

Project Oldstone— Greenland 1973

After the cold and dreary winter of 1972-73, every member of the Caltech community should have looked forward to the warm, if smoggy, summer. Along with millions of Angelenos, all Tech people should have flocked to the beaches or the desert to soak up the sun's rays. So why would seven members of the Division of Geological and Planetary Sciences head for the fog-shrouded shores of Greenland? To pick up samples of the oldest rocks on earth, of course.

In an immensely successful expedition (one of the largest ever to work out of Caltech) we collected 20 tons of rock samples, which now constitute North America's most complete suite of samples from the west coast of Greenland. Among the prizes are many samples of Amîtsoq gneiss, the world's oldest known rock formation, tentatively dating from 3.7 billion years ago. During our travels along 200 miles of the coast from Fiskenaeset to Sukkertoppen, we also collected samples of pegmatite dikes (coarse-grained intrusive rocks), gneisses younger than the Amîtsoq gneiss, anorthosites, granites, and supracrustal rocks (metamorphosed sediments).

Project Oldstone was conceived in June 1972, when graduate student Alex Gancarz wrote the Greenland Geological Survey (GGU) requesting permission to join a GGU field party in order to collect rock samples for isotope age-dating as part of his PhD thesis. They replied that he would have to form his own expedition—with the approval of the Danish government—and thus 11 months of frustrating letter-writing and telephoning began.

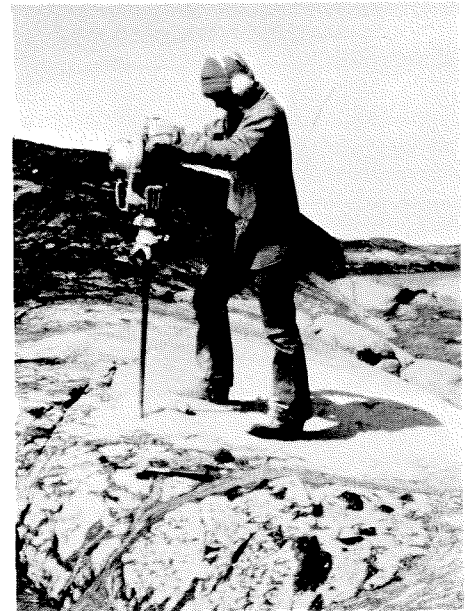
By June 11, 1973, the project had been funded by the National Science Foundation; equipment had been purchased, packed, and shipped to Greenland; the members of the expedition had learned to drill and blast rock; and Alex and fellow graduate student Bob Dymek were ready to venture into the unknown. Their itinerary included 8,000 miles of air travel for the 3,400-mile trip because the only scheduled flights to Greenland originate in Copenhagen; hence, their first view of the famed icecap came midway through the 11-hour flight from Los Angeles to Denmark.

After two days of meetings in Copenhagen, they flew to Greenland on June 15 and experienced a reverse cultural shock: Instead of finding primitive settlements, they encountered modern cities quite like those in Denmark, apart from the snowstorms. Godthaab, Greenland's capital and Oldstone's base of operations, is a town of 8,000, featuring high-rise apartment buildings, and with television, supermarkets, a modern hotel, good restaurants, paved streets, and even a discotheque!

While Alex and Bob unpacked the expedition's equipment, did some sampling, and watched the snow fall in Greenland, the other five members of the expedition did some last-minute shopping and packing in California. On June 25, professors Jerry Wasserburg and Arden Albee, their sons Charles Wasserburg and James Albee, and I boarded our flight to Copenhagen. There, we too had two days of meetings and sight-seeing, and then flew to Greenland, arriving in Godthaab on June 30. After a day of stowing gear aboard our chartered ship, the *Jens Jarl*, Alex hoisted the expedition's orange flag, and we sailed out of Godthaab on the first of eight cruises in the land of the midnight sun.

Squeezing nine people aboard a 33-foot boat was no easy matter; feeding them was nearly impossible. The ship's owner and resident Viking, Rudi Burghardt of Godthaab, decided to sleep ashore every night rather than wedge himself into one of the narrow bunks. Jorgen Ostergaard of Qorqut, the captain and old salt of the ship, slept in the wheelhouse, leaving the two main cabins to the Americans. The senior citizens of the group (Jerry, Arden, Alex, and Bob Dymek) slept in the main cabin and were forced to get up every morning so that breakfast could be prepared in the cramped quarters. By breakfast time all nine of us had to be very ductile in order to fit around the ship's 4- x 2-foot table. The forward "cabin," which had barely enough floor space for one person to stand, served as sleeping quarters for the kids (Charlie, Jamie, and me).

