

## Hawaiian Monk Seals' Secret Weapon Against Sharks

# Seal Secret

Hawaiian monk seals may have a secret weapon to protect themselves against sharks. That weapon is a *bubble of air!*

How can a seal use a simple air bubble to fool a shark? Dr. Leighton Taylor, Director of Waikiki Aquarium in Honolulu, Hawaii, believes he has discovered the monk seals' secret.

The day he discovered the secret, he was scuba diving off French Frigate Shoals, islets about 450 miles (724 kilometers) northwest of Honolulu, where he was studying sharks. This water teems with 12-foot (4 meter) tiger sharks that enjoy an occasional meal of seal. In these waters, seals must live their whole lives, find food, mate and raise their pups. For some time, scientists have marveled that seals can survive in the midst of tiger sharks, because seals *seem* to have no way to defend themselves.

Or have they found a way? Dr. Taylor believes they have.

Dr. Taylor was curious about the underwater caves beneath a rocky point off the island of French Frigate Shoals, where he was diving. He swam into one of the caves to take a look. There, inside the cave, a monk seal startled him.

"She was resting, looking at me," he said. "I noted above her head a bubble which had risen to the ceiling of the cave, and I wondered how the



Bruce Carlson

bubble was formed. I knew none of our divers had been here before me, and I hadn't exhaled inside the cave."

Although they live in water, seals must breathe air just as you do. You have probably noticed when you swim or dive, that the air you breathe out under water forms bubbles that rise to the surface. It seemed to Dr. Taylor that the big air bubble in the cave must have formed from smaller bubbles the seal had breathed out. This air bubble then rose and became trapped against the ceiling of the cave.

As Dr. Taylor watched, he saw a surprising thing happen. The seal stuck her head up into the bubble. Dr. Taylor explained, "Seals close their nostrils when they go underwater. When this seal stuck her head up into the bubble, her nostrils flared open. She seemed to be breathing inside the bubble."

Dr. Taylor swam back to find an associate who could witness this. Together, they explored other caves where they found other seals doing the same thing. Dr. Taylor also saw one seal take a deep breath at the surface and then dive down and exhale into a cave where the bubble became trapped. Maybe the seal was doing this so it could use the bubble later. Seals were forming bubbles by exhaling, and they were drawing in air from these bubbles.

Dr. Taylor and his associate each sampled the air in one of the bubbles by sticking their heads inside a bubble and inhaling. As expected, the seal breath in the bubble was warm, moist, and fishy-tasting. Dr. Taylor said it was an exciting experience to breathe seal breath.

That evening, Dr. Taylor thought about the day's discovery. He thought that monk seals spend a good deal of time in caves, seeking their favorite food — spiny lobsters. He concluded that maybe the monk seals found that they could hide from tiger sharks in underwater caves. When a seal was forced to stay in the cave long after it had breathed out all



of its air, it still couldn't leave the cave while sharks were patrolling outside. In desperate need of air, a seal probably saw the shiny bubbles of air it had breathed out, trapped against the cave ceiling. The bubbles must have looked like the light reflections the seal was used to seeing at the surface of the ocean. So the seal stuck its nose up into the bubble to breathe in air.

Dr. Taylor says it is amazing that approximately 2,000 Hawaiian monk seals have been able to survive in these shark-infested waters. Some seals show big scars, probably from close encounters with sharks.


Cousins of Hawaiian monk seals in

other locations have not been lucky. Monk seals used to live in the Caribbean, but they are now extinct; and monk seals in the Mediterranean are very rare.

Hawaiian monk seals experience only short periods of comparative safety. They may rest on beaches and rocky ledges in the daytime, and they haul themselves onto beaches to have their pups or to nurse them. However, these slow-swimming mammals often remain in the ocean feeding for six to eight days at a time. They wander many miles from their islands.

How have Hawaiian monk seals managed to survive? Dr. Taylor says,

"They must have developed protective behavior." He wonders — can it be that Hawaiian monk seals have survived because they have learned to hide in caves and blow life-saving bubbles?

