

SHARKS - HAWAII
G.A. BALAZS FILE



Jan
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Kauai Bureau

Shark attack

*Victim shrugs off pity —
and gets on with his life*

LIHUE — In the midst of a crisis, a person has a choice to give up control or take control. To survive, you have to take it, no matter how much it hurts.

That's a bit of the philosophy of Joseph Thomson, 35.

His personal crisis was a confrontation with a shark in waters off Princeville Oct. 18, 1985. The shark bit off his right hand and tore a gash across his left.

Thomson spent several years traveling and dealing with the loss. Today, he's bodyboarding again. He goes dancing. He builds things. He still lives within view of where the shark hit him.

"I've made my peace with the area," he said. But he has still been frightened out of the water by seeing something strange, like a turtle's head popping up nearby.

Thomson is matter-of-fact about the attack. He said it has taught him some things about how to handle oneself in waters where sharks live.

He was surfing alone, which he now says was a mistake. He believes sharks are less likely to attack a group than an individual.

There were tuna running

nearby, which might have attracted sharks. He saw turtles in the water with him. Another clue to get out of the water, he said, since sharks prey on turtles.

His hand-made body board had a yellow bottom, the same color as the bottom of a turtle.

From below, with his hands hanging off the front and feet off the back of the board, he must have looked pretty close to a turtle, he said. "You don't want to look like what is the existing food chain," he said.

Board surfers should break up the bottom of their boards with stickers, so they look less like prey. It might even be useful to color board bottoms light gray and paint a large mouth a quarter of the way back from the nose, to look a little like another shark, he said.

It seems the white flash of a swimmer or surfer's hand is also attractive to sharks. "An old Hawaiian guy told me when his boat went down and he had to swim to shore, he wrapped dark cloth around his hands, so the repetitive motion of the white palm couldn't be seen," Thomson said.

Get local knowledge. Know where sharks are found and stay away from there. Know the seasons when they are near shore and keep out of the way then, he said.

Thomson said he has been told since the accident that he was surfing in an area that Hawaiian tradition considers an ancestral home on Kauai of the shark god, Mano. "If I'd known, I wouldn't have been there," he said.

On that Friday morning, there was no warning. The shark tore off the right front side of the bodyboard, and with it Thomson's hand. It twisted and pulled while Thomson frantically back-pedaled. He got away. The shark spit out the piece of board, and it was found on the beach. Thomson's hand was never found.

He stopped the bleeding using pressure points learned in a first-aid course. He said having been a sailor taught him self-reliance and helped him not to panic. He got someone to call for an ambulance, was taken to the hospital and woke up there later.

"I was just so grateful to be alive and so stoked to be in a



Joseph Thomson in the hospital holds a piece of his bodyboard a day after a shark attacked him.



Advertiser photos by Jan TenBruggencate
Thomson last week shows his "grip." He's holding a "hand" he uses to go bodyboarding again.

hospital. It was 2:30 that night I realized that I couldn't play the piano any more. A lot of balloons popped later, but that was the first," he said.

But at a press conference in the hospital, he was cool. He wasn't mad at the shark, he said. He was in its world. He did not want to be responsible for starting a shark hunt.

"To go out and kill a lot of animals that are part of an ecosystem that's much, much older than we are, it's ridiculous," he said at the press conference.

Last week, he added: "There was no point in being mad. That seemed like the obvious conclusion. Why be mad at a big dumb fish, especially when you've eaten so much fish yourself."

A few days after the attack, while walking with his mother at a shopping center, Thomson was approached by an elderly local woman who thanked him for his attitude toward the shark. She was a teacher and had used in her class his attitude of respect and understanding, rather than hatred, of the shark. The meeting, Thomson said, was the beginning of a positive attitude for him.

"From there I went up and down the ladder many times, but it made me realize that something good can come out of something so bad," he said.

A week out of the hospital, being weaned off pain killers, he was introduced to the pain he would live with.

"I lost the hand on the 18th. On Halloween night I was in tears from the pain. One time it hit me so hard it threw me out of bed. It was torture. I couldn't sleep. Pain all the time." When exhaustion finally knocked him unconscious, it was okay, and for 30 seconds after awakening. Then it was back.

Thomson's girl friend, Pam Palmer, stayed by him. She gave him support and was a crucial factor in getting him through with a good attitude.

"There were times when I would just break down and cry, and she would hold me and comfort me, and that kept me from wallowing in it longer and longer," he said.

They left Kauai and traveled, working for a time with mentally retarded children.

"I got involved with other handicapped people who were worse off than me, and it

made me really grateful. Being with them I saw that I was inconvenienced, not handicapped," he said.

He took college courses, feeling he'd need to use his brain more to get along in life, now that he'd lost the hand. And all the time, his attitude was improving, he said.

"There are many ways to approach it, but basically, you have a choice. Am I going to be a victim of it, am I going to retire to it? Or take the bull by the horns and steer it?" He laughs: "Of course, the bull does half the steering."

There are lots of opportunities for despair, and it's all right to feel sorry for yourself for a while. But then you have to get it over with, Thomson said.

"Emotions are like an energy. If you block them and hold them back, they only build up more of that energy. It's therapeutic to express it and release it. A friend told me, 'You've got every right. Don't make a habit of it, but if the pain is too much, go out and drink a bottle of tequila and get drunk.' I guess

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Shark victim shrugs off pity,

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that's OK if you like tequila. I don't, but I had a lot of vodka a couple of times."

Thomson said he's seen in a distant relative the effects of drug addiction, and has tried to avoid dependency. Instead, he has trained himself to set the constant pain aside and go on with life. It's harder when he's tired, he said.

"You have to ignore the negative and search for the positive,"

he said.

He found he could easily judge people by how they react to his artificial hand, made of urethane and titanium, called "The Grip III." Some look away, feeling pity.

"They're generally not the kind of people I want to know, anyway. Kids are fascinated by it. It's right down there at their level. Kids are the best."

At first, Thomson took it for granted there were things, like making furniture, that he could no longer do. He's found he was

wrong about that.

"Now I know better. It just takes longer, and I wear heavy shoes because I drop things. I need my own shop, with extra clamps" to take the place of the missing hand, he said.

Thomson once again builds his own bodyboards, but with black bottoms so they're less likely to attract sharks. He also designs and builds artificial hands. Most of the ones available for people who need them are not adequate, he said.

He has built several, some for

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gets on with his life

different purposes. One is a body-surfing hand, a foam contraption. He has a swimming hand in mind. The one he wears most was built by a one-handed friend, Bob Radocy of Colorado, who makes the best, he said.

It has a series of crescent shapes in a prehensile grip for grasping objects of different sizes. It twists and opens and closes.

Thomson said he finds "The Grip III" much preferable to the more common split hook design, but he's continuing to work on

design improvements. And he wants something with classic simplicity.

There are electronic hands that look real, but Thomson said he's not thrilled with having a hand that's not easy to repair. He had an artificial hand break down in northern Thailand and was able to get it fixed in a bicycle shop. Had it been electronic, he'd have had to throw it away.

In three to five years, Thomson said he expects to have designed the best artificial hand in the world.

Improvements to parks readied

Contracts worth nearly \$250,000 have been awarded by the city for park improvements, the mayor's office has announced.

A sprinkler system at Lanakila Playground, a comfort station at Waiiau Neighborhood Park, basketball and volleyball courts at Waipio neighborhood park and a concrete drainage ditch at Honowai Park are some of the improvements included in the contracts.

White Sharks in Hawaii: Historical and Contemporary Records

Leighton Taylor

Abstract.—White sharks in Hawaii: historical and contemporary records by Leighton Taylor. *Southern California Acad. Sci., Memoirs*, Vol. 9, 1985. Study of Hawaiian artifacts collected by the expeditions of Cook and Vancouver indicates the historical presence of white sharks in Hawaiian waters. Since 1926 there have been eight confirmed collections of *Carcharodon carcharias* in the Hawaiian Islands; three from the island of Hawaii and five from Oahu, including the public display of a living 13-foot specimen. Two attacks on humans by white sharks have been documented on Oahu. *Carcharodon carcharias* is definitely rare in Hawaii but it is not known whether it is a resident or a vagrant species. Abundance may be related to population levels of either the Hawaiian monk seal or the humpback whale.

Carcharodon carcharias is reported in the literature to be a widely-ranging species in temperate and subtropical zones. However, specific records have not been summarized for Hawaii. Therefore, it seems worthwhile to review the contemporary records of white sharks in Hawaii and to examine historical sources for indications of the presence of the species in the Islands.

Methods

The ancient Hawaiian culture was rich with oral tradition and complex folklore about sharks (Beckwith 1970; Kamakau 1976; Malo 1951; Pukui et al. 1972). I carefully reviewed these legends for possible mention of great white sharks. Artifacts collected by early European visitors to the Hawaiian Islands (Kaeppeler 1978) were examined and the shark teeth included were identified to species using reference sets of teeth. Modern records of white sharks in Hawaii were sought by querying museums for holdings of white shark material from Hawaii, by reviewing the scientific and popular literature, and by interviewing local fishermen known to be reliable sources.

Results

Various shark species were of great cultural importance to Hawaiians in their religion, folklore, and as the source for strong cutting edges for tools and weapons. The particular species relating to various cultural aspects are not definitely known but can be considered to be among the following: *Carcharhinus* (six spp.); *Triacnodon obesus* (a common inshore species); *Galeocerdo cuvier* (the most abundant large species); and *Sphyrna lewini*.

There is a confusion of nomenclature between Hawaiian and scientific names and it is unclear which shark species match specific cultural contexts. Knowledge of the species and the folklore permits some speculation as to which species may be involved.

For example, the Hawaiian concept of *Aumakua*, or guardian species, may be

related to *Carcharhinus amblyrhynchos* or *Carcharhinus melanopterus*. The Hawaiians believed that deceased family members would find reincarnation in animal form (aumakua), often as a shark. The aumakua could be found in specific areas of the reef and could be relied upon for fishing assistance and protection. It seems likely that this belief involved a smaller territorial species rather than a large shark such as the great white.

