A Life of Science at Sea

by Tom Stetson

From Dories to *Asterias*

I was born in 1931. My family lived in Belmont but we spent summers in Falmouth and Woods Hole where my father, Henry C. Stetson, a professor of geology and paleontology and an Agassiz Fellow at Harvard University, joined the influx of summer scientists at the Woods Hole Oceanographic Institution.

As long as I can remember, summer days started early, beckoned me outside, and lasted long. The legendary lifeguard Joe Goudreau taught me to swim in the warm arm of the pool at the Old Stone Dock beach. I taught myself to row and to sail the family's Swampscott dory, first in Eel Pond and then in the waters beyond the Eel Pond drawbridge.

I went to the Children's School of Science in Woods Hole in the summer of 1942, the year our family had rented a cottage on Agassiz Road in the Gansett Woods neighborhood. It always seemed to be raining when I woke up, because the trees were dripping the morning dew onto the roof.

I said "no" to science school the next year. Both my friend David Clarke and I wanted to work. Early in the summer of 1943, we walked into Dr. Nelson Marshall's office and asked for summer jobs. A professor and dean at the University of Rhode Island's Graduate School of Oceanography, Dr. Marshall was another WHOI summer scientist. He promptly hired us at 50 cents an hour (presumably out of his own pocket) to measure and tag sea robins in his lab. WHOI had grown rapidly during the war and had become very crowded so Dr. Marshall's summer office and his lab were over in the Crane Building at the Marine Biological Laboratory.

Sea robins are ugly, interesting fish with six "legs," and they are covered with sharp spines. David and I took them out of their tank in Dr. Marshall's lab and put them in a standard V-shaped trough, like the ones used by the Fisheries, to keep them somewhat contained. Then we measured and tagged each one. One day a sea robin jumped right out of the trough onto the floor and slid under a radiator. That summer job was real work for us boys. In fact, Dr. Marshall gave David and me credit in his book, "In the Wake of A Great Yankee Oceanographer: Recollections from the Years Following the Foundations Laid Down by Henry Bryant Bigelow," published in 1999.

When I was a teenager, Father bought me a 12-foot fisherman's dory at Sam Cahoon's fish market. It was a well-built, heavy boat that had thole pins instead of oarlocks. One day I rowed that dory all the way around Naushon Island. I had been careful to check the tides in the Eldridge Tide and Pilot Book but had not told my parents first.

In the summer my father was an oceanographer, usually at sea aboard *Atlantis*, WHOI's largest research vessel. Built for WHOI the year I was born, the 142-foot ketch was the first vessel built explicitly for American oceanographic research. My father made 25 cruises on her, often sailing out of Woods Hole to seamounts on the continental shelf off New England, where he was one of the first scientists to dredge up

and analyze samples of the sea floor. He and Charles S. Piggot, the founding father of ocean floor marine research, designed an instrument to extract useful samples. They took a corer that weighed 1,500 pounds to an old clay pit in Belmont, suspended it from a tripod, and determined the explosive charge that would force the corer into the sea floor without blowing itself up on the way. At sea, their long cores came to the surface intact, filled with geological and paleontological information about the ancient ocean.

In 1955, while I was stationed with the U.S. Army in Japan, my father died aboard *Atlantis* off the coast of Chile. *Atlantis* had been important to his work and later became a large part of my work. But for me, before *Atlantis* came *Asterias*.

Starting in 1944 when I turned 13, I spent a lot of my summer days aboard WHOI's *Asterias*, a 40-foot day boat used for inshore research. I worked for five different captains during the next seven summers. Captain Russ Bosworth was the most memorable. In 1944 the Navy delivered an experimental smoke generator to the WHOI shop for testing. John Churchill, Stanley Fisher, and Gil Oakley all decided it would be too dangerous, and probably not very useful, to test such a device on shore. Since John was responsible for the maintenance of WHOI's vessels, Gil was in charge of operations on the dock, and Stanley was in charge of the machine shop, their decision was final. The smoke generator was put on the fantail of *Asterias*, I was handed a jug of "fog oil," and we set out into Vineyard Sound. Half way across to the Vineyard we fired up the smoke generator and I poured in the oil. A tremendous cloud of dense, oily smoke poured up around us. We couldn't see a thing, but we knew that the wind was blowing the smoke toward Gay Head and that the tide was pushing us in the same direction. Not sure just where we were but blindly hoping that we wouldn't run into the Middle Ground shoal, Russ sped up to outrun our self-made cloud. No luck. Still operating in zero visibility, he turned back upwind and let our cloud blow on down the Sound.

