Briefings

edited by FAYE FLAM

Oceanography on Ice

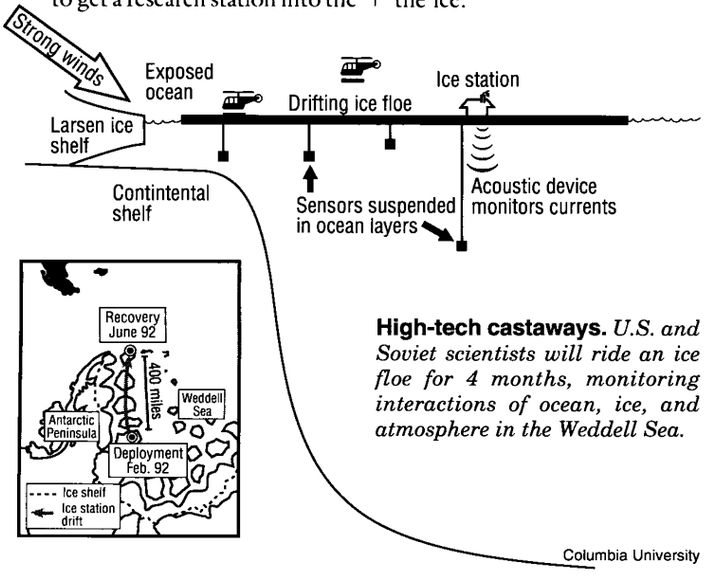
The ghost of Sir Ernest Shackleton, the British explorer who spent 9 months of 1915 drifting in the pack ice near Antarctica, will be hovering over the Weddell Sea next spring. In February, 20 U.S. and Soviet scientists, together with 12 support personnel, will disembark from a Soviet ship onto an ice floe at the southern end of the Weddell Sea, just off the Antarctic coast. Camped in a clutch of prefabricated huts on the 3-to-4-meter-thick ice, they'll drift northward for 5 months, observing the interactions of ocean, ice, and atmosphere.

The floe's trajectory will take the scientists through the western part of the sea, a region that has been largely off limits to science because of its perpetual ice. "We don't know if it's possible to get into this part of the Weddell Sea by ice-breaker," says Arnold Gordon, an oceanographer at the Lamont-Doherty Geological Observatory of Columbia University and the chief U.S. scientist on the expedition. But in a 1988 meeting in the Soviet Union, Gordon recalls, Soviet scientists suggested a slow but sure way to get a research station into the western Weddell: rely on the natural drift of the ice flocs.

Besides posing a logistical challenge, the perpetual ice is also one of the puzzles the researchers hope to solve. In the rest of the Weddell Sea, the ice melts away in summer. "Why does this region look more like the [ice-bound] Arctic than the Antarctic?" asks Gordon. One possibility, he says, is that the upwelling of relatively warm water from the ocean depths, which melts the pack ice elsewhere in the Weddell, may be absent at the sea's western end.

By lowering current meters and other oceanographic instruments through the ice and measuring heat flow across it, the researchers hope to find out what is happening under the ice pack, and why. The issue has more than parochial interest, says Gordon, because the "overturning" of deep water near Antarctica plays a major role in world climate, releasing heat and taking up gases. One of the ultimate questions driving the project, he says, is, "How does the Southern Ocean feed back into global warming?"

The joint National Science Foundation-Soviet project will end in June or July 1992. An American ship will pick up the floe stowaways at the northern end of the pack ice, 400 miles from their starting point and not far from where Shackleton and his men finally escaped the ice.

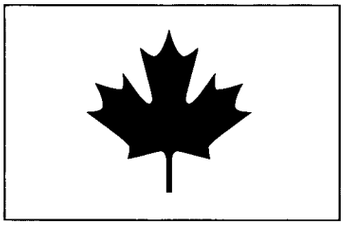


High-tech castaways. *U.S. and Soviet scientists will ride an ice floe for 4 months, monitoring interactions of ocean, ice, and atmosphere in the Weddell Sea.*

Canadian Federal Lab Goes Private

Eager to see a return on R&D investments, the Canadian government has, for the first time, contracted out the operations of a federal laboratory to a private company. The move follows the pattern of government-owned, contractor-operated labs in the United States.

RockCliffe Research and Technology Inc., a privately held Ottawa-based firm founded by Stuart Smith, former chairman of the Science Council for Canada, took over the management and operations of Environment Canada's Wastewater Technology Centre (WTC) on 1 July 1991. Under the 3-year deal, the government will continue to provide $9 million annually in research support, but all 100 employees of WTC have become employees of the contractor.



RockCliffe is not allowed to profit on the federal funding, but it will retain 45% of any profit from the sale of products and services, with 20% going to the employees and the remaining 35% back to the federal government.

Although a government spokesperson claims that Canada has no plans for similar arrangements with other federal labs, the government reportedly views this initial arrangement as an experiment—one that could serve as a model for future co-operative undertakings. However, Smith, who has been negotiating this venture with the government for the past 3 years, maintains that his company would be willing to take on other government labs but that additional contracts are being stymied by government bureaucracy.

GONG Gets Going

Last month, astronomers at the National Solar Observatory in Tucson successfully tested a prototype telescope for a study that by the mid-1990s promises to unveil the secrets of the inside of the sun. Eventually, five identical devices will join the Arizona prototype in a worldwide array known as the Global Oscillation Network Group (GONG)—a project run by the National Science Foundation. Then it will be GONG meets gong as the network monitors the sun's pulsating vibrations, which probe its internal processes.

Fifteen years ago, says NSO astronomer Doug Rabin, researchers discovered that the sun vibrates as a whole, like a bell, ringing with millions of frequencies. The most prevalent solar vibration expands and contracts the sun about once every 5 minutes. No one yet knows what drives these vibrations, but Rabin says that his astronomer colleagues now agree that they originate deep in the interior—a place still understood only in theory.

Which is why astronomers are GONG-ho. The project will offer scientists their first hard look at the sun's interior. With six sites spread around the world they will be able to stare at the sun continuously, 24 hours a day.

The six small telescopes that make up GONG will catch every solar pulse and wiggle by monitoring small patches of the sun as they move away from and toward the earth. As an area of sun advances or retreats, the wavelengths of light emanating from it becomes Doppler shifted by about one part in 300,000, a shift GONG can detect. Scientists expect to use the subtle record of these solar vibrations to measure the heat and density structure of the interior, just as seismologists use vibrations in the earth to reveal the nature of its mantle and core.