A tattooing motif of small triangles encircling the ankle of a Hawaiian protected by an aumakua is said to have its origin in an incident which would also argue against the white shark as aumakua: a woman swimming across a bay on the Island of Hawaii was attacked by a shark who began to bite off her foot. She recognized the shark as her aumakua and shouted its name. The shark then released her and said "I'm sorry, I didn't realize it was you. Whenever I see the ankle of scars which I have made, I will recognize and protect you."

The Hawaiians also built *heiau*, or temple platforms, near the shore in areas where sharks seasonally aggregated. Legends tell of Hawaiian men and women swimming freely with these sharks and having the ability to predict the time of the sharks' return from year to year. It seems likely that this species is also *Carcharhinus amblyrhynchos* because large aggregations have been observed to recur regularly and predictably over the past eight years in a number of study sites in Hawaiian islands, including Laysan and French Frigate Shoals (this aggregating behavior is reported on in a separate manuscript).

The largest common shark species in Hawaii is the tiger shark, the teeth of which frequently occur in artifacts. This species has been implicated in human attack in modern Hawaii and might be the "man-eating shark" which Hawaiians referred to as *niuhi*. Kamakau (1976) relates a special method of fishing for *niuhi*:

"A fisherman sailed far out on the ocean until the land looked level with the sea, that was the place for shark fishing. When all was ready, the prow of the canoe was turned into the current so that the upswell of the current would be behind the canoe. The net containing the decomposed pig mixed with pebbles and broken kukui nut shells was tied to the starboard side of the canoe at the forward boom. Then the net was splashed into the sea and poked with a stick until the grease ran through the pebbles and shells. A shark would scent the grease, his dorsal fin would break through the surface of the sea, and it would snap its teeth close to the canoe. The large sharks were the *niuhi*; they could be tamed like pet pigs and be tickled and patted on the head. The fisherman would pat the shark on the head until it became used to being touched. Then he rested his chin on the head of the shark and slipped a noose over its head with his hands, turning his palms away from the shark lest it see their whiteness and turn and bite them. When the snare reached the gills, the fisherman eased it downward to the center of the body and tightened the noose. If it were a big shark there would be a furious tugging and battling."

It seems more likely that the large *niuhi* described in this account is a tiger shark rather than a great white shark. Large tigers are known to be quite tractable and can be handled relatively easily as demonstrated by film makers in such films as "For Your Eyes Only." Tiger sharks are also known to occur a considerable distance offshore (Tricas et al. 1981).

Table 1. Hawaiian artifacts containing teeth of great white sharks (examined by author).

Description	Museum and catalog no.	Maximum tooth size (mm)	Illustration	Remarks
1. Jawbone handle; single tooth	Cambridge 22.921	25 x 21	LT*, Fig. 177, Kaeppler 1978	Pre-Cook
2. Curved handle; single tooth	British Museum 1944 Oc.2-705	40 x 45	LT	Pre-Cook
3. Curved handle; single tooth	Cambridge 1920.803	31 x 28	LT	Pre-Cook
4. Curved handle; single tooth	Oxford Balfour I.15-II62 1896.29.43	35 x 27	LT	Post-Cook?
5. Curved handle	Oxford PR IV.53 1884.23.16	30 x 37	LT	Post-Cook?
6. Curved handle; single tooth	Dubling 1880.1613	—	Fig. 179, Kaeppler 1978	Pre-Cook
7. Curved handle; single tooth	Sydney H 111	—	Fig. 180, Kaeppler 1978	Pre-Cook
8. Semi-circle; two teeth simple handle	British Museum 2043	37 x 36	LT; Brit. Mus. PS057672	Pre-Cook
		35 x 35		
9. Semi-circle; two teeth; compound handle	British Museum HAW 186	24 x 24	LT; Brit. Mus. 061329	Pre-Cook
		19 x 19		
10. "Cricket bat"; twenty-two teeth	Cambridge 25.366	38 x 35	LT; Fig. 176, Kaeppler 1978	Pre-Cook
11. Curved handle; single tooth	British Museum HAW 191	38 x 40	LT	Post-Cook Iron blade simulating great white shark tooth
				Post-Cook Worked ivory simulating great white shark tooth
12. Curved handle; single tooth	British Museum 1944-Oc2-706	35 x 40	LT	

* LT = Author has 35 mm color transparency of artifact.

I feel that the legends that are most likely to involve white sharks are those in which supernatural or spiritual powers are attributed to the shark. For example, there is a legend about the mother of Kamehameha I, who, during her pregnancy, craved the eye of the niuhi, "the bravest of sharks," and a shark which was sometimes called "chief." A priest predicted that she would give birth to a chief "whose anger would flash through his eyes and whose great power would be compared to the niuhi" (Pukui et al. 1972). Although it has been assumed by some that the niuhi in this instance is the tiger shark, it seems that such attributes would be more likely recognized in the great white.

While consideration of Hawaiian folk legend permits only speculation about the species of shark involved, an examination of Hawaiian artifacts provides much more concrete evidence. In an attempt to identify which shark species were utilized by the Hawaiians before western contact, I examined artifacts in various museums; those which were found to contain the teeth of great white sharks are summarized in Table 1.

Data on Hawaiian artifacts is scant indeed. However, those labelled "pre-Cook" are generally recognized to have been collected on Cook's expedition and are assumed to have been constructed before western contact influenced Hawaiian culture.

Hawaiians actively fished for sharks using large wooden hooks tipped with whalebone, specially made nets, and by noosing individuals (Buck 1964). I assume that the white sharks whose teeth are contained in these artifacts were probably caught by hook and line. It is unlikely that the Hawaiians would have traded these teeth with other Polynesian cultures or salvaged the teeth from beached carcasses. Some teeth included in the artifacts are quite large and indicate that white sharks of a total length of about 5 m (by extrapolation from the curve provided by Randall 1973) were available to the Hawaiians.

It has generally been reported by anthropologists that the typical curved-handled utensil bearing a single shark tooth (Fig. 1) was a weapon used in close infighting. However, after handling these artifacts, I feel that they could also have been used as utensils for delicate work such as trimming or carving.

It is noteworthy that there are two post-Cook artifacts which contain replicas of great white shark teeth. One of these is an iron blade. The other is a carefully worked piece of ivory complete with serrations; great care was taken to simulate a great white shark's tooth. It is possible that these are collector's attempts to restore the original artifacts, but one might also speculate that there was something significant to the Hawaiians about the tooth of this species. Such significance might be strictly utilitarian, or it might be related to the strong spiritual powers that the Hawaiians attributed to the great white shark.

No ichthyological specimens of *Carcharodon* from Hawaii exist in the collections of B.P. Bishop Museum, Honolulu; California Academy of Sciences, San Francisco; or the U.S. National Museum of Natural History. However, a review of local newspaper files and the final reports of several shark abatement programs in Hawaii revealed nine records of great whites in Hawaii since 1926.

Table 2 summarizes contemporary records; Balazs and Kam (1981) searched local records back to 1886 and found no reports of white sharks until 1926 when the fatal attack on W. J. Goins was noted. A second attack involving a white shark took place on 8 March 1969. Licius Lee, a 16-year-old surfer, suffered a

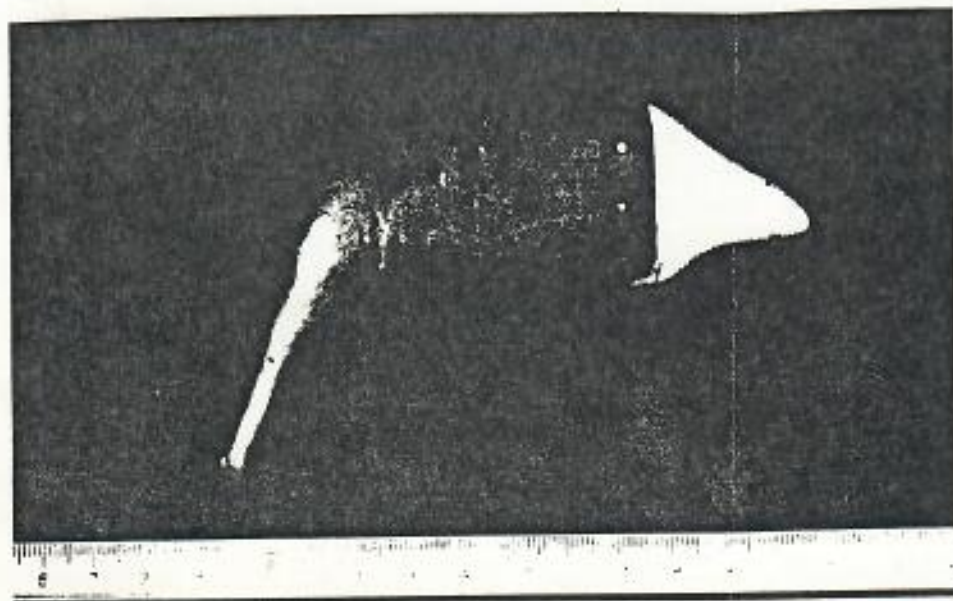


Fig. 1. Hawaiian implement containing a *Carcharodon* tooth held in place by bone pins. Tooth size (maximum enamel height = 27 mm) suggests the shark was at least 3 m total length (based on Randall 1973). Photo by author; Pitt Rivers Museum, Oxford University: Balfour L.15 IL.62-1896.29.43.

laceration on his right leg requiring 23 stitches when a white shark bit the tail of his surfboard while he was paddling off Makaha, Oahu. The shark was not captured, but experienced observers (Dr. Richard Wass and Dr. Albert Tester 1969) attested to the identity of the species after examining the bite marks. Another notable record is the 13-foot 4-inch specimen captured off Honolulu Harbor on 8 March 1961 which was displayed alive in a Honolulu oceanarium for 24 hours. This is believed to be the first display of a living great white shark.

Although eight of the nine sharks reported in Table 2 were landed by fishermen, no formal deposition of their remains has been made. No samples exist in the collections of local museums and I have been unable to identify private individuals who may have kept souvenirs of their capture.