Captain Bosworth had *Asterias* fitted out with a long pulpit extending forward of the bow for swordfishing. One day a new scientist irritated him by continually advising him how to handle the boat. As we approached the WHOI dock, Captain Bosworth said, "You do it," and left the wheelhouse. What a disaster! The scientist drove *Asterias* straight at the dock, wedging her pulpit and part of her bow between two pilings. Russ came up, grabbed the man by his collar and the seat of his pants and threw him overboard. Russ and I walked over to Tsiknas' store (now the Woods Hole Market) to return empty milk bottles to Louis Hatzikon and then take the coins they earned us to the drugstore for ice cream. When we got back to the dock, the dripping scientist was complaining loudly to Gil Oakley while John Churchill and WHOI's director, Columbus O'D. Iselin, looked on. Gil listened to the scientist's story, told him that Captain Bosworth was quite right, and walked away.

Another day Captain Bosworth and I were at sea on *Asterias* when we received a radio call asking us to look out for *Molecule IV*, a 60-foot Matthews Cruiser owned by the president of the Maxwell House Coffee company. He was offering a handsome reward for her recovery. Airplanes searching for swordfish started looking for her and so did we. Eventually we saw the cruiser rolling unattended in the trough of the waves southeast of Block Island. We came alongside. Russ gave me the wheel of *Asterias* and went aboard *Molecule IV*. He tied down her wheel to keep her circling me while he sat on the fantail and smoked a cigar. Eventually, with a plan to tow *Asterias* home, I tied her lines together and Russ made a bridle at the

end to go over the bitts at the stern of *Molecule IV*. She had two Chrysler marine engines that could drive her through the water at 18 knots while *Asterias* could just manage six knots. Unfortunately, the bitts pulled right out and flew off into the air so we couldn't tow. Instead we went home at six knots rather than 18 knots, with me at the helm of *Asterias* and Captain Bosworth running *Molecule IV* along side. Slowly, yes, but in happy anticipation of the reward, which was10 percent of her assessed value, estimated to be between $60,000 and $90,000. Alas, the director of WHOI declined the reward on the grounds that WHOI was a "not-for-profit" institution. Captain Bosworth quit as a result.

Atlantis

Tom aboard *Atlantis*, 1948.

Atlantis off Bermuda, 1959. Photo courtesy WHOI.

My first cruise on *Atlantis* was as a mess boy in the summer of 1948 on a cruise to Labrador. *Atlantis* had a crew of 18 and carried a varying number of scientists. She could make 14 knots under sail, and she usually did sail, heeling smartly as she sliced through the waves. Luckily I did not get seasick, but I did have to learn how to carry two hot soup plates over pitching and rolling decks to the gimbaled dining table, where the food could swing safely regardless of the ship's action. I did not sail on *Atlantis* again for ten years.

In the fall of 1950 I went off to Brown University, where I majored in geology and graduated in 1954. After a brief stint working in the oilfields of Oklahoma and the Texas panhandle, I was drafted by the U.S. Army, processed for Germany but sent to Japan. Back home in the spring of 1957, I visited

