Siple Station: the first winter

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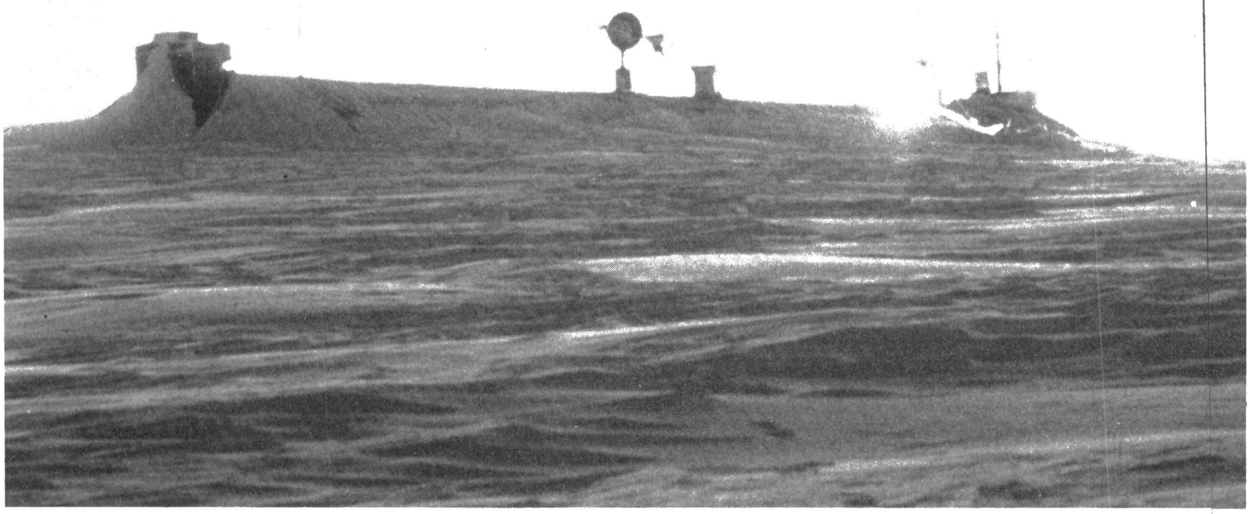

Sunrise 1973. (W. J. Trabucco)

Siple Station is on a featureless snow plain at the Antarctic Peninsula's base (Ellsworth Land). Its setting, although barren, is rich in scientific importance. At the geomagnetic conjugate point of Roberval, Quebec, Canada, Siple affords a unique window through which to study the earth's upper atmosphere. Very low frequency (VLF) transmissions (see "VLF transmissions received," Antarctic Journal, VIII(4): 231) from Siple to Roberval, via magnetospheric ducts, are used to study how electrically charged particles and waves interact in space and how the distribution of charged particles is affected by solar activity.

Mr. Trabucco, an electronics engineer who is a research assistant at Stanford Electronics Laboratories, Stanford, California, was station leader during Siple's first winter of operation. For 10 months he and three others—Jay Klinck (engineer), Evans Paschal (engineer), and Russell Threlkeld, M.D. (physician)—comprised the numerically smallest, most isolated U.S. group to winter in Antarctica since Admiral Byrd's 1934 lone 4-month stay at an outpost south of Little America II. The four persons at Siple during the 1973 austral winter also were the first all-civilian crew to operate a U.S. antarctic station.

Mr. Trabucco returned from Antarctica on January 8, 1974. What follows is his personal account of the first winter at Siple.

Our isolation began earlier than expected. The loss of an LC-130 at South Pole Station on January 29 reduced air support and caused an early exit of construction workers who were helping to ready Siple for the long winter ahead. On February 4, the last flight departed.

The four of us were left with much outside work to complete. We spent 3 weeks sorting through and stacking cargo left outside of the station. It was hard to decide what should be stored inside the limited space under the station arch and what should be left outside to be drifted over during the winter and recovered later.