These wonderful seals have found a way to avoid being eaten by sharks, but they still aren't safe. They are an endangered species, maybe partly because people bother them in their breeding grounds. These seals are smart enough to avoid sharks. Can we be smart enough to protect the Hawaiian monk seals? 

*Article by Margaret Johnson*



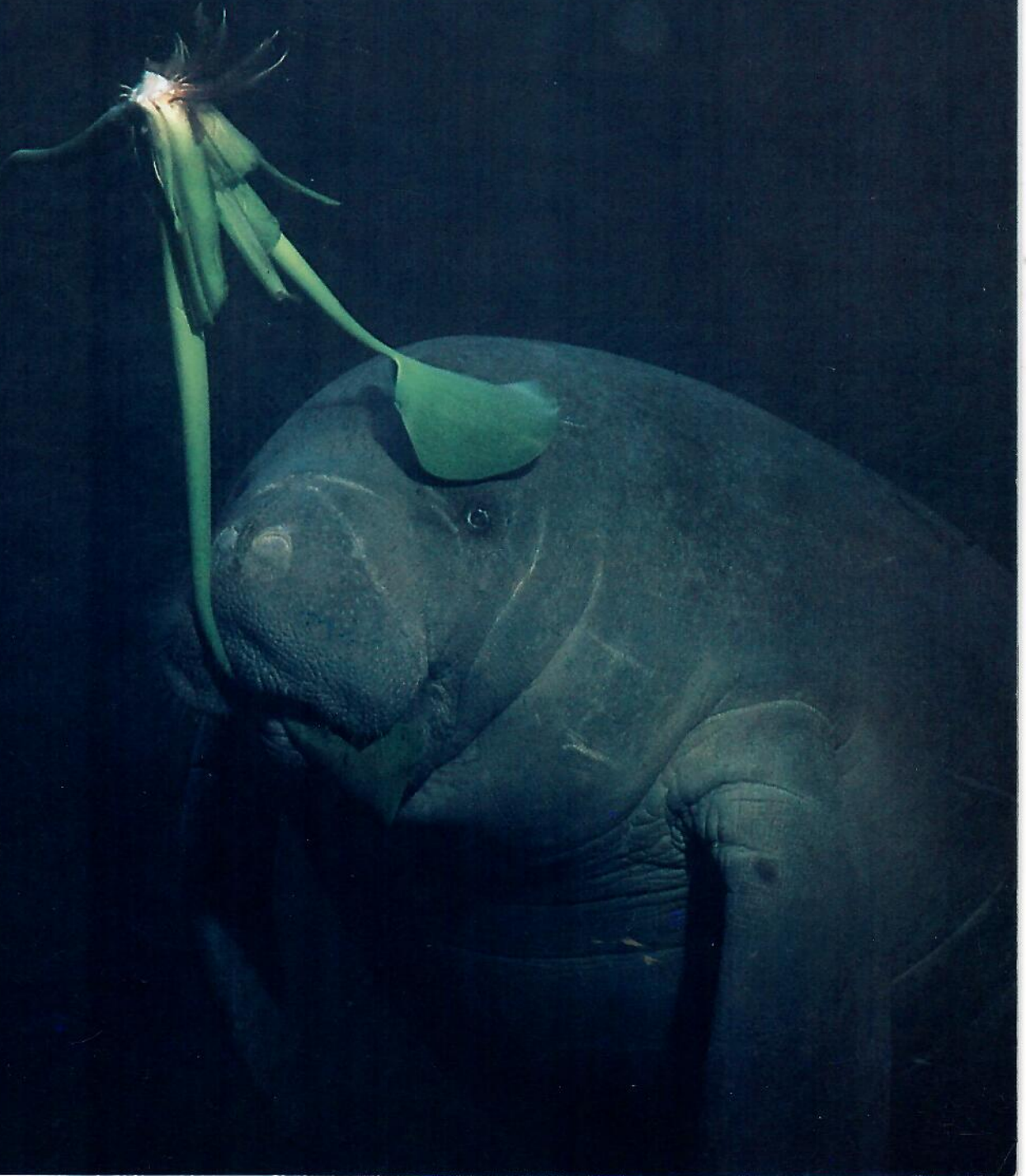
*G. H. Balazs*

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# DOLPHIN LOG



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# SIGHTINGS

**Front cover:** To find out more about this curious creature, turn to page four.

**Back cover:** Here are a few creatures that divers of the Cousteau team have come to know—close up. As we enter their water world, we realize we are guests. Some creatures stare at us. Others swim quickly away. Some swim toward us. We might look very funny to them.

1	2
3	4
5	6

*Back Cover*

You can match the description of each creature to its picture on the back cover.

- 1) Queen conch (sounds like "konk"). This is a large snail or gastropod. In the Caribbean sea, some people eat this sea snail. It has a beautiful shell and its eyes are on stalks.
- 2) Toadfish. This fish is found on the East coast of the United States. Not only does it have a funny name, but it makes a funny sound—just like a fohorn.