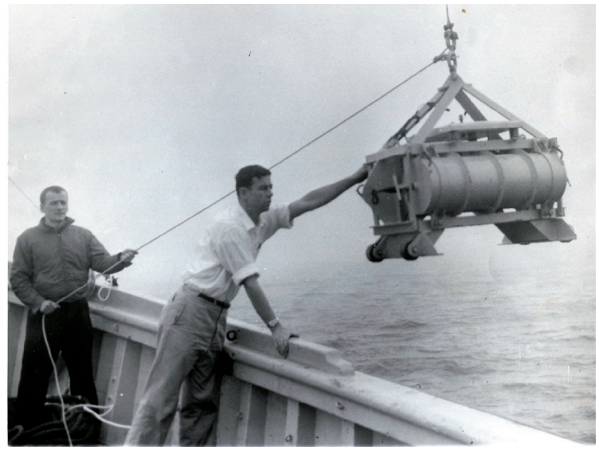
WHOI hoping to get an interview with someone from my father's old department. Good luck! I was interviewed and hired that very same day by Dr. J. Brackett Hersey to work in his Hersey Group, a group that became the Department of Geology in 1966, when WHOI had grown large enough to have departments.

In the spring of 1958 I was back on *Atlantis*, this time as chief scientist for the first five months of her record-breaking 16,000-mile research cruise to the Mediterranean, the Red Sea, and the Indian Ocean, during part of the International Geophysical Year. We sailed from Woods Hole on April 3 to the Indian Ocean, where *Atlantis* joined *Vema* of the Lamont Geological Observatory. The two ships ran westerly toward Aden conducting seismic observations to create profiles of the structural layers of the earth's crust under the ocean bottom. The cruise involved the continuous use of explosives, exciting work, especially from the deck of a sailing ship.

Atlantis left Aden at the end of that leg of her cruise and sailed back up the Red Sea to Port Sudan. The weather was unbearably hot. Day after day the sun blazed down on us. The water temperature rose to 90 degrees. The nights were hot and windless. The steel hull caught and trapped the heat from the air and the water. A few of the crew had bought souvenir shields from local shops and stowed them aboard. Covered with insufficiently tanned hides, those shields soon reeked so badly that we threw them all overboard.

On November 4, 1959, *Atlantis* left Woods Hole for the Blake Plateau, a broad undersea plain that extends out to the edge of the continental shelf off the coastline from Cape Hatteras to Florida. Our primary projects were to make topographical studies, to take underwater photographs, and to dredge up manganese nodules for analysis. We had discovered that the Blake Plateau was covered with so many manganese nodules that they might be commercially viable sources of copper, cobalt, and rare earths.

On this cruise I was again chief scientist and was in charge of the new Edgerton Thumper, which was used to produce a continuous profile of the seafloor and layers beneath it. The Edgerton Thumper was an underwater sound device invented by Professor Harold Edgerton of the Massachusetts Institute of Technology and developed by Hersey's group at WHOI. Pairs of electro-magnetic plates were fastened together and attached to a cable towed behind the ship. When we sent an electric current down the cable, magnetic attraction brought the plates together with a loud clap. We reversed the current to make the plates repel each other, draw apart, and be ready for the next clap.



Sam Raymond and Tom lowering the EdgertonThumper. May 1960.

This cruise ended near Bermuda just before Christmas. There was some pressure from the other scientists and crew members to put in to Bermuda to buy liquor for the holidays, but the captain and I made ourselves very unpopular by vetoing that extra, unscheduled port stop and heading straight

Bosun Mattie Richard and Mate Arvid Karlson putting in an eye splice aboard *Atlantis*.
The mantra for an eye splice was Worm & Parcel with the Lay,
Turn and Serve the other way.
The block and tackle visible below Richard's hand holds the work taut.
Arvid Karlson was a good friend and mentor aboard *Atlantis*. Photo by Jan Hahn.

back to Woods Hole. When we arrived, we learned that *Crawford*, another WHOI ship, had made just such a stopover in Bermuda on her way home. She had been met and searched at the WHOI dock by a team of federal agents from the Bureau of Alcohol, Tobacco, and Firearms who confiscated all the smuggled liquor. Even the cars waiting to pick up the men and their goods were impounded as soon as illegal alcohol had been put into them. Of course when *Atlantis* docked, the ship and all our baggage were carefully searched. The ATF men were considerably surprised to come up empty-handed.

