to the lake for successful fishing (Tschopik 1951:200).

Conclusions

A total of twenty-four specially carved stone boxes, sixteen rounded and eight rectangular, one large stone container of a square and conical shape, numerous pieces of ceramics (belonging to different types of incense burners, and a vessel for holding liquids), five figurines of spondylus shell, one figurine of silver, three shawl pins of gold, one gold statue, and bones from domesticated camelids (llamas or alpacas), and birds were found at the site. (This is assuming the items found by the Japanese in 1977 were from the same place, which is likely).

There is little doubt that other items were taken by local inhabitants when the water level dropped and also that some were taken by divers. Although the chance of finding additional boxes is not great, more pottery will certainly be recovered, as the careful sifting of the sedimentation has not yet been undertaken. However, I doubt that any future finds will fundamentally change the picture that we now have of the ridge as being a place at which both the Incas and people of Tlahuanaco performed worship.

In view of the information that has been brought together here, it is possible that the current-day legend of the ridge being an "altar of Viracocha" (or a similar deity associated with the lake and water/weather in general) is based on beliefs that had their origin during the Tiahuanaco period. This helps explain why the ridge was a place of worship not only for the Tiahuanaco people but also for the Incas. Just as the religious importance of the Island of the Sun continued from the Tiahuanaco period and on through the time that the Incas ruled in the Lake Titicaca region, so too continued the ritual importance of a unique site in Lake Titicaca – the sunken ridge of Koa.

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The US Ambassador to Bolivia, Robert Gelbard, provided the initial impulse to the 1989 Koa project. The Bolivian Navy through its Commander in Chief Vice Admiral Alberto Sáenz and the Commander of the Lake Titicaca Naval District Luis Daza kindly supported the first part of our project (June 10–15, 1989) by enabling us to use a Navy launch. The launch was under the command of Second Lieutenant Reynaldo Marín, with its crewmen being Marcelo Lima and Moisés Castaños, and the Navy diver, Rodolfo Carbajal. The second expedition to Koa (July 1989) consisted of the Bolivian divers Miguel Reznichek, Conrad von Bergen and Jaime Losano, along with Eduardo Pareja and Johan Reinhard. Carlos Reznichek was the owner and captain of the launch we utilized, and Miguel Reznichek contributed the use of his speedboat. Due to rough weather, both of these boats suffered damages, and I am most grateful to their owners for their participation in the project.

The third expedition (June 1990) consisted of Fredi Arce, Eduardo Pareja, Julian Lindenauer, Charles Llewellyn and myself. Participants of the fourth expedition (August 1990) were Eduardo Pareja, Tom Barnes, Reynaldo de Avila, and myself. All of these team members made sacrifices to participate and I owe them my sincere thanks.

Joanna Burkhardt helped obtain important materials relating to underwater archaeology and Lake Titicaca. The South American Explorers Club has made possible a number of donations which greatly facilitated my research. Finally, I would like to thank the people of the Island of the Sun (and especially Simón Arias and those in the village of Challa Pampa) who demonstrated considerable kindness to us during the periods we spent on the island.

APPENDIX

During February and March 1991, in addition to numerous pieces of Tiahuanaco ceramics and the camelid bones with which they were associated, a carved stone box, several gold items, and two silver statues were located at the underwater site at Koa by Eduardo Pareja and Johan Reinhard. A beaker and a pendant of gold were were of Tiahuanaco origin, and a thin gold band was likely so. Only a few examples of Tiahuanaco beakers exist and the one found at the site of Koa is unique in its form (see Figure 19). The pendant has an engraving of an image similar to the so-called Gateway God from the site of Tiahuanaco