After a week at sea, we had established a routine for collecting samples. In each interesting location two or three people went ashore, chose a sampling site, and



Charles Wasserburg mans the expedition's indispensable tool—a gasoline-powered drill that bored about 500 holes in behalf of Project Oldstone.

radioed to *Jens Jarl* requesting the necessary tools; then those on ship went ashore with the tools and set to work. One instrument that always went with us was the gasoline-powered, air-cooled drill. In seven weeks we used it to drill approximately 500 holes, each of which was used for either plug-and-feather-wedge splitting or blasting. Of course, the more mundane sledge hammers and chisels also did their part in procuring fresh, football-sized samples of the old stones, but without the drill the expedition's output probably would have been cut by 80 percent.

Project Oldstone owes a great deal to Dr. Vic McGregor of the GGU. He spent much of his field season showing the Americans his favorite outcrops, but he also played a major role in the expedition's only near-disaster, which all involved refer to as "the drowning." On the morning of July 6, Vic took Jerry, Alex, and Bob Dymek in his tiny two-man dinghy to show them a favorite outcrop. They were about 30 yards offshore when the overloaded boat swamped, throwing its occupants into the icy water of Ameralik

Ten Weeks at Hard Labor

Fjord. Vic, Alex, and Bob managed to swim ashore while Jerry stayed with the overturned boat until Jorgen Ostergaard, in the *Jens Jarl* dinghy, arrived at the scene two or three minutes later. Soon after this the Albees and I arrived with McGregor's boat, the *Pingo*, retrieved the floating gear, and bailed out the swamped dinghy. Luckily the only losses were two pairs of eyeglasses and two ruined cameras, but the potential seriousness of such accidents made everybody careful not to overload a dinghy again.

Much of the time in Greenland was spent gathering samples, but several unusual incidents, of course, will survive in our memories long after the monotony of drilling and hammering is forgotten. For instance, one day when *Jens Jarl* was refueling in Napassoq, Jorgen returned with a half-caribou he had purchased, so for a few days everyone ate fresh—and, eventually, not-so-fresh—caribou stew rather than dehydrated beef stew. A few days later, on Friday, the 13th of July, Jerry, Arden, Alex, and Bob Dymek went ashore for a “15-minute” sampling stop before dinner—and dinner was postponed for four hours while various sampling methods backfired.

The shortest swim on record occurred one sunny morning off Narssaq when James decided to go swimming. Diving in, he found that 29°-water is colder than it looks, and he popped out like a champagne cork after one second of immersion. And one evening Jerry went ashore to look at the rocks and came back with a five-pound sea catfish he had caught with his bare hands!

The highlight of the expedition was the voyage south to Fiskennaeset, where Project Oldstone visited the GGU permanent camp at Midgaard. In addition to such luxuries as outhouses and a shower, the GGU used the ultimate in rock-sampling equipment: two three-seater helicopters. In the two days we borrowed their helicopters for our work, we collected two tons of samples from remote areas—the only old stones not acquired near the high-tide line. And nobody from the expedition will ever forget the rides aboard the whirlybirds—hair-raising because their

Swiss pilots loved to fly through narrow gorges, skim over cliffs, and chase ducks at 90 miles per hour.

These helicopter rides marked the last activities of the Albees and the Wasserburgs in Greenland. On August 6 they left Godthaab for another 8,000 miles of flying to return to Los Angeles. Meanwhile Alex, Bob Dymek, and I did some final sampling, lowered the now-famous Oldstone flag, and packed the expedition equipment for shipment back to the United States. After

saying “farvel” to all our Greenland friends, we left Godthaab on August 25, ten weeks after our arrival. We spent a day in Copenhagen, and then flew back to the USA. When the rock samples arrive—all 20 tons of them—they will provide the age-daters in Tech's Lunatic Asylum and elsewhere in the world with material for years of research into questions concerning the formation of the earth's oldest rocks.

—Bob Kieckhefer, '74



It's a great place to spend the summer—if you're a geologist. Dwarfed by icebergs and threatened by fog, the *Jens Jarl* cruises up Godthaabsfjord on Greenland's west coast.