Discussion

Although it has been definitely demonstrated that *Carcharodon carcharias* has occurred in Hawaii historically and in recent years, it is certainly a rare species in Hawaiian waters. Only five white sharks were captured during two shark abatement programs (Ikehara 1961; Norris and Harvey 1969), and no specimens were collected in the 1967-69 Cooperative Shark Research and Control Program during which 13,594 hooks were set around the main Hawaiian Islands. The fishing program conducted by Gary Naftel and myself in the waters off Oahu, Maui, and Kauai, in which 1000 hooks were set, also failed to produce *Carcharodon*, as did a 2000 hook program in the Northwestern Hawaiian Islands at French Frigate Shoals, Pearl and Hermes Reef, and Maro Reef.

Sharks do enter the fresh fish market in Hawaii as incidental products from other fisheries but shark fishing effort in recent years has been concentrated in

Table 2. Contemporary records of great white sharks in Hawaii.

Date	Locale	(No. reported) length in feet	Source	Remarks
May 18, 1926	Kahuku, Oahu	(1) 12.5'	Anonymous, 1926	Stomach contained remains of W. J. Goins
1958-1960	Windward Oahu	(3) 10'10"-11'5"	Ikehara, 1960	Caught during abatement program
March 8, 1961	Off Honolulu Harbor	(1) 13'4"	Anonymous, 1961 Frank Inoue, pers. comm.	Displayed alive in oceanarium for one day
January 20, 1966	Kawaihae Bay, Hawaii	(2) not reported	Norris & Harvey, 1969	Caught during abatement program
March 8, 1969	Makaha, Oahu	(1) 12' (estimated)	Anonymous, 1969	Attacked surfboard; swam away
May 3, 1969	Kawaihae Bay, Hawaii	(1) not reported, male	Norris & Harvey, 1969	Caught during abatement program

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state supported abatement programs. Typical catch per unit effort for these programs was approximately 3 sharks per 100 hooks set for tiger sharks, a species comparable in size to a great white shark. Although it is possible that the longline fishing method does not accurately portray the number of great white sharks because of their size, the fact that three specimens larger than ten feet have been caught in this manner argues that it is a successful fishing method.

The size of the sharks caught in Hawaiian waters and the size of the sharks whose teeth are included in Hawaiian artifacts (based on Randall 1973) all exceed the length at which the dietary shift to marine mammals has taken place (McCosker, this volume). At sizes in excess of 2.5 meters, white sharks are assumed to feed primarily on pinnipeds and other marine mammals.

Hawaii as a subtropical volcanic archipelago is quite different from those continental areas where white sharks are common. Primary productivity and fish standing crop are lower in Hawaii than in those areas and there are no large concentrations of pinnipeds. However, there is a native phocid, the Hawaiian monk seal (*Monachus schauinslandi*), now limited to the Northwestern Hawaiian Island chain. It is an endangered species numbering less than 1500 individuals. While there is no tangible evidence that the seals ever occurred in the main Hawaiian islands, recent work on Hawaiian midden material and on fossil birds suggest that the colonizing Polynesians may have rapidly exterminated defenseless species such as flightless birds and perhaps the Hawaiian monk seal. It may be possible that great white sharks were more abundant in Hawaii during a period when monk seals may have colonized the high islands.

There has been one reported sighting of a white shark within the range of the Hawaiian monk seal at Laysan Island, Northwestern Hawaiian Islands (by commercial fisherman Gary Naftel and National Marine Fisheries biologist John Naughton). However, no tangible evidence for the occurrence of *Carcharodon* in the Northwestern Hawaiian Islands exists despite fishing efforts from 1976 to 1980.

Humpback whales, *Megaptera novaeangliae*, are regular visitors to Hawaii from November to May and give birth to calves in Hawaiian waters during this period. It is interesting to note that almost all of the sharks recorded in Table 2 were collected or observed during the period when Humpbacks are present in Hawaiian waters.

All of the white sharks recorded from Hawaii are adults; no juveniles have been collected here. This suggests that there is no resident population of white sharks in Hawaii, but rather that the Hawaiian records represent vagrants or commuters from one area of the Pacific to another (a recent record of a healthy female elephant seal tagged at Ano Nuevo Island off California and found basking on the beach on Midway Island at the northwestern end of the Hawaiian chain is of note here).

Conclusion

While *Carcharodon carcharias*, the great white shark, was contemporaneous with the ancient Hawaiian culture, contemporary records suggest that this species is an irregular visitor to Hawaiian waters. The white shark should be considered a rare species and is probably not resident in Hawaii. Its presence here may be correlated with the occurrence of monk seals and humpback whales.

Literature Cited

- Anonymous. 1926. Maneating shark caught at Kahuku with human skull and bones in its stomach. *Honolulu Advertiser*, 4 June:1.
- Anonymous. 1961a. Huge shark caught, near death here. *Honolulu Star Bulletin*, 9 March:A1-2.
- Anonymous. 1961b. Monster (photo with caption). *Honolulu Advertiser*, 9 March:C8.
- Anonymous. 1969. Shark attacks surfer, bites off hunk of board. *Honolulu Advertiser*, 9 March:A1.
- Balazs, G. H., and A. Kam. 1981. A review of shark attacks in the Hawaiian Islands. *Elapaso*, 41(10): 97-106.
- Beckwith, M. 1970. Hawaiian mythology. University Press of Hawaii. 171 pp.
- Buck, P. H. 1964. Arts and crafts of Hawaii: Section VII—Fishing. Bishop Museum Special Publication 45. Bishop Museum Press.
- Ishihara, I. I. 1960. Shark predation studies. Job Completion Report. State of Hawaii Division of Fish and Game.
- Kaeppeler, A. 1978. Artificial curiosities—An exhibit at the Bishop Museum. January 18, 1978—August 31, 1978, on the occasion of the bicentennial of the European discovery of the Hawaiian Islands by Captain Cook on January 18, 1778. Bishop Museum Special Publication 65. Bishop Museum Press.
- Kamakau, S. M. 1976. The works of the people of Od (translation from Hawaiian language newspaper by M. K. Pukui). Bishop Museum Special Publication 61. Bishop Museum Press.
- Malo, D. 1951. Hawaiian antiquities (translation by N. B. Emerson 1891). Bishop Museum Press.
- Norris, K. S., and G. W. Harvey. 1969. A shark control program at Kawahar Bay. (An unpublished final report of The Oceanic Institute, Waianalo, Hawaii.)
- Pukui, M. K., E. W. Haertig, and C. A. Lee. 1972. Nana I Ke Kumu (Look to the source), Vol. II. Queen Liliuokalani Children's Center, Honolulu.
- Randall, J. E. 1973. Size of the great white shark (*Carcharodon*). *Science*, 181:159-170.
- Tester, A. H. 1969. Cooperative Shark Research and Control Program. Final Report 1967-69. Unpublished manuscript. University of Hawaii.
- Tricas, T. C., Taylor, L., and G. Nafel. 1981. Diel behavior of the tiger shark, *Galeocerdo cuvier*, at French Frigate Shoals, Hawaiian Islands. *Copeia* 1981, (4):904-908.

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Island Edition



Pierre Bowman of Big Isle practices with harpoon — but there was no target by the end of the day.

Advertiser photo by Hugh Clark

2,000 at shark hunt, but star fails to show

By HUGH CLARK

Advertiser Big Island Bureau

UPOLU POINT, Hawaii—Man declared war on the sharks again at another of North Kohala's hunts during the weekend. This time, the sharks didn't bother to come.

But up to 2,000 persons came to line the Upolu Point cliffs to watch a headless cow carcass in the water as a would-be lure to the feared foes from the sea.

A crew of shark experts occasionally poured another can of slaughterhouse blood into the swirling waters to augment the carcass lure, which had been floating in the water for two days after the cow's death by cancer. But even 25 gallons of blood failed to produce a single pass of a shark.

HAD A SHARK COME BY, veteran hunter Pierre Bowman of Union Mill and his crew of spearmen and riflemen would have shot at and harpooned the creature to the apparent thrill of the crowd.

The local phrase here for the grisly activity is called euphemistically, "shark charming." Bowman, a one-time Oregon State football star who recently retired from a career in the sugar industry, has been hunting sharks for 30 years.

Every two or three years, he explained, he stages a spectacular like this as a fund-raiser. Once it was for the prep basketball team; this year, it was for Steve McPeck, who recently was elected statewide president of the Future Farmers of America and needs some travel funds to go to the Mainland.

ON SUNDAY, the young farmers took donations at a roped entrance to the area of the hunt. They also sold soda, hot dogs, hamburgers and shaved ice. A booth loaded with vegetables and plants grown by the young farmers did a brisk business.

The Kohala High School stage band played swing numbers from 1930's — rather incongruous music to watch for sharks while the now bloated cow bobbed in the sea.

The crowd was not particularly boisterous or excited — but certainly curious.

Viewers were drawn from all parts of the Island, including large numbers from Hilo and Puna 80 to 100 miles away.

Persons had different reasons for attending.

"Never seen anything like this before," was the most common reason offered.

"Doesn't bother me. If it (the shark) will kill man, we shouldn't worry about what happens to it," was another explanation.

"I don't bother with why — let's just say it's a pre-Christian event," is the way another wrote off the experience.

A QUESTION was raised: Why do police and prosecutors arrest, charge and try cockfighters for cruelty to animals and not even patrol this shark hunt?

A member of the vice squad who asked not to be identified responded with a large shrug: "Gee, don't ask me. Go higher up. You do seem to have a point, though."

County Prosecutor Paul M. de Silva said the criminal-justice system must choose which activities to stop and which to permit.

"This must be determined against a backdrop of acceptability," he said.

If the 1972 cruelty-to-animal statute were applied evenly, police and prosecutors might be forced to press against weekend paniolos for calf roping or Kona fishermen for their bouts with billfish, De Silva reasoned.