Three more weeks were spent completing work at the emergency camp. Hatches had to be finished, electrical wiring had to be installed, and a 250-gallon fuel tank had to be positioned at the generator shack. Soon all but the hatches of the emergency camp would be buried.

Over the summer a 25,000 gallon fuel bladder was drifted over by about 2 feet of snow. We spent 3 days digging it out. Only a trackmaster remained snow-free throughout most of the winter. The vehicle was used to haul garbage to the dump. Toward winter's end we used it to traverse the east leg of the 21-kilometer-long dipole antenna to repair a break 7 kilometers from the station.

The station arch did not drift over as much as we thought it would. I attribute this to wind scouring that was aided by smoothly contoured drifts formed during the previous winter. About 2 meters of snow accumulated in undisturbed areas. The small amount of drifting around the arch enabled use, until well into the winter, of a surface access door. This door, rather than an elevated hatch reached by ladder, was a great help to cargo and supply operations at the winter's onset and to garbage removal later on.

The last outside work at the season's beginning was to flag materials left outside of the station arch and to erect two riometer antennas. The flagging was to help locate the cargo at the end of winter, after it had been buried by snow. Outside activity was limited, of course, during most of the winter. In November, we dug out a bulldozer that would be needed to unload the first summer airplane to the station. We also readied the emergency camp for summer occupancy.

Siple really was not as complete as we had hoped until nearly the end of the winter, but it certainly was comfortable. There were many initial problems in the mechanical area, including generator overheating during intense VLF transmissions, improper wiring of generator governors and poor wiring throughout much of the station, and leaks in water, glycol, and fuel systems throughout the station. The biggest problem, however, was the generator exhaust system. Eventually most of the problems were solved through such modifications as installing a blower in the ducts of the generator air circulation system, repairing leaks, and rewiring. The generator exhaust system deteriorated as time passed. Flexible connections broke and valves failed.

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Erecting towers for very low frequency (VLF) dipole antenna.

Heat from the exhaust was used to melt snow for the station water supply. But the system failed, resulting in a fire, and electrical elements were installed to take over melting operations.

A small repair shop was built under the arch. This eliminated having to do our repair work on the dining table or in the kitchen. Interior walls in the VLF laboratory van were removed to provide more space for research equipment. In addition to other projects, the station's interior was finished by painting doors and walls, and installing floor tiling. The prefabricated vans under the station arch had been punctured during transportation and installation. We had to caulk and patch the walls to prevent freezing of pipes and loss of warmth. Storage shelves were built inside and outside station vans and supplies were inventoried and organized. These projects consumed many hours of our time.

The station's purpose—scientific research—rewarded our efforts. Although we got a late start on science programs, because of nearly 2 months of construction and repair projects, passive (recording) science programs bordered on completion in August. All of the passive programs operated earlier in the season, although they were rather hastily installed. The most important science program, VLF transmissions, started in late April. Cooling of the transmitter was a problem during high power transmissions until we discovered that a heat exchanger cooling fan and the modulating controls were installed backwards during station construction. A small room was built over the transmitter van to house transmitter circuitry. Results of the VLF research boosted our morale during times of strain caused by our heavy work schedules.

Transmitter operations were enhanced later in the season by a minicomputer. The computer ran the transmitter and some recorders; it even controlled generator cooling systems during times of heavy transmitter loading.

High snow static along the 21-kilometer-long dipole antenna produced fireworks during wind storms. The static caused difficulties with the riometer.

No one could have anticipated how the winter at Siple would go. But each of us contributed something to its ultimate success. Our work load precluded work on hobbies and did not leave much time to watch movies. This probably was therapeutic. At small stations everyone gets involved in everything. There are no rigid divisions of tasks or of responsibilities. One of the more positive things to emerge during our winter at Siple was proof that just four persons can handle the isolation and the demands of a winter's work in Antarctica. They can arise to the problems of a new station, maintain a healthy state of morale, and operate successfully a majoı science program.