3) Batfish. This awesome-looking fish is a very poor swimmer and can easily be caught by a diver's hands. A type of anglerfish, the batfish catches food by dangling its own lure from between its eyes. When a fish comes close to inspect, the batfish eats it.

4) Flatfish. What a crooked smile. The flatfish begins life with an eye on each side of its body, like most fish. As it gets older, one eye begins to travel. It moves over to the other side of the flatfish's body. The fish then turns over and spends the rest of its life lying on its side. The halibut is a member of this group.

5) This green-eyed beauty is a blenny. It is a small fish and hides in worm tubes and holes in the reef, waiting for a tasty little dinner to swim by. Then it darts out for a meal.

6) Orca. These "killer whales" are among the most intelligent and beautiful of all marine mammals.

*Photos 1, 2, 3, 4, and 6 by R. C. Murphy*

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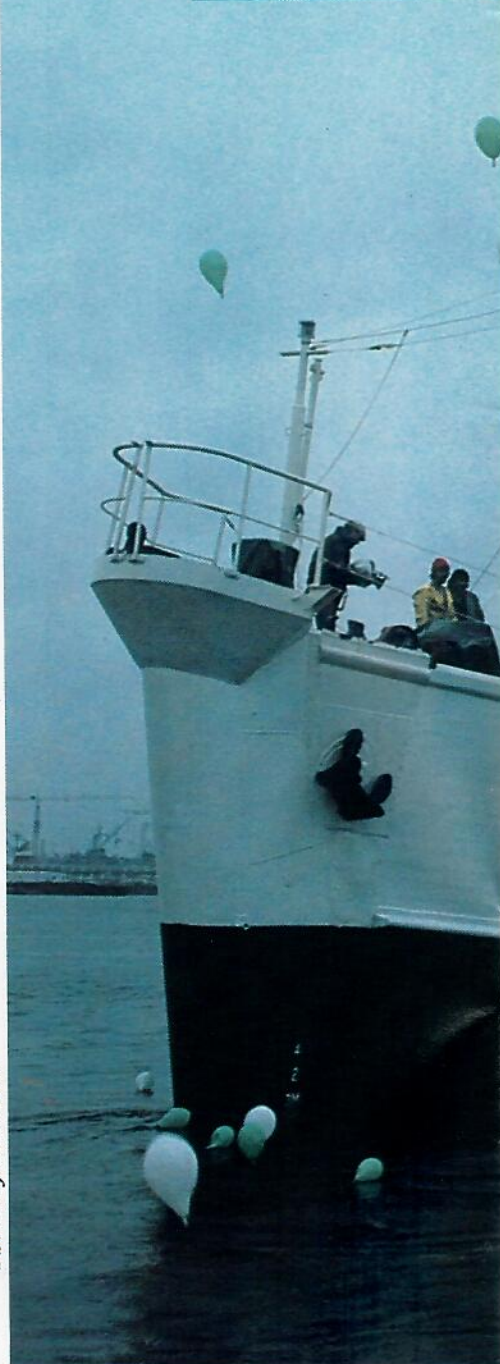
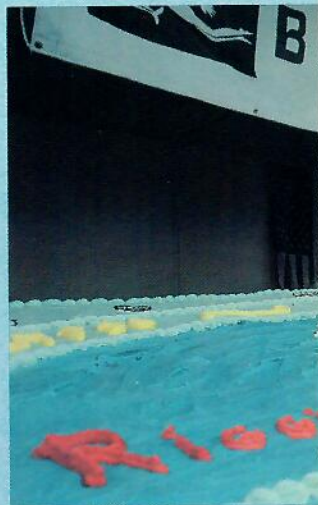
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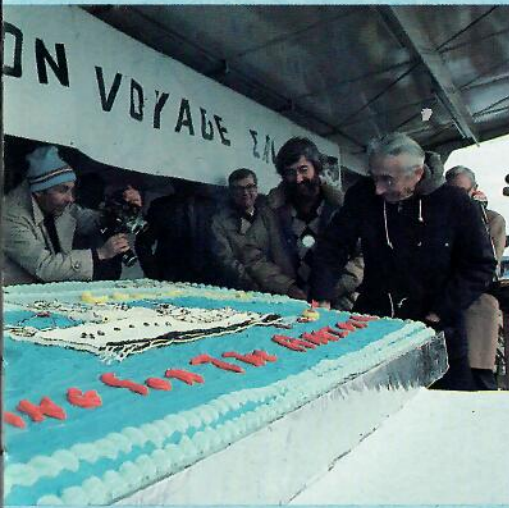
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*Photos by Scott Frier*