On October 4, 1960, Captain Dick Colburn took chief scientist Earl Hays, and five other scientists — Harold E. Edgerton, Samuel Raymond, Carl Maurey, Gary Haywood and me — aboard *Atlantis*. We sailed southeasterly from Woods Hole to a point where the ocean depth was 9,000 feet.

There we made a series of thumper lowerings to calibrate the instruments. We returned to Woods Hole on October 6, just in time for me to drive to Milton for my wedding rehearsal on October 7 and my wedding on October 8!

I loved working at WHOI. I loved working with scientists, engineers, and mechanics to adapt equipment and instruments that had been designed for terrestrial experiments to work in the very different conditions at sea. I had been sailing all my life and never tired of sailing on *Atlantis*: heaving to in mid-ocean to conduct experiments, meeting ships from other institutions for joint cruises, docking in foreign ports and exploring waterfronts.

It was all wonderful, although sometimes it could be terrifying, such as the time on *Atlantis* when we were throwing half-pound blocks of TNT overboard at two-minute intervals to make seismic profiles. We had attached detonators with fuses to the TNT blocks. We had also attached balloons so the blocks would go only 18 inches below the surface before

exploding. One of the scientists tossed a lit block of TNT off to windward where it caught in the mizzen shrouds. Everyone dove for cover. Luckily it came free and slid overboard before it exploded, but the shock wave blew out the aneroid barometer mounted on the back of the wheelhouse.

Chain

David M. Owen, WHOI's diving instructor, trained Earl Hays and me to be divers in 1958. As soon as I was certified, Dr. J. Brackett Hersey sent me to join two experienced divers from Scripps Institution of Oceanography in California to fix the Sea Spider buoy moored in 450 fathoms off Charleston, South Carolina.

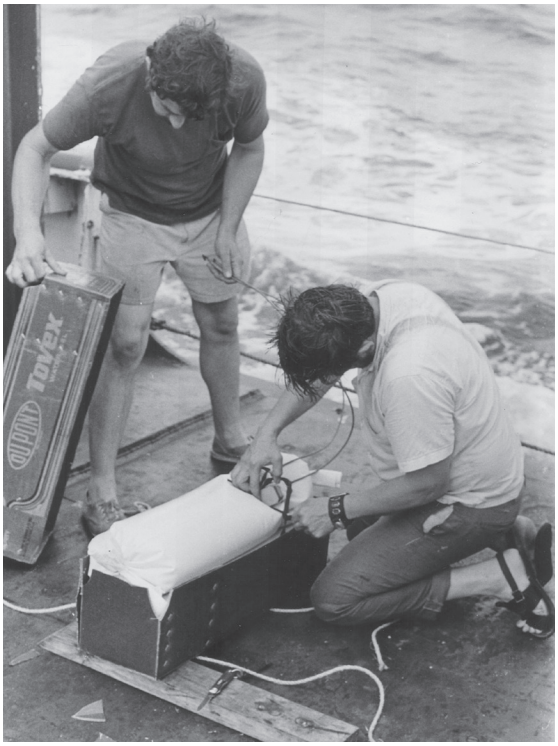
The Sea Spider was a large underwater buoy designed to withstand the water pressure at the research site 100 feet below the surface. It was held in place by wire ropes that radiated out from its base down to three ten-ton anchors on the sea floor. Dan Clark, a Woods Hole marine contractor who could make anything from surplus parts, had made those anchors in Woods Hole by welding old Boston & Maine railroad wheels together. He had also been in charge of lowering the anchors from WHOI's *Chain* down to precisely chosen spots on the sea floor. All three wires carried hydrophones, temperature sensors, and the Savonius rotors which measured ocean currents. The Sea Spider rig had worked very well until the wind and wave action on the surface buoy and its line leading down wrenched the swivel on the Sea Spider, partially flooding the buoy and wiping out all the oceanographic data that had been collected by the instruments. Because it would be too difficult and too expensive to haul the buoy up, divers had to be sent down to repair it in place.