Trying to show the absurdity of concerns for baited sharks, he said: "We would have to prosecute a person for using an aerosol can on mosquitoes."

Fatal Shark Attack, Oahu, Hawaii, December 13, 1958¹

ALBERT L. TESTER²

ON DECEMBER 13, 1958, a large shark believed to be *Galeocerdo cuvieri*, the tiger shark, was responsible for the death of 15-year-old William (Billy) Weaver in water about 12 feet in depth off Lanikai on the windward (east) coast of the island of Oahu, Hawaii. Although the story of the tragedy was well covered in the local newspapers, a condensed version has been prepared which includes information of interest to scientists who are concerned with factors motivating shark attack. In preparing the account which follows, conflicting stories have been resolved and additional information has been obtained by correspondence and interview with several of the persons directly or indirectly involved. Additional information on shark identification, shark fishing, etc., was supplied by the staffs of the Board of Agriculture and Forestry, Division of Fish and Game, and the Bureau of Commercial Fisheries, Pacific Oceanic Fisheries Investigation.

DESCRIPTION OF THE INCIDENT

A party of six boys including the victim (Billy Weaver) and five friends (Terry Oakland, age 14; Tom Replogle, 14; Garrett Goo, 13; Brook Collins, 10; and Charles Collins, 9) were swimming and surfing about noon off a reef near Twin Islands (Mokulua Island) about $\frac{3}{4}$ mile off Lanikai (Fig. 1). They had three surfboards which were light green, red and "natural" in color, three air mattresses which were red on one side and blue on the other, and an 8-foot sailboat, without mast or sail, which was white in color and anchored near the reef.

¹ Contribution No. 125 of the Hawaii Marine Laboratory, University of Hawaii. Manuscript received April 6, 1959.

² Department of Zoology and Entomology, University of Hawaii.

The sky was clear but the water was rough with whitecaps and good-sized waves. The boys kept together; never was one more than 75-100 feet from the others.

About 1 p.m. Brook Collins was resting in the boat with his surfboard across it; Charles Collins was resting on his surfboard beside the boat, holding on to the anchor line—he was afraid of the waves after "pearl diving" on one. The four older boys were surfing off the reef. Garrett Goo and Terry Oakland, on air mattresses, and Tom Replogle, on the light green surfboard, caught a wave and rode a short distance. Billy Weaver, on an air mattress, failed to catch the wave. When about 50 yards away, the boys noticed that Weaver was clinging to the mat, apparently in difficulty. On hearing a feeble cry for help, Goo swam over, saw blood in the water, and realized that Weaver had lost a leg. The three boys attempted to support the victim and called to Brook Collins to bring the boat over. After some difficulty in freeing the anchor from the coral, Brook Collins hauled it up and started rowing. As the boat was coming too slowly, Garrett Goo swam to it, climbed aboard, and pushed the surfboard off the boat to make more room for rowing. Brook Collins, standing up in the boat, saw a large shark surface 30 feet away, and screamed "Shark." The two boys supporting the victim pushed him toward the reef, and swam frantically to the boat. By the time they reached the boat he had disappeared. As they could not approach the spot where he had been last seen without risk of swamping the boat in the waves, the boys rowed to shore and summoned help.

A Fire Department rescue squad arrived at 2:30 p.m. and sped to the scene in a borrowed 25-foot Chris-Craft boat. Local residents in other boats joined in the search. The body was finally

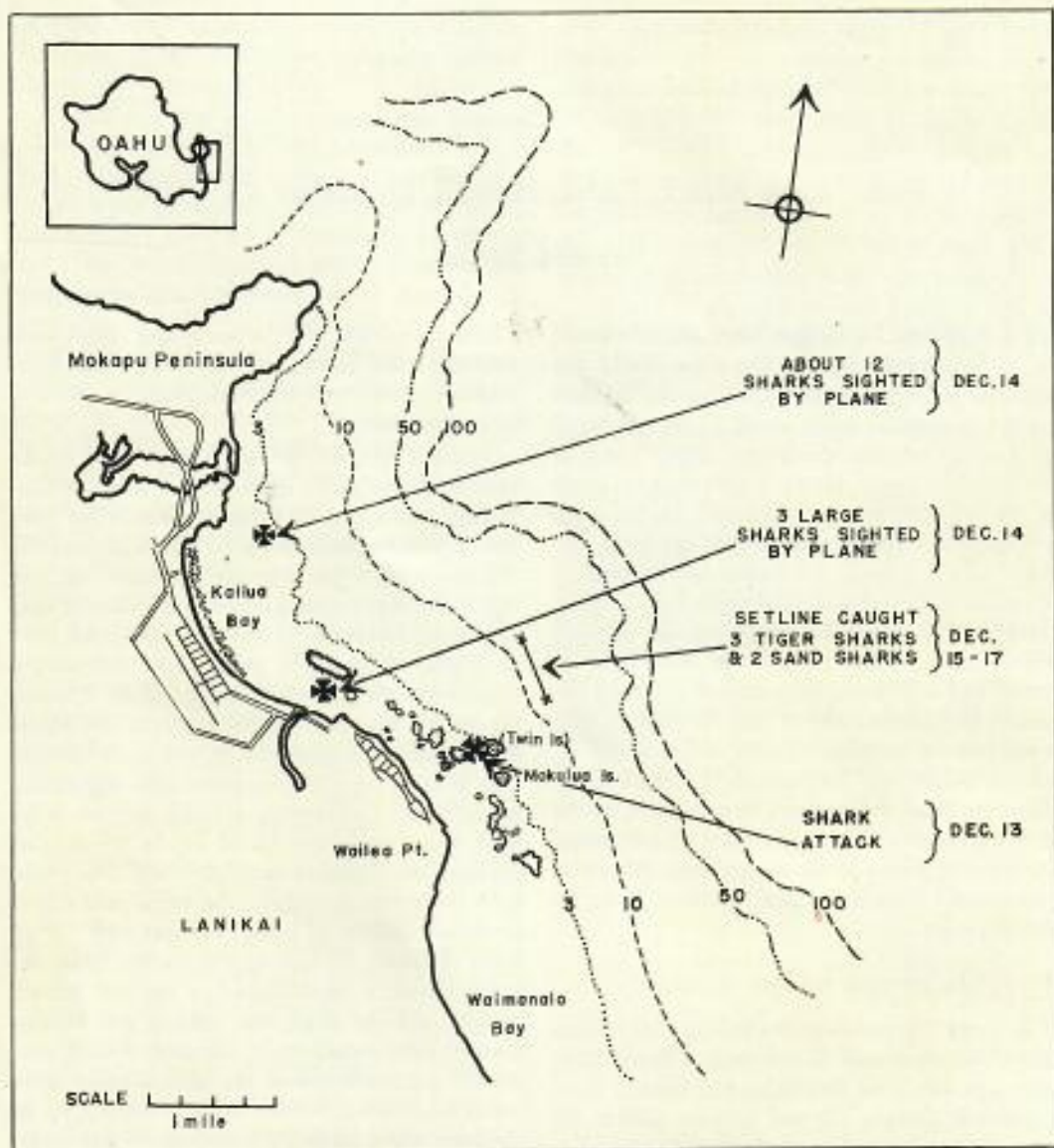


FIG. 1. Coastline of Oahu, showing places where sharks were sighted.

located by a helicopter crew from Kaneohe Marine Air Station in a hole in the reef seven feet deep, and it was recovered by a local resident, John G. Ferreira, by skin diving. The shark, variously estimated at 15 to 25 feet in length, was still cruising nearby, its dorsal fin about 1½ feet out of the water. Attempts to revive the boy with artificial respiration both on board the boat and on shore were unsuccessful. A deputy coroner stated the shark bite had

stripped away the flesh six inches above the knee and completely removed the right leg from the knee joint. The victim died from loss of blood, drowning, shock, or a combination of all three.

ATTEMPTS TO CATCH THE SHARK

On December 14, 1958, attempts were made by employees of the Division of Fish and Game

and by local residents to capture the shark. The Fish and Game employees set an 8-hook shark setline in the shallow water off the reef where the incident had taken place but without success. In the meantime, Piper Cub pilots searching the area spotted two schools of sharks in the adjacent waters of Kailua Bay (Fig. 1). One group of three large sharks was reported cruising just off Flat Island, 200 yards offshore from the public beach. The second school of about a dozen sharks was spotted on the north end of the bay. Local residents converged on both areas hoping to kill the sharks with high-powered rifles but were unsuccessful.

From December 15 through December 17, 1958, under the personal direction of C. Eric Reppun, President, Board of Agriculture and Forestry, and Michio Takata, Director, Division of Fish and Game, the Division's research vessel "Makua" fished a 24-hook setline (flagline or buoyed longline) offshore from the reef in about 70-80 feet of water (Fig. 1). The catch consisted of three tiger sharks and two sand sharks. Two of the tiger sharks were 12 feet in length and weighed 750-800 pounds; the third was 11 feet in length and weighed 410 pounds. The two sand sharks (*Eulamia menisorrah?*) were eight to nine feet in length and weighed about 350 pounds.

IDENTITY OF THE SHARKS

It seems most likely that the fatal attack was by a large tiger shark (*Galeocerdo cuvieri*). One of the searchers described the shark (to Herbert Mann, Bureau of Commercial Fisheries) as having blotches on its sides and a blunt nose, thus eliminating most other local species including the great white shark (*Carcharodon carcharias*). Moreover, in the recent six months of shark fishing to assess local abundance, the Division's ship "Makua" has caught only two species by setline in inshore water (50-120 feet in depth)—34 tiger sharks and 33 sand sharks. The largest tiger shark taken during this period, 14½ feet in length and 1,200 pounds in weight, approaches the reputed size of the Lanikai killer. However, an element of uncertainty is introduced by Brook Collins' observation that the dorsal fin of the shark appeared black along the

edge, suggesting some species other than the tiger.

COMMENT ON SHARK ATTACK

It is noteworthy that the fatal attack occurred before the swimmers were aware that a shark was in the vicinity. If the boys had been skin diving, rather than surfing, they may have discovered its presence. If the shark surfaced prior to the attack, its dorsal fin must have passed unnoticed in the rough surface water.

