

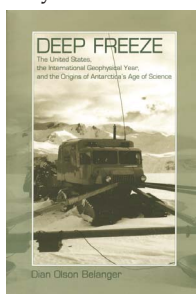
Scientific collaboration amid cold war politics

Deep Freeze The United States, the International Geophysical Year, and the Origins of Antarctica's Age of Science

Dian Olson Belanger
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Reviewed by Brian Fraser

"Operation Deep Freeze" may not mean anything to today's young generation, but 50 years ago, when I was an 18-year-old student about to commence



undergraduate studies in physics in Christchurch, New Zealand, it meant a great deal to me. With US Navy ships arriving at Port Lyttelton and aircraft landing at Wigram and Harewood airfields, the military

activity around town could not be avoided. Those were the Southern Hemisphere summers of 1955–56 and 1956–57, when the Deep Freeze I and II expeditions took place. The mobilization to Antarctica came before the International Geophysical Year (IGY), which ran from July 1957 to December 1958 (see the article by Fae Korsmo in this issue of PHYSICS TODAY, page 38). Scientists from 12 countries, as part of the IGY, undertook simultaneous scientific observations of the southern polar region's ice and upper atmosphere. Task Force 43, under the code name Operation Deep Freeze, was led by US Navy Admiral George Dufek and provided logistical support for the US IGY scientists once they began their research in 1957 along with their counterparts from other countries.

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In the late 1990s, NSF and the Antarctic Deep Freeze Association asked historian Dian Olson Belanger to document the story of the military and civilian personnel who planned, built, and helped operate the network of US facilities in Antarctica before the IGY commencement. With NSF grant money, Belanger's work expanded to include scientific activities of the IGY: The result is *Deep Freeze: The United States, the International Geophysical Year, and the Origins of Antarctica's Age of Science*. Out of the IGY emerged the 1959 Antarctic Treaty, which 45 countries still honor today; science has continued to be conducted in Antarctica for the past 50 years.

The IGY was the brainchild of two men: Lloyd Berkner, who headed a unit called the Exploratory Geophysics of the Atmosphere, located at the Carnegie Institution of Washington, and renowned geophysicist Sydney Chapman of Oxford University. At first the project was named the Third Polar Year, following the first one in 1882–83 and the second in 1932–33, and concentrated on the uninhabited final frontier of Antarctica. Belanger acknowledges that the success of the IGY must be credited to the organizers supported by the National Academy of Sciences and the International Council of Scientific Unions (ICSU), who invited the world's geophysicists directly through scientific organizations. With that approach, planning was supposed to proceed without the interference of politics and governments during the turbulent period of the cold war and Korean War. Of course, politics was involved. The US and the Soviet Union were unlikely collaborators, often competitors from the start and through the end of the cold war. Neither country had territorial claims to Antarctica, and the IGY bases for the US and Soviet Union were, respectively, on New Zealand and Australian territories.

The three chapters that cover the science of the IGY—meteorology, the physics of the upper atmosphere, and the geology of the icy continent—are presented from a humanitarian rather than scientific perspective. Interest-

ingly, very little life sciences and ecosystem research was conducted during the IGY. Those studies were to come later.

Deep Freeze gives an exciting account of the successes, failures, and difficulties that the early military personnel of Deep Freeze I and II confronted in their quest to establish scientific bases on the frozen continent. Navy operations prior to the arrival of the scientists established 7 stations that deployed 7 ships and 1800 military men in the first year and 3400 men, 12 ships, and the VX-6 air squadron in the second. Detailed descriptions, with many personal accounts, record the assembly and delivery of materials. The book also covers the construction of McMurdo station on Ross Island, where the first ice airfield was plowed; Little America on Kainan Bay; the inland stations of Byrd, Hallett, Wilkes, and Ellsworth; and the air-dropped South Pole station at the geographical pole.

An outstanding nugget of information is the account of the hazardous task of seeking a safe passage from Little America through crevasses to establish Byrd station, located 650 miles inland. A difficult trail forged by Deep Freeze I was abandoned, and Deep Freeze II found a more reliable route; part of it was aptly named Fashion Lane for its colored flag markers in crevasse territory, and the rest called Army–Navy Drive, where travel was flat and fast.

Belanger weaves an absorbing historical account, based on written and oral records, of the personalities of scientists and military personnel; she details their achievements in establishing the IGY in Antarctica and accumulating new scientific results in an extreme climate under isolated conditions. *Deep Freeze* is a blend of documentary and adventure. It is a must-read for those who were involved or have had relatives in the IGY or Operation Deep Freeze, which continued until 1997. For physicists and geophysicists, the book provides a brief history of how research in Antarctica advanced dramatically during and after the IGY and led into the space age.