The two SCUBA divers from Scripps and I met in Charleston and boarded *Chain,* which would be our home base while we worked. Every day we motored from *Chain* to the toroidal (doughnut-shaped) buoy marking the Sea Spider location to start our dive. The work was just deep enough that we had to decompress on the way back up. We hung on the line, vigorously exhaling to avoid getting the bends.

After the first day on the job, 100 feet down, I saw white-tipped brown sharks circling us at some distance. These are man-eating sharks. On the second day, their circle was tighter. Crewmen on *Chain* gave us 8-foot wooden poles to discourage the sharks, but the poles quickly became waterlogged and useless. On the third day, I noticed a distinct humping motion in the swimming pattern of the circling sharks. It was a new and ominous sign. To my relief, Dr. Robert Dietz, the senior diver, called off the dive but not until he had taken a photograph of me inside the circle of sharks. Later we learned that the mess boy on *Chain* had been throwing the ship's garbage overboard, up current from our work site. He was literally chumming those sharks to us!

Dan Clark went out on a later trip (presumably on *Chain*) and was able to cut one anchor wire off the subsurface buoy. That allowed the rig to float up to the surface. The two remaining anchoring wires were cut loose to fall to the seafloor and everything else was hauled aboard for transport back to port.

In the late 1950s I was in Savannah, Georgia, ready to board *Chain* for another cruise. On this trip she carried a thermistor chain, a brand new piece of equipment that had been designed and built at WHOI with Navy support. It was a great improvement over our old bathythermographs. The thermistor chain made it much easier to map the temperature gradients in the ocean. It had sens-



Tom Stetson and Donald Koelsch aboard *Chain* off the mouth of the Amazon River in June 1975. Koelsch was inserting a half pound block of TNT in a box containing two 60 lb. bags of TOVEX, an explosive gelatin. The corners were cut off so the boxes would sink when they went overboard. The TNT was used to detonate the TOVEX.

ing devices every 25 feet along a 600-foot chain. A 1,500-pound weight called a fish was hung on the end to prevent it from kinking. It was stored around the drum of a winch that had been mounted on the stern of *Chain.* When we got out to sea we paid the chain out to its full length. Towed behind the ship, the thermistor chain provided a continuous record of ocean temperatures down to a depth of several hundred feet and transferred that data automatically to a strip chart recorder for immediate study. What an improvement!

We got used to the rig while we crossed the Atlantic to the Mediterranean and nicknamed it Dinosaur Tail for its long, knobby look. The Strait of Messina between Italy and Sicily is quite shallow. When we got there we had to decide whether to slow down and winch the thermistor chain in or to speed up so that the chain towed out more horizontally behind us and did not hang up on the bottom. We opted for speed.

In the early 1960s Warren (Whitey) Witzell and I were stationed aboard a German tug doing joint seismic profiles with *Chain* in the Baltic. The tug still had tracks on its deck for the depth charges it had carried during World War II. It also still had a wartime mess. Coffee was only available at breakfast. At supper I could almost see through my single slice of German sausage, except where a bit of bone or gristle obscured the view.

The Cold War was well under way. An old Polish biplane buzzed us frequently. I used to stand on the deck and sweep a huge dip net at it as it went over. And a Soviet Coast Guard ship monitored us constantly, the officers staring at us through binoculars as we dropped our explosives. We started work at 2:00 a.m., partly to mystify them. Once Captain Emerson Hiller trailed a case of American beer behind the ship for a few hours, then cast it off under a float. The Soviet crewmen who collected it gave us a happy thumbs up.

In 1968 before I went off for a cruise in *Chain*, my four-year-old daughter gave me the chicken pox virus with her goodbye kiss. Halfway across the Atlantic I burst out with a terrible case: I had pox everywhere, including inside my mouth. I was put in the sickbay, partly for my own comfort and partly to isolate me from the rest of the crew. When we arrived in Gibraltar for a three-day stay, the port authorities would not let anyone ashore without proof that he had had

chicken pox. As I was the only one who could prove it, I was the only one allowed ashore. No one else on *Chain* was pleased about that ruling.