It is noteworthy that three of the four boys exposed to attack were using air mattresses. Manipulation of the mattress in pushing, boarding, and paddling, requires much more activity than does a surfboard. It is possible that the shark was attracted to the area by this unusual commotion. The victim is likely to have been thrashing his arms and legs extensively while attempting to catch the wave which carried away his companions.

Tom Replogle reported that he had seen coconut floats, such as are used to mark fish traps, near the scene of the tragedy. A turtle was also observed nearby. It is possible that the shark was attracted to the area by fish caught in the traps or by the turtle.

Although there is no on-the-spot record of water temperature, it was probably about 23° C. This temperature was recorded at the time of the tragedy for the salt water system at the Hawaii Marine Laboratory, Kaneohe Bay, some five miles distant. The water is pumped continuously from a depth of about 10 feet.

SHARK ABUNDANCE

Although quantitative data are not available over a sufficient period of time to measure changes in shark abundance, observations by fishermen and skin divers indicate the abundance has increased in the last few years. This has been attributed to several possible causes:

(1) Cessation of shark fishing because of a recent law (Hawaii Food, Drug and Cosmetic Act, 1941) requiring the labelling of ingredients in Japanese-style fish cake. Although most of the sharks used for this purpose were taken incidental to tuna longlining, which is still active, it is possible that the fishermen now cut the leader line when a shark is captured, allowing

it to go free. This practice would speed up the handling of the gear when using the recently introduced automatic hauler.

(2) Reduction in the inshore fish population, inducing sharks to frequent shallow waters and to become bolder in their search for food. There is not much doubt that the reef fish population is at a low level of abundance because of both commercial and sport fishing pressure. The latter must have increased greatly with the introduction of SCUBA diving gear.

(3) Increase in shark population for some unknown reason. Possibly an increase in abundance occurred following the war period of reduced effort in the longline fishery.

There appears to have been an increase in shark attacks during the past 10 years as compared with a previous 60-year period. Of the 5 (perhaps 6) known fatalities since 1886, 3 (including the present) have occurred in the last 10 years. Of the 11 incidents involving injury by sharks since 1886, 5 have occurred in the last 10 years. Whether the increase is due to the increased number of swimmers and consequent increased number of exposures is unknown.

PUBLIC REACTION

There was immediate and widespread concern

over the shark incident, together with public demand for action to reduce the hazard. Bounties were offered by a private individual (Bill Wills, \$20 each for 10 sharks) and by a radio station (KPOA, \$100 per shark over 15 feet, \$25 per smaller shark for sharks caught until the end of December in the vicinity of the tragedy). An action program for reducing shark abundance on a continuing basis was proposed by the Board of Agriculture and Forestry and endorsed by several windward Oahu associations on December 18, 1958. Its activation is contingent on funds to be raised by public subscription. The plans call for a one-vessel, scientifically directed shark fishing program embracing all inshore waters of Oahu. Should this become a reality, efforts will be made to not only control the local shark population but at the same time to gain information on the species composition, abundance, distribution, life history, and behavior of the sharks.

The Billy Weaver Shark Control Program was started April 1, 1959, using the vessel "Holo-kahana I" with Fred J. Inouye as master. Using three units of 24-hook long-line gear, 595 sharks were caught from the inshore waters of Oahu during the remainder of the year. Of these, 71 were tiger sharks.

Report

Honolulu Advertiser

★★ Tuesday, February 23, 1982 A-3



Waikiki Aquarium's curator of exhibits Bruce Carlson looks over the the 8½-foot tiger shark caught off Barbers Point yesterday. Intestines are coming out of the mouth of the shark, which was hooked in about 45 feet of water. State crews are out again today, hoping to hook more sharks.

Advertiser photo
by Charles Quarnus

23-hook line comes up with 1 shark

By Mark Matsunaga
Advertiser Government Bureau

The state shark-hunting project off Barbers Point yielded one 8½-foot tiger shark yesterday.

Three state fish and game workers laid a 23-hook long line yesterday morning off Barbers Point, where the Navy has closed all beaches because of a recent series of apparent shark attacks. The tiger shark was caught in about 45 feet of water, according to Ed Hamasu, deputy land and natural resources director.

The state crew, operating a 21-foot Boston whaler, laid another long line yesterday, and state officials hope to

catch more sharks overnight because sharks are most active at night.

The shark caught yesterday died at sea and was taken to the Waikiki Aquarium, where it will be studied.

A crew from the aquarium is scheduled to rendezvous with the state boat today, in hopes of getting some smaller, live sharks for the aquarium.

Meanwhile, Dr. Leighton Taylor, director of the aquarium, said, "I don't think we really ought to worry" about sharks off Barbers Point. "Sharks aren't altogether that bad," he said.

"An assumption seems to be made in the press that there's been a great increase in the shark population, but that assumption might not necessarily be true," Taylor said.

Even if there are more sharks around, he added, it's not certain that the state shark-fishing program will prevent future attacks.

He cited the case of the Navy woman who was bitten in the leg while swimming at a Barbers Point beach. Taylor said the attacker in that case, still undetermined, could have been a black-tip shark, a reef dweller that's known to "snap at people, like a dog."

"A longline fishing program offshore isn't going to catch those guys," he said. And it won't catch pregnant females, he added, because they don't feed until they pup.

Taylor said the fishing program

"could reduce the number of tiger sharks," one of which reportedly attacked an Aiea man off Barbers Point in December. But, Taylor added, "it's not like we're in California" where there's been a recent rash of attacks by great white sharks.

The last great white caught off Honolulu was an 18-footer, in 1963, he said.

State Fish and Game chief Henry Sakuda said the fishing project is aimed at gathering data about sharks as well as reducing the shark population off Barbers Point. Hopefully, he said, the catch will include "one or two peaky little ones" that have attacked people.

FATAL SHARK ATTACK ON A
HAWAIIAN MONK SEAL
(*MONACHUS SCHAUINSLANDI*)

We describe here a fatal attack on a Hawaiian monk seal, *Monachus schauinslandi*, apparently initiated by tiger sharks, *Galeocerdo cuvier*. The attack occurred near sunset at 1957 h on 28 May 1982, 15 m off the landing beach on the west side of Laysan Island (25°42'N, 171°44'W), Northwestern Hawaiian Islands. Observations were made from shore at a distance of approximately 33 m.

Predation by sharks on this endangered species is indicated by the presence of monk seal remains in tiger sharks (Taylor and Naftel 1978), tiger sharks seen feeding on dead seals (Balazs and Whittow 1979, Johanos and Kam 1986), a tiger shark seen injuring a seal (Johanos, unpubl. ms.) and apparent shark-inflicted wounds on monk seals (e.g., Wirtz 1968, Kenyon 1973, Johnson and Johnson 1978, Alcorn 1984), but a fatal attack on a live monk seal has not been documented.

First attack—At 1929 h the fins of a large tiger shark were seen about 12 m offshore, near two monk seals. One seal, an adult, appeared by its behavior to be a male; the other seal was the size of a subadult with open pink puncture wounds on its back and sides and shallow tears as long as 8 cm. The wounds were not bleeding and were at least a few days old; we had seen them on this seal 3 d earlier. At that time, the subadult was tentatively identified as a female, based on behavioral responses to an approaching adult male. The wounds were not caused by a shark but were the type inflicted by adult male seals during mating attempts (Johnson and Johnson 1978, E. Shallenberger pers. comm.). Such injuries occur most frequently on adult and subadult females and at geographic locations where adult male seals outnumber adult females.

The subadult rested on the surface and the adult circled it as the two seals drifted towards shore. They were within 6 m of shore when two large sharks approached from the south. The sharks were submerged but visible in the clear, shallow water. One veered seaward when about 30 m from the seals, and the other shark continued to approach at moderate speed. The approaching shark was twice the length of the approximately 2.1 m long adult seal. When the submerged shark had almost reached the seals, the adult ceased circling and rapidly swam between the injured subadult and approaching shark. The three shapes fused. There were a few seconds of violent splashing but no sign of blood. The shark disappeared.

The two seals continued to move towards shore, the adult again circling the subadult. The adult frequently lifted its head high and looked around. Twice it abandoned the subadult to haul out briefly on the beach. Both seals finally reached the shoreline and remained there 2 min. The subadult raised its head but did not haul out. The adult hauled out briefly on the beach but followed the subadult when it moved offshore again.

Second attack—At 1947 h the seals were together about 5 m offshore when a large fin appeared north of them. The fin moved slowly and steadily south directly towards the seals. Again the adult seal rapidly swam between the subadult and approaching shark and the fin disappeared. The adult seal immediately hauled out, then briefly returned to the subadult in the water but stayed on the shoreline and did not circle. The adult hauled out again and remained on the beach.

Fatal attack—At 1957 h, approximately 4 min after the adult seal left it, the subadult rested alone on water 3–6 m deep over sandy bottom, 23–30 m south of where the first attack was observed. A large submerged shark approached from the south. Suddenly there was violent splashing as the subadult was pulled under in a single motion and replaced on the surface by a cloud of blood. The fins of at least 10 small sharks immediately appeared, circling within a 15 m radius. These sharks were an estimated total length of 1.5–1.8 m and were presumed to be gray reef sharks, *Carcharhinus amblyrhynchos*, based on coloration, size and known abundance in the Laysan area. Large fins were not seen. Within 2.5 min after the fatal attack, the blood dissipated and the small fins began to disperse. A few frigate birds, *Fregata minor*, dived into the water 15 min after the attack. Twenty-eight minutes after the attack, the forms of two large sharks and 20 or more small dorsal fins were seen in the immediate vicinity. An adult seal swimming north passed within a meter of the small sharks, and both species appeared to ignore each other. A minute later the dorsal surfaces and dorsal and caudal fins of two large tiger sharks (estimated total lengths 3.5 and 5.0 m) simultaneously surfaced. Observations were terminated by rain and darkness.