## NEWS FROM CALYPSO



"Bon Voyage, *Calypso*." With those happy words, she sailed in February from Norfolk, Virginia, on her way to the great river Amazon in South America. *Calypso* and her crew and Captain and Jean-Michel Cousteau were on their way to a great adventure. The adults and children of Norfolk celebrated her leaving by sending off 4,000 green and white balloons and eating a 500 pound cake.

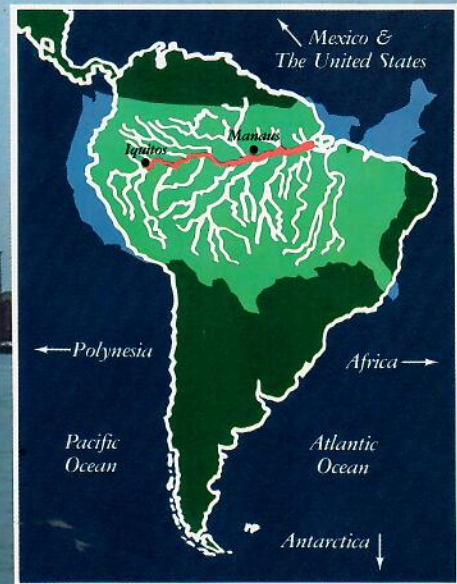
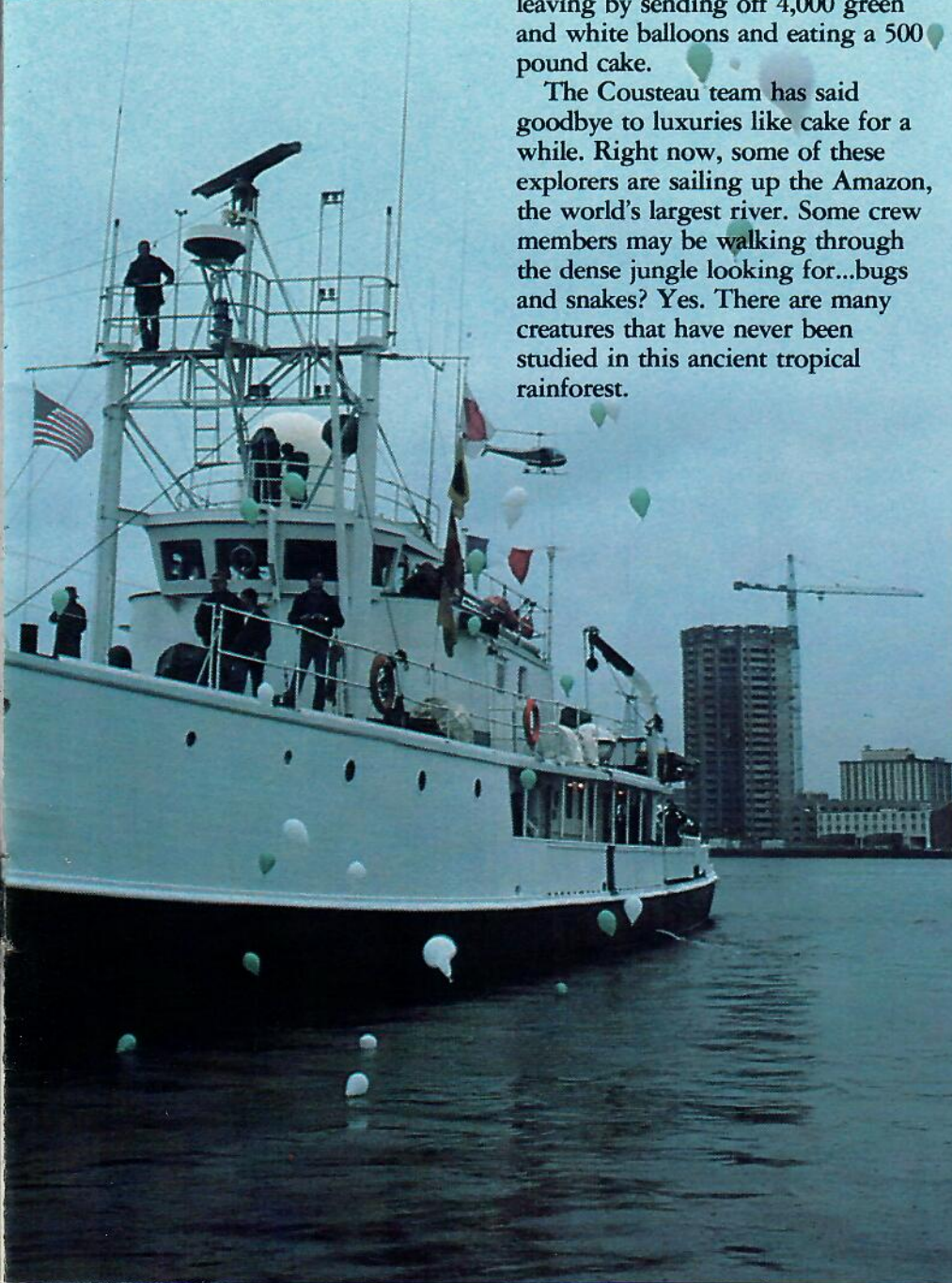
The Cousteau team has said goodbye to luxuries like cake for a while. Right now, some of these explorers are sailing up the Amazon, the world's largest river. Some crew members may be walking through the dense jungle looking for...bugs and snakes? Yes. There are many creatures that have never been studied in this ancient tropical rainforest.

The Amazon has only two seasons of the year — wet, when it rains, and dry, when it doesn't. During the dry season, in some parts of the Amazon, the level of the river may drop 45 feet, creating a wall at the water's edge.

The crew of *Calypso* is looking for many special animals there. The Amazon Basin is home to the world's largest parrots, largest rodents, largest ants, largest river otter, and longest snakes. In the water they will look for, and may swim with, sharks, porpoises, stingrays, electric eels, sawfish, manatees, and turtles. The people who live on and near the rivers may share their stories of what life is like there.

Captain Cousteau and many scientists will study the Amazon and its important role on our water planet. The next issues of the DOLPHIN LOG will report to you what the Cousteaus and crew members find.

Welcome to the Amazon, *Calypso*!



The Amazon River Basin is almost as big as the United States.