The summer of 1975 *Chain* was off the 200-mile-wide mouth of the Amazon River making seismic profiles. Fresh water carrying indigenous fresh-water creatures floods far out into the ocean. We were towing a 1,000-foot cable that we had borrowed from Columbia's Lamont-Doherty Earth Observatory. One day we caught the cable in one of *Chain*'s twin propellers. Bad news. Someone would have to go overboard to disentangle it. John Milliman, the chief scientist, and I were the only two certified divers aboard, but we had no wet suits and no weight belts. We asked the crew to launch the ship's Zodiac. After all, there might be disoriented piranhas swimming in the middle of that river outflow. It took forever to find and inflate the Zodiac and we got tired of waiting on deck in the heat and humidity. I could see the cable perfectly clearly. It was hung up over the uppermost propeller blade, just within snorkel depth. I grabbed fins, goggles, a snorkel, and went over. Standing on the metal prop guard, I slipped the cable free and the job was done. And no piranhas. It was raining, and the sun was shining, and there were two waterspouts in view. Tropical weather on show!

An Arctic Adventure

In October 1958 WHOI flew me to the Arctic to join eight other scientists and eleven Air Force men on Drifting Ice Station Alpha. It was dark all the time and freezing cold, in fact 20 degrees below zero cold, all the time. Sometimes 45 degrees below.

As part of the eighteen-month International Geophysical Year, Ice Station Alpha had been established on April 5, 1957, on an ice floe more than 900 miles north of Point Barrow, Alaska. The ice floe had been drifting since then, more or less eastward in response to the winds and currents. When I landed on it, its surface was about a square mile and the ice was 10 feet thick. The scientists were studying earth magnetism, meteorology, and weather patterns. They were also taking water samples and making seismic soundings. By the time I arrived, Dr. Vaughn Bowen had collected samples of seawater in 35-gallon containers to ship back to WHOI for analysis. To do their work, the oceanographers had to drill holes through the ice. Sometimes a seal would pop its head up through the hole for a breath of air and a look around. My chief job was to collect hydrographic data. I used an array of Nansen water-sampling bottles and reversing thermometers that had been designed in Germany to work with the Nansen bottles. Those reversing thermometers recorded excellent data under the challenging Arctic conditions, but every single one of them had to be recalibrated by Geoff Whitney back in Woods Hole before its data could be trusted. Scientists from across the country sent their reversing thermometers to Whitney's lab in WHOI's Blake Building for recalibration.

We lived in Quonset huts that had been erected at a safe distance from our 4,300-foot landing strip. Near the runway were the remains of a small bulldozer that had crash landed from an air drop. The remains of a skinned polar bear lay just under the ice on the path from the runway to the huts. It looked uncannily like a frozen human being. Because of bears, we never kept any food in our sleeping huts. The air in those huts stratified into temperature layers. I soon learned to keep my clothes and boots near the ceiling where they would be nice and warm in the morning. I also learned that to take photographs outside, I had to aim and shoot one picture before the film froze, then bring the camera back inside to warm up so I could wind the film forward for another photograph.

By the fall of 1958, Ice Station Alpha was about 300 miles from the North Pole, 960 miles northeast of Point Barrow, Alaska, and 600 miles northwest of Thule, Greenland. On Sunday, November 2, in the middle of a violent storm, we heard a roar louder than the sound of the wind, a roar like a speeding train barreling past our huts. When we were able to go outside, we saw that the ice floe had split apart. About half a mile of open water separated us from the runway, and the runway itself had been shortened to only 2,200 feet. Uh oh!