There are three aspects of these observations that are of particular interest. First, they confirm that sharks do not merely scavenge or injure monk seals but kill them. Second, the adult seal's "attack" on the large approaching shark exemplifies the aggressiveness of adult male monk seals during the breeding season. Aggressive behavior of adult males towards large tiger sharks has also

been seen on nearby Lisianski Island (T. Loughlin and G. Kooyman, pers. comm., Johanos and Kam 1986). Third, the combined presence of large predators and injured seals (frequently females with adult male inflicted injuries) indicates that females at some locations may be more prone to shark predation. Fatal shark attacks could contribute to the monk seal population decline at these locations, both through direct fatalities and due to reduced natality when females are the victims. This can have dire consequences for this species whose counts since 1958 indicate a low and declining total population (Johnson *et al.* 1982).

ACKNOWLEDGMENTS

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LITERATURE CITED

- ALCORN, D. J. 1984. The Hawaiian monk seal on Laysan Island: 1982. U.S. Department of Commerce, NOAA Technical Memorandum NMFS, NOAA-TM-NMFS-SWFC-42. 37 pp.
- BALAZS, G. H., AND G. C. WHITTON. 1979. First record of a tiger shark observed feeding on a Hawaiian monk seal. *Elepaio* 39(9):107-109.
- JOHANOS, T., AND A. KAM. 1986. The Hawaiian monk seal on Lisianski Island: 1983. U.S. Department of Commerce, NOAA Technical Memorandum NMFS, NOAA-TM-NMFS-SWFC-58. 37 pp.
- JOHNSON, A. M., R. L. DeLONG AND C. H. FISCH. 1982. Population status of the Hawaiian monk seal (*Monachus schauinslandi*), 1978. *Journal of Mammalogy* 64: 415-421.
- JOHNSON, B. W., AND P. A. JOHNSON. 1978. The Hawaiian monk seal on Laysan Island: 1977. U.S. Department of Commerce, National Technical Information Service, Springfield, VA, PB-285 428. 36 pp.
- KENYON, K. W. 1973. Hawaiian monk seal (*Monachus schauinslandi*). IUCN. Survival Service Commission. IUCN Pub. New Series Supplementary Paper 39:88-97.
- TAYLOR, L. R., AND G. NAFFEL. 1978. Preliminary investigations of shark predation on the Hawaiian monk seal at Pearl and Hermes Reef and French Frigate Shoals. Final report to U.S. Marine Mammal Commission in fulfillment of Contract 7AC011, U.S. Department of Commerce, National Technical Information Service, Springfield, VA, No. PB285 626. 34 pp.
- WIRTZ II, W. O. 1968. Reproduction, growth and development, and juvenile mortality in the Hawaiian monk seal. *Journal of Mammalogy* 49:229-238.

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QUESTION: I have noticed that commercially available shark jaws are always free of tissue and very white. How can I achieve the same results when cleaning shark jaws at home? K.K., Clinton, Maryland.

ANSWER: First, with a knife and a single-edged razor, cut away all the soft tissue and muscle, and the gum on the back of the jaws. Leave the cartilage and the ligaments at the joints intact. The jaws can then be bleached, overnight, in either hydrogen peroxide or dilute Clorox. Next, rinse the jaws thoroughly in freshwater and dry them in the shade. Use sticks to hold the jaws open while they are drying. If any of the teeth are loose, they can be glued back into their sockets with strong glue.

1.52(4) 3770

QUESTION: Can you provide information about the sea mink, an extinct marine mammal? C.M., Fort Myers, Florida.

ANSWER: The sea mink (*Mustela macrodon*) was not a marine mammal. This mink lived along the coast of Maine and perhaps northeastern Canada. It lived among the coastal rocks and on islands, and this may account for the common name sea mink. *M. macrodon* is known to science only from reports of fur trappers and incomplete skeletons found in the shell heaps of Indian tribes. For this reason, it also has the common name shell-heap mink.

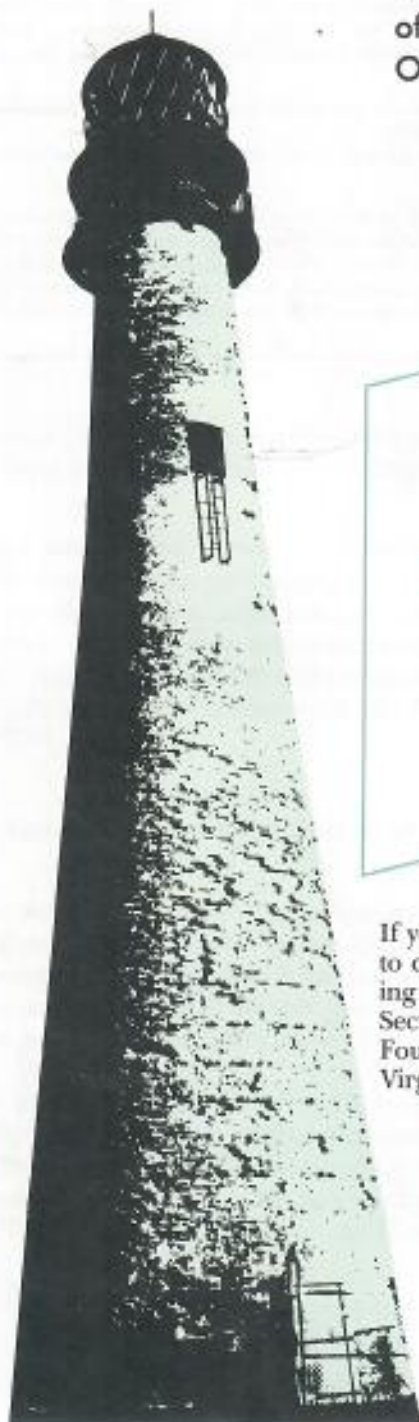
M. macrodon had a head-and-body length of about 3 feet, and a tail about 10 inches long. This very fat mink was larger and had coarser, redder fur than the North American mink (*M. vison*). Because of the larger size of its pelt, the sea mink was prized by fur trappers. Living among the rocks, with a limited range, the animal was hunted to extinction by 1860 to 1880.

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3 feet = 91 centimeters; 10 inches = 25.4 centimeters

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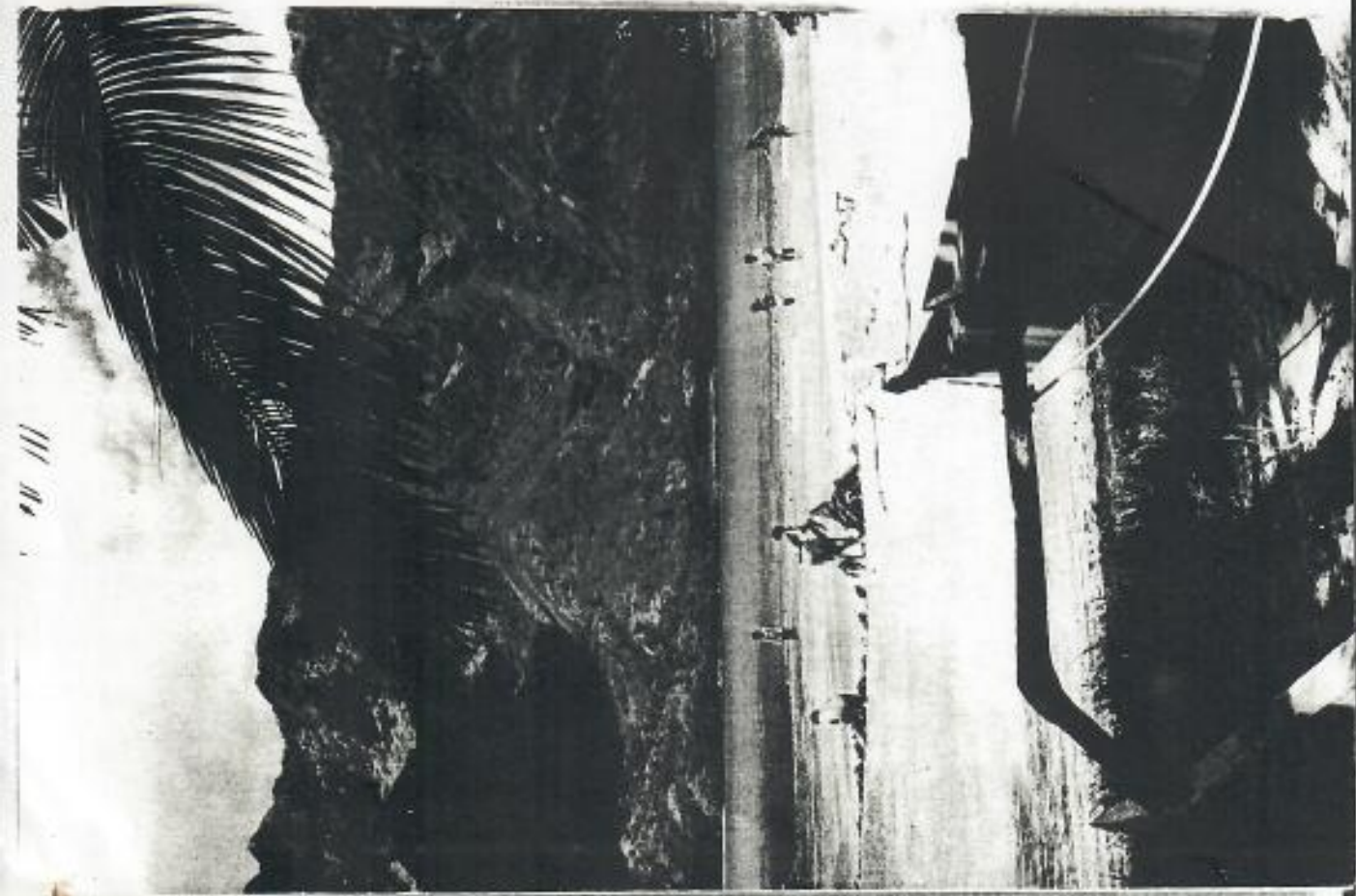


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Hawaii Goes Fishing

Jean Scott Mackellar

CHARLES E. TUTTLE CO.: PUBLISHERS
Rutland, Vermont & Tokyo, Japan



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The Hawaiian Shark

SHARK! For most people the very word carries a sinister thrill. Immediately it brings a picture of the great fish as it prowls the sea with unhurried power, the warning dorsal fin just grazing the surface of the water. One thinks of the cruel, down-curved mouth hidden back under the brutish snout, the tough, sandpapery skin, the jaws like a guillotine blade. The shark is the villain of the sea. It has provided material for some of the most exciting sea-adventure stories that have ever been written. Horror, tragedy, or at the very least, high suspense, are synonymous with this most dramatic of all fish.

