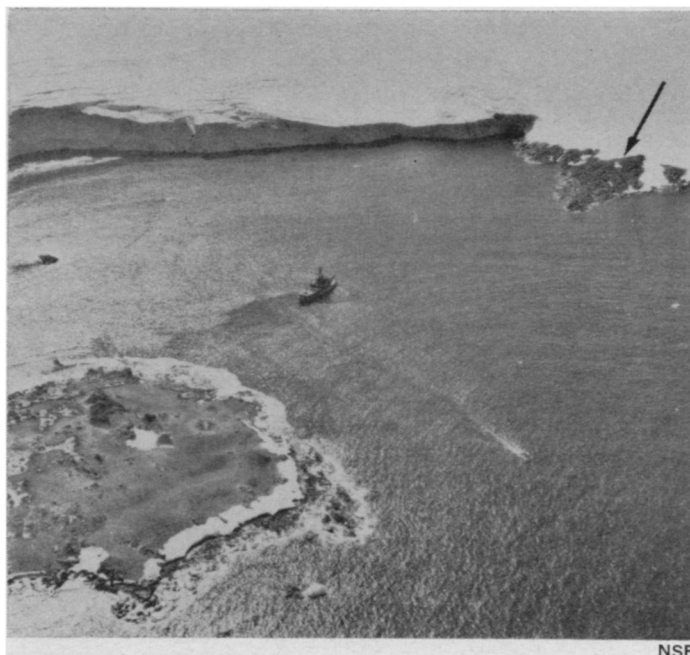


Antarctica under sail

Sails and a wooden hull open ways to the bottom of the world

by Jonathan Eberhart



Palmer Station on Anvers Island is the new home for . . .

Transportation has been one of the major limitations to exploration of the Antarctic. Snow tractors, commonly used for short overland hauls, are far too small to handle adequate scientific equipment and personnel and are limited in range. Icebreakers float too low in the water for use close to shore. Helicopters are not only expensive for their carrying ability, but in Antarctica they face the treacherous whiteout—the horizon completely disappears between snowy land and featureless, white sky, sometimes causing pilots to fly straight into the ground.

One answer, a new research vessel called *Hero*, combines modern research facilities with a flavor of past centuries—including sails and a wooden hull.

Early in 1963, the need for appropriate transportation, equipped with laboratories for research on the way, became obvious to U.S. scientists hunting a site for a U.S. research station on the Antarctic Peninsula. Fjords, channels and hundreds of tiny islands surround the peninsula, which stretches northward to about 600 miles from Cape Horn at the tip of South America.

The vast finger of snow and ice has long been of interest to scientists, partly because of its varied, storm-tossed climate, in contrast to the dry air masses of the inner continent. Its major attraction, however, is its abundance of life. Low-pressure weather systems cause upwelling of the surrounding bottom waters, bringing with them a rich supply of silicates, nitrates and phosphates—a feast for marine life.

Near the bottom of the ecological chain are the phytoplankton, particularly diatoms, which thrive so successfully around the peninsula that they

often form a bloom on the surface and discolor many square miles of ice. Jellyfish, small crustaceans and other creatures graze on the plankton.

On the continental shelf can be found everything from sponges to sea spiders and the Antarctic codfish (*Notothenia*). At least seven species of whales and six of seals are known to live in the area.

On land some 70 species of moss have already been found, along with five times as many varieties of lichens. Primitive insects and birds abound.

The U.S. has been scientifically interested in the peninsula since some 140 years ago, when naturalist James Eights made a series of observations in the South Shetland Islands. Three major U.S. expeditions went there in the years 1946 through 1948. Impetus for a permanent research station, however, did not come until the U.S. Antarctic research program expanded to include biology and other life sciences that had been largely ignored through the end of the International Geophysical Year in 1958.

When the actual site survey got underway, just over four years later, the investigators spent two months looking over some 30 possible sites, finally settling on a 24-by-37-mile chunk of icy, mountainous wasteland called Anvers Island. Anvers was picked because it was about midway along the peninsula's length, and about as far south as a ship could get, even in the December-to-April summer season, without running into dangerous amounts of sea ice.

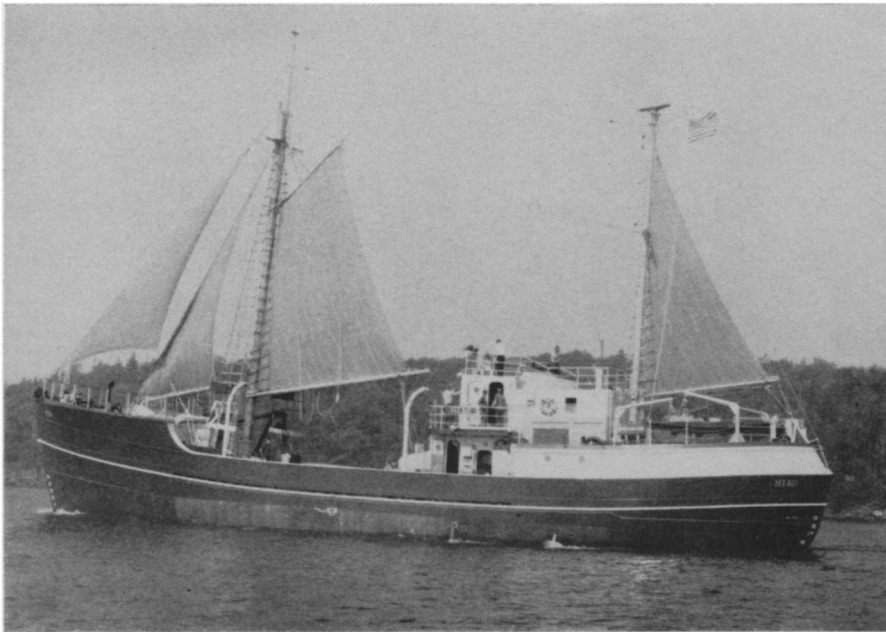
The need for a special ship operating from the base was clear from the start. In 1964, Britain offered the U.S. the use of its "Base N," which had been deactivated since 1958, located at the

