A long winter's isolation at the end of magnetic lines in Antarctica

A long Antarctic winter looms ahead for a team of four Americans who have settled into a newly built scientific outpost on the ice cap at the base of the Antarctic Peninsula. According to the National Science Foundation, it is the smallest, completely isolated American group to winter-over in the Antarctic since Admiral Richard E. Byrd spent four months in a one-man outpost 100 miles south of his main base at Little America II in 1934.

The four were left at the outpost, Siple Station, in February and won't be picked up by an NSF ski-equipped LC-130 Hercules until next November. The exact date is uncertain; nobody has ever wintered at the station before and the weather conditions are highly variable.

The group consists of William J. Trabucco and Evans W. Paschal, both young Stanford University scientists; Jay C. Klinck, a mechanic; and Russell D. Threlkeld, a physician. Located on a windswept plain, Siple Station is 1,350 miles from McMurdo Station, the U.S. logistic center on Antarctica.

The station is situated at one of the points where magnetic field lines that pass through the boundary between the active and quiet regions of the magnetosphere intercept the earth. The other end of the lines intercept the earth near Roberval, Quebec, Canada.

Coordinated experiments will be conducted at both ends of this magnetic channel. The hope is that new understanding can be obtained about the interaction between electromagnetic waves and charged particles in the space surrounding the earth. This should help clarify some of the ways in which the sun affects the earth's environment.

Trabucco and Paschal will use a 13-mile-long antenna elevated above the ice surface to artifically stimulate the magnetic field line.

The station will be isolated, but it's hardly primitive. There are 10 tons of food (including steak, lobster, strawberries, and ice cream); 50,000 gallons of diesel oil to power the generator and heaters; a radio, movies, and 1,000 books; and enough medical supplies and equipment for minor emergency operations and even dental work.

A solution to the lunar soil's age discrepancy

One mystery of lunar science is the age of lunar soils. The rubidium-strontium age-dating method usually yields ages for the soils of about 4.6 billion years. Yet most scientists (with the exception of one holdout) think the soil came from the rocks. The rocks usually give younger ages.

Scientists attributed this discrepancy to some "magic component" in the soils that made them appear older. KREEP (material high in uranium, thorium, potassium, phosphorus and rare earth elements) was the most likely culprit, so Lawrence E. Nyquist, Paul W. Gast and N. J. Hubbard of the Johnson Space Center (JSC) decided to isolate KREEP and date it. The date they came out with was 4.3 billion years old. So apparently KREEP could not be the aging factor in the soils.

Leon T. Silver last year proposed that volatization of materials on the lunar surface could be what was messing up the age-dating results (SN: 1/1/72, p. 12). If material has lost rubidium, for example, it would appear older than it actually is. To volatilize rubidium, temperatures need to be about 800 to 900 degrees C. Impacts on the moon that melt glass generate temperatures of about 1,000 degrees C. Now the JSC group has found a direct correlation between the older ages and impact-generated material that would have been heated enough to allow rubidium to escape.

U. S. Clanton and D. S. McKay noted that soils vary in the amounts of agglutinates they contain. Agglutinates are soils that have been welded together from bombardment. The more agglutinates, the longer the soils have been banged about on the moon's surface. The group found that soils with five to six percent agglutinates dated about 4.36 billion years. The soils from Apollo 14 containing about 60 percent agglutinates gave apparent ages of 4.72 billion years. They believe the agglutinated soil lost rubidium, thus giving a discrepant apparent age older than the true age.

The group is pursuing this hypothesis further. Rather than comparing different soils from the same site, they are now analyzing one soil sample grain by grain. If the agglutinated grains turn out to have older apparent ages than the non-agglutinates, their theory may be borne out.

Meanwhile, somewhere on the moon there should be material that appears much younger because it contains the lost rubidium. "Where has all the rubidium gone?" asks Gast. "We don't know," is his answer. □

Clanton and McKay/NASA

Agglutinated soils: Age indicator.

Dividing the NRC two different ways

In order to take a more aggressive role in its duties as the nation's top scientific advisory body, the National Academy of Sciences (NAS) has begun reorganizing its main operating branch, the National Research Council (NRC). The long-discussed reorganization was approved last spring (SN: 5/6/72, p. 294).

Traditionally, the NRC responds to Congressional and governmental requests for an in-depth analysis of some broad problem of national interest, such as its recently publicized study of automobile emission standards. To provide more continuity in responding to such requests and to more actively initiate investigations on its own, the NRC will split into two sets of advisory groups, each group to be charged with a particular, long-range set of responsibilities.

The first set of groups, called Assemblies, will be organized along lines of scientific fields and will be charged with studies of a strictly disciplinary nature, for example, conducting manpower surveys. The first Assembly, formed last month, is responsible for the Behavioral and Social Sciences. Assemblies in the Life Sciences and the Physical Sciences and Mathematics will be formed shortly.

The other set of groups will be called Commissions, and will be charged with studying broad national problem areas. The Commission on Natural Resources has just been formed, and will be followed later by Commissions dealing with problems in international scientific affairs, national security, human resources, technology in urban development and so forth. □