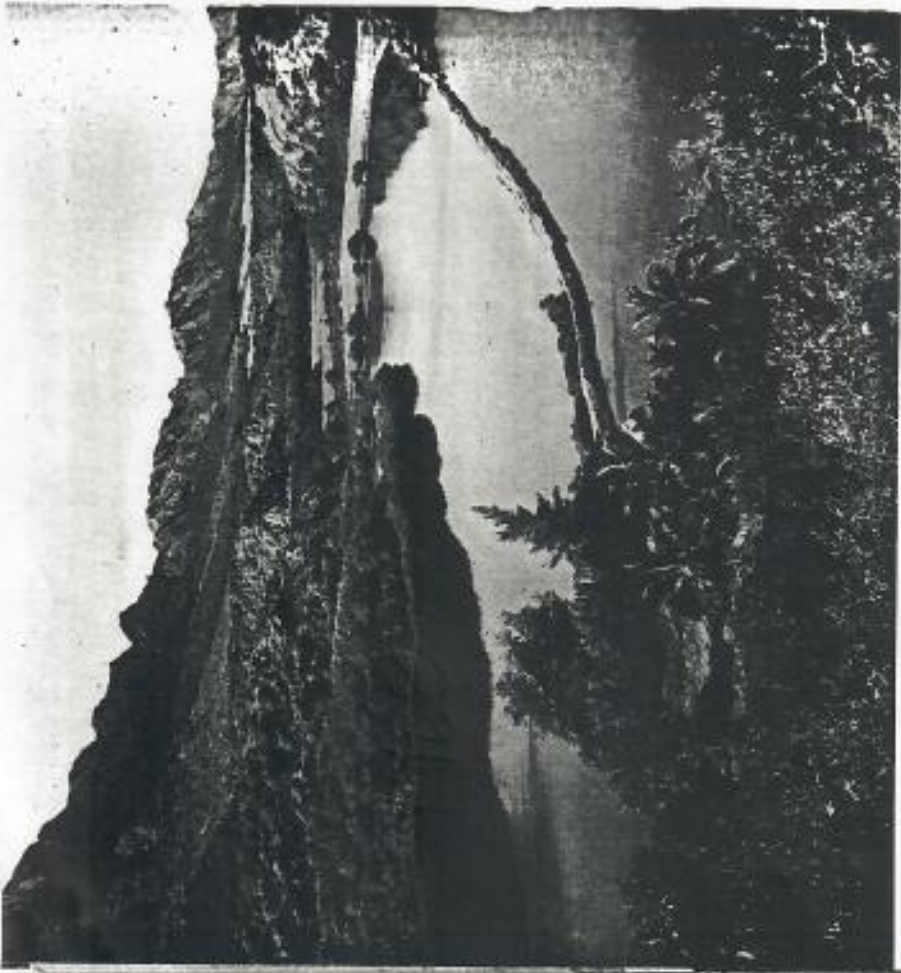
Since this image of the shark is common to scagoing people both in the warm South Pacific and in colder oceans, it is striking to find that the Hawaiians should feel quite differently from the rest of the world about the shark. While others have fled in terror, the Hawaiians have wooed the shark. While others have hunted and killed it, the Hawaiians have protected and cultivated this fearsome fish. Why? This attitude is the result of a curious cycle of thinking which is not uncommon to people whose lives have been intimately related with the raw forces of nature.

The first Polynesians inevitably had numerous encounters with sharks as they fished, swam or navigated their canoes across the spaces of the Pacific. These en-

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ANCIENT FISH POND
STILL IN USE ON KAUAI

Hawaii Visitors Bureau Photo



counters, which sometimes ended in escape, sometimes in disaster, were described in tales which became a part of their folklore. Like everyone else, the Polynesians enjoyed making a good story better, so these folk tales were enhanced as they were retold through the years. As the actual events faded into antiquity, they acquired mystical aspects. The shark was frequently believed to be a god in disguise. Heeding the warnings which these legends seemed to convey, the Polynesians cautiously began to identify every shark as a creature of supernatural powers. It was only a short step from there to actual deification. Rituals were evolved to insure the favor of the shark-god. It was worshipped and finally considered a friend and guardian of all faithful followers. Thus the fish which had once been a source of terror and sometimes tragedy was transformed, in the minds of the Hawaiians, into a symbol of benevolence.

Gods and Guardians

At one time the island of Molokai had a particularly famous and dreaded shark-god named Moaalii. Many temples were built on coastal promontories to Moaalii and to him went the first of the fishermen's catch. Whenever it was decided that the shark required a sacrifice, the Hawaiian priests obtained a human victim for him. Anyone who had the bad luck to cross their path at that time they snared and strangled with a rope. The body was then cut into pieces and thrown to the shark. In order to catch a victim the priests sometimes had to resort to such tricks as hiding and uttering piteous cries like someone wounded or sick. Whoever was attracted to the spot was seized and killed.

Each section of Island coast had its own patron shark whose name, history, place of abode and appearance were well-known to everyone who lived there. Each of these sharks had a *kahu* or keeper who was responsible for its care and worship and from time to time offered it a pig, chicken, *awa* or some other token of devotion. The work of a *kahu* was handed down from parent to child for many generations or until the family became extinct. According to reports, the relationship between the shark and its keeper was of a most confidential and intimate nature.

Certain families, particularly those of fishermen who depended on the sea and felt a kinship with all of the life within it, believed that the shark was their *aumakua* or family god. Paradoxically, often the shark *aumakua* was regarded as having human parentage and was thought related by ties of kinship to these families. Several of the highest *alii* families worshipped the shark as their family *aumakua* and claimed to be descendants of the shark-gods.

The fishermen believed to some extent in transmigration and often threw their dead into the sea so that the sharks which devoured them would be animated ever after by the souls of those persons. Killing a shark or eating shark meat was therefore strictly *kapu*. It would have been like killing one of the family. Even today many a Hawaiian mother of a newborn son will have the baby's umbilical cord cast into the sea for the shark. This, she believes, will insure the child's safety when he is old enough to go out in the sea for, from this offering, he will always be recognized as a friend by the shark. There is also a belief, by some inverted process of identification, that the child will acquire something

of the strength and invulnerability of the shark to whom this homage is paid.

The shark was the *aumakua* of King Kalakaua and his family. It is said that when Queen Liliuokalani lost her throne in 1893, the *kahuna* of the kingdom interpreted it as a symbol of the displeasure of the family *aumakua*. He advised her to tour the Island waters, beginning at Niihau, and to make offerings to all the shark gods. She did not do so. The reason is not known: whether it was an indifference to the old Hawaiian belief or some other. But the humiliation of the proud queen who was taken prisoner two years later by the white men is history today, and is interpreted by each person according to his own background.

Many Hawaiian families have stories, treasured like heirlooms, of ancestors who were protected or saved from danger in the sea by a shark *aumakua*. This one, related not long ago by a young *hapa-haole* woman, is typical.

"My Hawaiian great-grandfather was an expert fisherman," she said, "and used to go far out to sea for certain kinds of fish. One day when he was out alone a fierce storm came up and, as the canoe was tossed about, he was thrown out and knocked unconscious. When he came to his senses again, he found that he was only a few yards from shore. The canoe was gone and he was all alone. He couldn't imagine how he had got there until he noticed a great, gray shark near him. It turned and headed slowly back out to sea. Then he knew it was his *aumakua* that had saved him." The young woman gave a smile that made it hard to guess how much of it seemed true to her today. "He told this to the family because he believed it," she said, "and it has been handed down as part of our family history."

Man-Eaters or Mice?

The sharks in Hawaiian waters do not seem to be as fierce as those in other localities such as the West Indies where they have justly earned their reputations as man-eaters. Although sharks have mutilated bodies of drowned persons, there are only four authenticated records in Hawaii of a shark attacking and killing live persons. The most recent victim was a Filipino sampan captain who was in the water, setting nets to catch a school of small fish about a mile off the leeward shore of Oahu on July 4, 1953. His assistant saw a shark, which he estimated to be about twenty feet long, take one bite and then another of the captain's arm. The water turned red with blood. The struggling, injured man was dragged up into the sampan and a tourniquet applied but he died of hemorrhage and shock. The experts' explanation of the attack is that the shark was probably after the bait which had been scattered on the water to attract the school of fish, and bit the man "in a feeding frenzy." The chances of getting bitten by a shark in Hawaiian waters, says Vernon Brock, head of the territory's Division of Fish and Game, are akin to those of being struck by lightning. Still, the possibility always exists whenever swimmers are outside the reef, and particularly if they have dead or bleeding fish with them.

Spear fishermen know this all too well from the sharks they have found trying to thief their catch. Usually the shark circles the spearman cautiously, looking for a chance to snatch the string of fish and flee. The spearman knows that the shark is interested primarily in the catch, not himself, as a meal, although in his hunger the creature might make a mistake. There are several

alternatives in this situation. The prudent will immediately head for shore, towing his catch line, but leaving plenty of distance between himself and the catch. The bold will attempt to frighten the shark away. This they say they can sometimes do simply by loudly thrashing the water. If the shark doesn't respond to this, the next step is to jab him with a spear. Some spearmen say that if you throw the shark a fish or two, he will be satisfied and leave. Others say that this will only establish a permanent pest and you will be unable to do any more fishing. Some Hawaiians will not continue to fish when they see a shark. To them it is more an omen of bad luck than a potential danger. Most spearmen avoid attracting sharks by throwing their catch into a boat or a bucket, instead of dragging it on a line.