island's Arthur Harbor. In the same year, the National Science Foundation awarded the contract for the ship's design. From their inception, ship and station were planned as a single facility, part of which was equipped to go to sea.

Last March, a permanent station near Base N was christened Palmer Station, for Nathaniel B. Palmer, who in 1820, at the age of 20, became the first American to sight the Antarctic continent. Eight days later, on the high tide, the unusual research vessel slid down the ways of the Harvey F. Gamage shipyard in South Bristol, Me., after being christened the *Hero* in honor of Palmer's sloop of the same name.

The 300-ton vessel draws only 12 feet 6 inches of water, compared to the 29-foot draft of a typical icebreaker. "It can get in and around these islands in the Antarctic Peninsula, so that we have a platform for research," says marine biologist Dr. John H. Dearborn of the University of Maine's research center at Walpole, who went on the *Hero's* Arctic shakedown cruise. "It's sort of a cross between a large oceanographic ship and a shore party." Its 125-foot length would dwarf the original *Hero*, but its most unusual feature, for a modern-day research ship, is its sails. A 760-horsepower diesel provides the main power, but for steadying the ship during precise measurements, as well as for providing an emergency push if necessary, the dark green ketch-rigged trawler carries some 1,700 square feet of high-visibility orange nylons.

Though not a full-fledged icebreaker, the new *Hero* has been made as strong as possible for its pioneering role, which it will assume this month: the first ship to be based in Antarctica. Unlike ice-



NSF

... the new *Hero*, first vessel to be based in the wastes of Antarctica.

breakers, which stay at the isolated outposts only long enough to deliver supplies and changes of personnel, the *Hero* will operate out of Palmer Station throughout the Antarctic summer, departing for winter quarters at Punta Arenas, Chile, only when gathering ice threatens to make operations dangerous.

The ship's frame consists of six-by-six-inch oak timbers, spaced only eight inches apart for strength, in contrast to some 24 inches in other ships of her class. Overlying the frame is two inches of oak planking, chosen not only for strength but for quiet. "You don't get a lot of the vibrations of an all-metal ship," Dr. Dearborn says. "It's possible to do research that requires a low ground noise level." To protect against ice abrasion, keel and sides are sheathed in tough South American greenheart wood. In addition, the forward part of the hull, which takes the most abuse, is overlaid with steel plate.

The *Hero* has also been designed with the scientist in mind. At the forward end of the main deck is the hydrographic laboratory, designed, as are all the ship's research facilities, so that scientists can readily change instruments and equipment to suit their projects. Farther aft are analytical and dissection laboratories, as well as a large freezer for preserving biological specimens. A small instrumentation laboratory and microbiology laboratory are below decks, and winches for deep research are above.

In September, following four shake-down cruises, the *Hero* sailed south to Miami, taking time on the way for testing of nets for research planned by the Bureau of Commercial Fisheries in the Drake Passage between Cape Horn and

the Antarctic Peninsula. Three weeks later the ship set forth through the Panama Canal to Valparaiso, Chile, to pick up some scientists and equipment, then down to Puerto Montt, also in Chile, to begin its first scientific cruise, studying whales and porpoises along the coast.

The cetacean survey is taking the *Hero* down to Punta Arenas, the take-off point for Antarctica. The departure date was planned as about Dec. 10 or 12, to reach Palmer late in the month.

For its first summer on the job, the *Hero* has a busy schedule. Perhaps the major project will be aiding in investigations of Deception Island, a volcanic upthrusting which erupted violently last December after 38 relatively quiet years, forcing the evacuation of 52 Argentine, British and Chilean researchers. With the *Hero*, scientists will study the eruption's effect on the nearby pack ice, as well as microorganisms in the soil (related to development of life-detection devices for planetary probes) and fish and sea spiders in the surrounding waters.

Plans for the *Hero* also include studies of weathering on the Trinity Peninsula, at the northern tip of the Antarctic Peninsula. In addition, geologists will investigate the history and structure of the Scotia Arc, a submerged mountain belt that could shed light on other arc systems such as the West Indies and the Aleutians.

Even in the off-season, when Antarctica is iced in, the *Hero* will be busy. For at least the first two winters, the vessel will cruise the Drake Passage, possibly the roughest seas in the world, and the Straits of Magellan, helping the Bureau of Commercial Fisheries survey marine life. ◇

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