Fig. 19. *The gold beaker (no. 76) found associated with Tiahuanaco ceramics.*

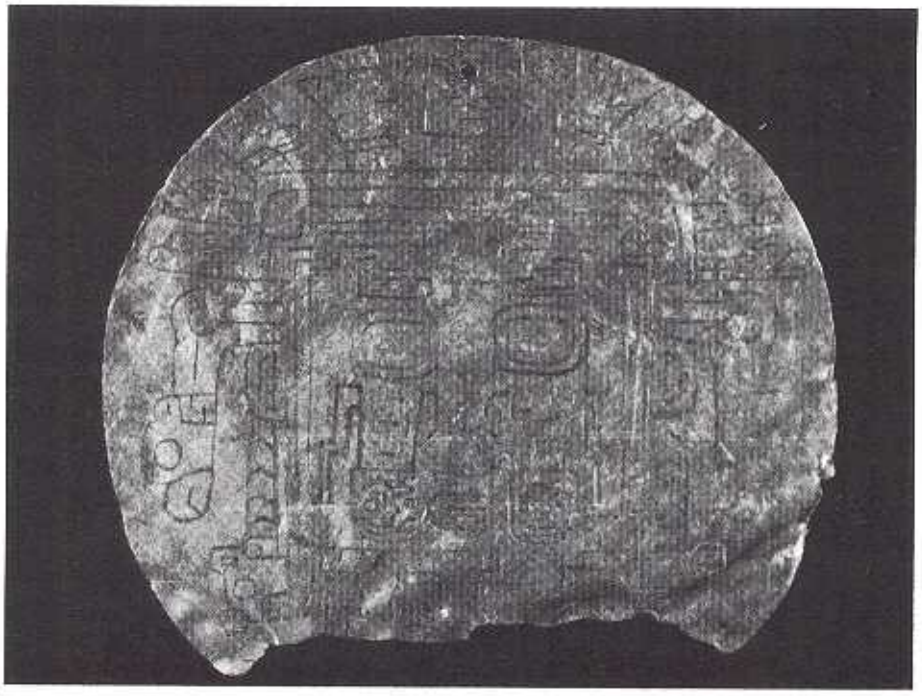

Fig. 20a. *The gold pendant (no. 70) with an engraving similar to the "Gateway God" at the site of Tiahuanaco.*

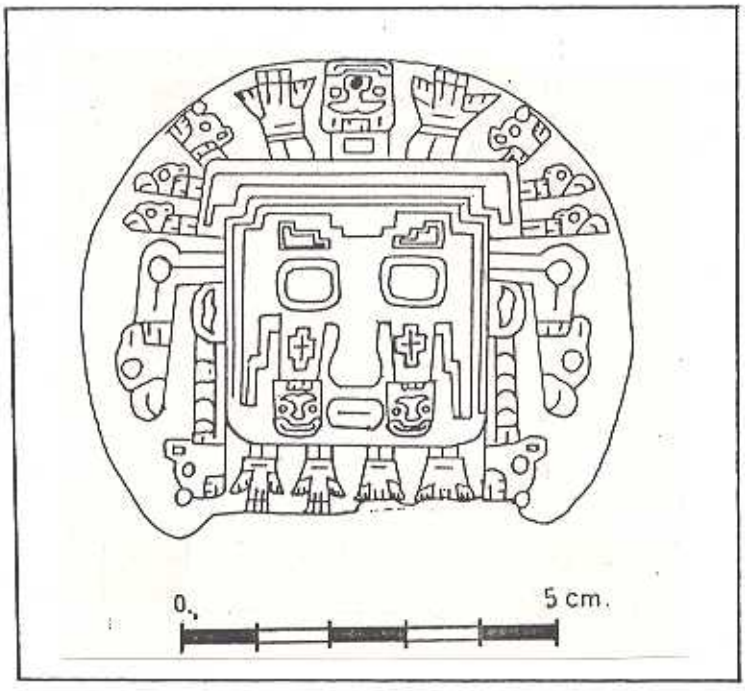

Fig. 20b. *A drawing of the engraved figure on the gold pendant.*

(see Figure 20). Such pendants are rare, and the one from Koa represents the finest Tiahuanaco goldwork known. The beaker measures 11.9 cm high, 6.5 cm in diameter at its mouth and 4.7 cm in diameter at its base. The pendant is 7.3 cm wide and 6.0 cm high. The gold band is 31 cm long and .2 cm wide. Both the pendant and the beaker were found under the outer edges of boulders, whereas the band was located amidst weeds on the surface.