Gottfried Seitz tells a not unusual story of a spearing adventure at Waianae. One day he went out with a young Hawaiian who promised to show him some fish holes. They had good luck and after a couple of hours there was a fine string of fish on their catch line, a piece of piano wire attached to a block of wood. As they were returning to shore, the Hawaiian, who was holding the catch line, let out a loud oath. "That such and such (those were not his exact words) shark just took off with our fish." Seitz could think of nothing but getting to dry land as fast as he could, but the Hawaiian swam back leisurely, cursing all the way. He was particularly sore about losing the piano wire, which was a hard-to-get item. The shark had swallowed the line of fish, block of wood and all. Later Seitz asked the Hawaiian if he had seen the shark before it snatched the fish. "Oh, sure," the Hawaiian replied. "I saw him first thing when we went out, but I took a chance he wasn't hungry." He scowled. "I was wrong."

The many strange objects that have been found in sharks' stomachs when they were cut open have contributed to the fearsome yet curious reputation of the great fish. In one shark caught at Makaha, fishermen discovered half an *utua*, several tin cans, two horse's hoofs and the frame and handles of a valise. Another shark was found to have swallowed a small anchor. Belt buckles, shoes and soldier's identification tags found in shark's stomachs have added to their fame as man-eaters. Yet there have been hundreds of instances in which humans have not been molested in shark-infested seas. Pilots of downed planes, shipwrecked sailors and marathons swimmers have been among those who described the sharks which came near them as "only curious, not savage."

Some Islanders have had encounters with sharks which bordered on the amicable, such as this one described by Emil A. Berndt. One day when he was a boy, he and several friends were swimming at the old Inter Island dry dock which used to be at the foot of Kakaako Street. They climbed up on the clusters of piles and then dove into the bay for pieces of white crockery to see who could go the deepest and stay down the longest. The boys noticed a shark cruising up and down the harbor channel but were not concerned. When it came Berndt's turn, he dove for the chip and picked it up. As he began to rise to the surface, the shark swam between his legs. He found himself riding on its back. When his friends on the piles above saw what had happened, they jumped into the water to try to frighten away the twelve-foot creature. As the shark rushed to escape, Berndt toppled off. Later he said, "When I got on the dock again, the insides of my legs were severely chafed from the roughness of the shark's skin. However, I'm still convinced that

the big boy was scavenging for food thrown overboard and was perfectly friendly."

The early Hawaiians distinguished five kinds of sharks: the *mano kīhikīhi* or hammerhead shark, the *lalakea* or white-fin, the *mano kanaka* or man shark which was revered as the family *aumakua*, the *mano*, a large white shark, and the *niuhi* which was the largest and fiercest of them all. The *niuhi* was greatly feared by the Hawaiians who said they could see it a long way off at night by the greenish light of its eyeballs. The capture of one of these sharks was a great event. The following description was written in 1897 by a Hawaiian woman:

Preparations consisted of catching many of the common shark and cooking their livers, together with a little of the flesh, in *ti* leaves in underground ovens. Large quantities of *awa* root were pounded and mixed with water to make a highly intoxicating liquor. Then the cooked meat and *awa* were put in gourds and loaded into fifty to a hundred of the largest single and double canoes. This fleet sailed many miles out to sea where the *niuhi* was known to appear frequently. When they had arrived at a comparatively shallow place, the canoe in which the *kahuna* for the expedition rode, cast anchor. The meat and baked liver were thrown overboard, a few bundles at a time, to attract the shark. After a few days the grease and scent of the cooked meat spread through the water many miles in radius. The *niuhi* would almost always make its appearance on the third or fourth day. Bundles of meat were thrown to it as fast as it could swallow them. After awhile

the shark became comparatively tame and would come close to the canoes to be fed. Then bundles of the liver soaked with *awa* were given to it. When it had become not only satiated but stupefied with the *awa*, a noose was slipped over its head. The fleet raised anchor and started for home, the shark following, a willing prisoner. The people of the nearest canoe carefully continued to feed it the *awa*-soaked liver from time to time. When they reached land, the shark was led into shallow water, stranded, and killed. The body was carefully divided among all the participants. Apparently the value of the capture of the *niuhi* was entirely psychological. It was believed that whoever owned any fragment of its skin or bones became endowed with great courage. The man who slipped the noose over the head of the shark was supposed to be victorious ever after.

Shark fishing was considered a great sport by the ancient *aiti*. The bait used was human flesh, which, according to one authority, was cheaper than pig and equally acceptable to the shark. Besides, it gave the chiefs an opportunity to dispose of anyone they disliked. The victim was killed two or three days in advance of the fishing expedition and the flesh cut up, placed in a calabash and left exposed to the air to decompose.

On the day of the event the royal party set out with the human bait tied to the outrigger of the canoe in such a manner that it would leave a trail of blood and oil on the water. At the shark grounds, hooks of bone or wood a foot in length were baited with chunks of the flesh. The chiefs showed great skill and courage in

capturing the sharks for this feat was considered a measure of their stature as *alii*. Kamehameha I was very proud of his title as a great shark hunter. He penned his victims close to the *heiau* of Mookini near Kawaihae, Hawaii.

In shark fishing, as in other things, the *haoles* brought progress to the Islands. Their advances consisted of using harpoons instead of oversized fish hooks, and horses instead of humans for bait. According to one old account, a dead horse was tied to the stern of a boat and the belly slashed so that it bled freely and the entrails spread through the water. This attracted the sharks so that they came quite close to the boat where they were easily harpooned. In one day of such sport the catch was three yellow-green sharks and one with indistinct stripes like a tiger.

Noosing a shark while it slept with its head in a cave in the reef was once a popular technique with the Hawaiians. A fisherman would dive down and gently slip a noose around the tail of the shark, then return to the surface and climb into his canoe. The line was pulled in and the shark hauled up and killed. Dangerous as this sounds, it is not at all impossible, for fishermen have found that the shark's active strength is in its tail. When the shark is lifted tail first out of the water it seems to be paralyzed by the weight of its body pressing downward on its head and can make only feeble movements. While hanging thus it may be killed without difficulty.

Today shark hunting is no longer a sport, although sharks are sometimes caught with a hook and line by fishermen casting for *ulua*. Gill nets stretched across channels and harbors often entangle small hammerheads. The shark is the only fish which may legally be killed

with firearms. This is for protection, not sport, and is done chiefly by big game fishermen when they see a shark after their catch. Many fishing launches carry pistols or rifles and if a shark follows a boat too closely or attempts to molest the catch, the skipper may dispatch it with a shot in the head.

The Enigma

So much fact and fancy have been woven together about sharks that it is hard to separate the two. The Hawaiians call the *haoles* "shark bait" because they say that sharks prefer "white meat" to that of the dark-skinned local people. While a fish which swallows anchors, tin cans and valises would hardly appear discriminating enough to care, still the saying has a basis of truth. During the war, when the Air Force was developing a shark repellent to use on life rafts, it was found that sharks have a negative reaction to dark colors but are attracted to white. Shark repellents are therefore made of a black dye combined with a copper acetate which dulls the smell of the shark.

The shark is such a tempting subject for tales of the heroic that, thanks to the movies, a kind of tradition has grown up that no South Sea native is really worth his *poi* if he doesn't occasionally meet and kill a shark in underwater combat. There are also a number of references to shark wrestling, and to heroes who fought and killed sharks, in some of the old books on Polynesia. But Hollywood and legends to the contrary, it is impossible. The skin of a shark is almost impenetrable to a hand-wielded knife. Even on land it takes full strength to puncture and rip the shark's grainy, tough hide. In

a moving, underwater battle, with no footing, a human would be a pitiful match, no matter how strong or agile as a swimmer.

The shark is comparatively slow-moving and clumsy, and its mouth is inconveniently located quite far behind the snout. To take a bite from a large object the shark must roll to one side. This has given many a would-be victim a chance to play the courageous tricks which probably form the basis for the shark-wrestling stories. One shark hunter, it is alleged, carried with him a stout stick or a piece of pipe sharpened at both ends. When a shark opened its mouth to bite him he thrust the stick in vertically so that its mouth was propped open and the gape-jawed creature was helpless. Another fisherman is reputed to have thrust a fish into a shark's mouth when it lunged for him. The satisfied shark bothered him no more. Many Islanders have escaped from encounters with sharks because of their "cool head, main thing," not because they were victorious in underwater combat.

The shark will probably baffle men and excite conflicting stories always, for its inconsistency of behavior under different circumstances defies a pat definition of its nature. Sometimes it appears a man-eater of blind ferocity, other times a cowardly scavenger. In Hawaii it has achieved the unique status of an ocean god, regarded with mingled admiration, fear and affection. Its controversial character remains one of the most fascinating aspects of sea life.

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A Fisherman's Luck

FISHERMEN are probably the most superstitious of all sportsmen. No matter how scientific they may be when it comes to caring for an automobile, treating an illness or handling their jobs, when they set out for the sea they immediately become involved in doing certain things in certain ways, not because there is any direct effect on the fishing, but because it seems the "right" way to do them and somehow should bring luck. They are fantastically willing to believe almost any stray tidbit of information about fish and their preferences, which probably accounts for the vast array of lures, hooks and baits used by fishermen. The implication is that not only is a certain lure attractive to fish, but besides, it seems to bring with it "good luck." The fish not only seize it if they see it, but this particular hook or lure just always seems to be where the fish are. In a cold recounting of facts the modern fisherman may deny that he has ever felt, much less relied on, such feelings. But when he is wearing his favorite fishing clothes and civilization is far away (in his mind at least) and there is only the clean smell of the sea around him, plus his hopes for contact with some now-unaware fish blithely swimming not so far from where he stands—as the eagerness of those hopes climbs almost to a peak of prayer, let him *then* deny that there is such a thing as being