Our radio antenna kept falling down so the radio operators only had intermittent contact with their superiors at the Air Force bases. Over the next few days, we scientists heard various stories from the Air Force men about how and when we might be rescued. It would have to be by one or possibly two planes. The planes would have to be big enough to be able to reach us, but small enough to be able to land on our shortened runway and then take off again fully loaded. By this time our runway was just long enough for a C-140 to land safely and take off again loaded with passengers. Our rescuers might come from either the Alaskan Air Command at Ladd Air Force Base in Fairbanks, Alaska, or from the Thule Air Force Base in Greenland. The two commands were considering their options and waiting for the storm to abate. Meanwhile medics were sent up in a C-123-J to circle overhead, ready to parachute down to us if we had an emergency. That plane was big enough to carry fuel to last for a good long time, but it was too big to land and rescue us.

We were told to be ready to leave at any minute. Every supper was steak and ice cream; often breakfast was steak, too. My hut-mate and I got tired of that menu, so we took an axe to the food storage hut and chopped off a large chunk of frozen shrimp to thaw and cook. Much tastier!

When the time for our rescue neared, we were told that each man could take one suitcase. What did we pack? One man filled his suitcase with cigarettes. Another packed as many of the guns on the station as he could. I packed the reversing thermometers: they had to be recalibrated in Woods Hole or we would lose all the oceanographic data collected during the two years of Station A's existence. And I took most of the Arctic gear we had been issued. My parka hood, for instance, was lined with wolverine fur, the only material that could keep your exhaled breath from condensing and forming large, hard icicles all around your face.

On Thursday, November 6, we heard that a C-54 had taken off from Thule. The Air Force men went over to the runway and lit flares to illuminate the landing area. The rest of us picked up our suitcases and walked out of our huts, leaving the doors open and all the lights on, blazing in the Arctic darkness. The open seawater had frozen into fairly thick brash ice. We trudged over it dragging all our baggage behind us in a fiberglass toboggan. But when we got to the runway, the pilot said, "No baggage!" The takeoff conditions were dangerous enough without any added weight. So all those suitcases had to be left behind on the ice. I did manage to take out the reversing thermometers and push them into the fingers of one of my Arctic gloves. One thermometer dropped through my freezing hands and smashed on the ice, but the others went aboard the plane safely.

When we landed at Thule, our group split up. The Air Force men flew back to Alaska after a quick round of hot showers and haircuts. We scientists accepted the showers but said "no thanks" to the barbers. We flew on to Westover Air Force Base in Massachusetts, where we arrived on Saturday afternoon. A brass band, photographers, lots of reporters, and a few friends and relatives met us. I was the only one who

lived anywhere near Boston, so I got most of the attention from the local papers.

My mother, Edith R. Stetson, only learned that I was marooned when a Boston reporter telephoned her at her home in Belmont and asked how she felt about her son being in mortal danger. He also asked her what lucky charms she believed in. Perhaps a rabbit's foot? Nonsense questions. In the story he filed, he quoted her as saying, "I have great faith in the ability of men of that caliber to take care of themselves. Naturally I was concerned when I heard that Tom and his associates were in trouble on the ice floe when it broke off from a larger ice mass and began floating aimlessly in the wilderness. But my son has always been quite self-sufficient and I knew that somehow he would make it back to safety. I guess the training these men receive for their scientific purposes teaches them the rudiments of self-preservation also."

My mother never talked like that. I think the reporter must have invented at least some of that quote. But he probably did get the next quote right when she expressed her gratitude, "I knew the Air Force would get those men out of trouble as soon as the storm subsided and they could get a plane into the area."

Mother and I reluctantly posed for the photographers, but we absolutely refused to fake a tearful, joyful hug for the cameras.

(AP Wirephoto)

RESCUED BELMONT scientist Thomas R. Stetson, 27, who was among 20 taken from storm-broken Arctic ice floe, was greeted by his mother, Mrs. H. C. Stetson, last night on arrival at Westover Field.

About the Author:

Tom Stetson has lived year-round in Woods Hole since 1957. He moved from scientific research into administration, becoming the executive assistant to the chairman of WHOI's Geophysics Department.

He thanks his wife, Judith G. Stetson, for her help in writing down his "sea stories."

Atlantis sailing in a stiff breeze. Photo by David M. Owen.