Numbers 64, 65b, 66b, 67b, 69b, 71, 74, 75, 77, 81b, 86, 88b, 91, 93, 94, 96, 103–105, 107–110 consisted of camelid bones. Number 89 was the bone of a sheep. Numbers 65a, 66a, 67a, 68, 69a, 79, 81a, 82, 83, 84, 85, 87, 88a, 90, 92, 95, 97, 102, and 106–111 were pieces of Tiahuanaco incense burners. Number 72 consisted of small bird bones. Number 70 was the pendant, number 73 the gold band, and number 76 the beaker. (The gold items have not been marked on the plan.) Number 78 was a complete Spondylus shell.

Number 80 was flat stone, 44 cm high, 19–22 cm wide and 4.5 cm thick (weighing 11 kg.) with a hole through one end. Based on ethnographic analogy from the Island of the Sun, it might have been used as a stone to tie a llama or alpaca. It is suggestive that it was found not far from where the majority of camelid bones were located. The bones (and associated Tiahuanaco ceramics) were concentrated in an area about 3–4 meters below a flat place in the reef. It is possible that these offerings had originally been made there when a lower water level had exposed this part of the reef and that they later had fallen to the bottom of the reef when the lake level rose.

***Fig. 21.** Male gold statues.*

Number 98 was a rectangular shaped stone box, 21 cm high, and 17 x 18 cm wide which weighed 11 kg. This was the first box recovered which had not been opened previously by treasure hunters or by natural causes. In it were two Inca male statues of gold (both 3 cm in height) (nos. 99 and 100) (Figure 21) and two silver (nos. 101a and 101b) (3.8 cm in height), albeit only small pieces remained of one of the latter. Also in the box was a miniature metalic pendant, similar to ones seen tied by a thread to clothed statues found on land. This supports the hypothesis that the figures had originally been clothed when placed in the box. The organic material would have decomposed during the five centuries the statues were underwater.

Footnotes

1. The numbers in the Plan of the underwater ridge (Figure 5) refer to artifacts that were found in 1989 and 1990. JP1 and JP2 indicate the points used by the Japanese for their measurements, according to a diver who had worked with them. A, B and F mark the endpoints of a baseline on the north side of the ridge and C and D those of the baseline on the south side. E links with C to form a baseline at the northwest end of the ridge. Numbers 1–3, 11–12, 15, 20, 22–23, 30, 37–40, 41–46, 48, 50, 52, and 57–63 were pieces of Tiahuanaco incense burners. Numbers 4–6, 13 and 24 were rounded Inca stone boxes and number 32 was a rectangular stone box. Number 8 was the unusual stone container shown in Figure 10. (Numbers 7 & 10 were of objects found in the large container, while no. 9 was a rock sample taken from the boulder above no. 8.) The rounded stone boxes were 20–21 cm in diameter at the base, 16–18 cm in diameter at the top, 16–22 cm high (the rectangular box was 28 cm high), and had holes in them 9–10 cm deep. They weighed 8–11 kg. The large stone container was 52 cm high, had a square base of 35 cm on a side, a top 16 cm in diameter and a central cavity 24 cm deep. It weighed 64.5 kg. Number 14 was a piece of a Tiahuanaco vessel for holding liquids. Numbers 16–19, 25, 29, 31, 33–35, 47, 51, 54–56 were bones, mainly identified as being of llamas or alpacas. Number 49 was a bird bone, possibly of a duck. Numbers 26 and 36 were Spondylus shells. Numbers 27–28 were stone anchors (ca. 50 cm long and 16 cm wide) of indeterminate origin. Number 21 was a gold female Inca statue 6 cm high. (See Pareja 1990 for a detailed description of the objects.)
2. An example of the importance of water birds in a water cult can be seen in the case of ducks. They were prevalent in the area during recent times (Bandelier 1910:53) and were so in the 1600's (Ramos 1976:11). Being water birds, they may have been used in rituals relating to the lake. Inca vessels in the shape of ducks were common on the Island of the Sun (Bandelier 1910:185). In a legend noted in 1631, ducks (and llamas) were said to have been sacrificed at the Sacred Rock (Bandelier 1910:326). Today on Taquile, an island in Lake Titicaca, the duck is still used as a symbol associated with Viracocha and Mamacocha (Mother of Water) (Braunsberger 1983:65, 69).

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