

This disclosure set the stage for screening blood donors for hepatitis (SN: 6/13/70, p. 584). It also allowed Saul Krugman and Joan P. Giles of New York University School of Medicine to use the antigen to develop a vaccine against hepatitis B. They showed the vaccine's effectiveness in a small number of persons in 1971, and in still more by 1973 (SN: 4/21/73, p. 155). The vaccine is now being produced by Merck and Co. for experimental use. Blumberg and vaccine authorities predict that the Food and Drug Administration will approve the vaccine in another two or three years (SN: 12/14/74, p. 38). □

Chemistry: Structure of borane compounds



Wide World



Lipscomb and diborane molecule.

Research on molecular structure and chemical bonding is the basis of the 1976 Nobel Prize in Chemistry, awarded to William N. Lipscomb of Harvard University.

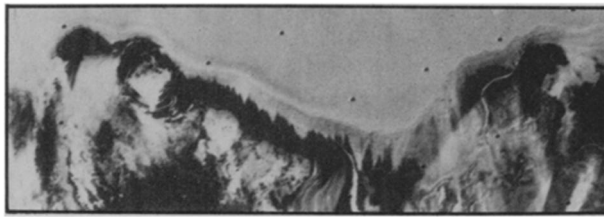
Since 1949 Lipscomb has worked with compounds called boranes, which are made up of boron and hydrogen atoms. Chemists did not understand how the atoms were linked together in these molecules, because there didn't seem to be enough electrons. Most chemical bonds are formed by one or more pairs of electrons between each pair of atomic nuclei. But in diborane (B_2H_6) for example, only two electrons apparently make up two bonds, linking each central hydrogen to two boron atoms.

Lipscomb examined the structure of boranes by observing the pattern of deflections of X-rays beamed at a pure crystal. This work was done at low temperatures because boranes are often explosive. Lipscomb discovered that complex borane molecules were polyhedral structures, with boron atoms at the corners.

By studying the simpler boranes, Lipscomb and co-workers described a "three-center bond" by which two electrons connect three nuclei. Extensions of this description have allowed Lipscomb to predict structures of new, more complex boranes and reactions of boranes with other compounds.

Lipscomb is now working primarily on the structure of proteins. Other researchers are doing preliminary studies on the use of boranes in cancer therapy. □

Viking: Perplexing data, icy imagery



Ice-draped cliff near edge of Martian north polar cap: Like fingers of ice on a window pane.

NASA/Viking 2

The Viking mission to Mars has in the past week produced more bizarre results from the landers and some striking photographs of the Martian poles from the orbiters.

Two of the major question marks come from the biology instruments aboard lander number 2. The labeled-release experiment, designed to seek signs of metabolism by monitoring the release of gases containing carbon-14 from a labeled nutrient, was studying a soil sample that had been "cold-sterilized" at 50° to 55° C. Previous tests with lander 1's instrument had shown a high, smooth release curve from unsterilized soil and a low curve from soil sterilized by three hours of heating at 160° C. This had suggested either a life form that was killed off or a nonbiologic, chemical process that was somehow deactivated by the heat. The lower sterilization temperature in the latest run was supposed either to point to biology (which should be more heat sensitive) or else reduce the nonbiologic alternatives by limiting them to processes that would be altered at the lower temperatures.

The result was perplexing. The curve was lower by at least 60 percent than that of the earlier, nonsterile run, but it was still substantially higher than that from the fully sterilized sample. "The biology does not appear to be eliminated," says LR coinvestigator Patricia Straat of Biospherics, Inc., "and we would conclude that the chemical range of possibilities has been narrowed." But, she warns, "again we have a ways to go before we can rely on the interpretation of the data." One reason is the shape of the curve itself. Instead of following a smooth course like the previous runs (both sterile and otherwise), it is a jagged, up-down-up-down sawtooth shape, suggesting, says Straat, "some very peculiar kinetics that at the moment we really don't know how to interpret." One possibility is that some electronic problem has caused the carbon-14 detector to vary in its sensitivity with the small temperature variations that are always taking place within the instrument. But it's still a mystery.

Another unusual result turned up in lander 2's pyrolytic-release experiment, which exposes its samples to gases containing carbon-14 to see if microorganisms are assimilating carbon from the atmosphere. The latest cycle, says Norman H. Horowitz of the California Institute of Technology, was run "with all

cannons blazing." The sun-simulating xenon lamp (left dark in the previous cycle) was on, and for the first time a sample was moistened with about 100 micrograms of water vapor, in hopes of compensating for the fact that the sample was gathered at a warmer, drier time of day than the sample that produced the exciting, "positive" results in the first cycle aboard lander 1. The first of the latest cycle's two data peaks, which reflects the efficiency with which excess gaseous carbon-14 has been flushed from the system, was the highest ever recorded by either lander: more than 12,500 radioactivity counts per minute. Yet the key second peak was the lowest ever, 0.69 counts per minute or, says Horowitz, "essentially zero." Adding to the confusion was an indication that a possible leak in the instrument's radiation counter may have been letting gas escape from the system, thus lowering the count. But even corrected for that, says one Viking biologist, the level seems to be only about 2 to 3 c.p.m. "The most obvious and most probable explanation," according to Horowitz, "is that the injection of water vapor actually destroyed the capacity of the soil or the surface material to do the organic synthesis that it was doing previously." Yet the supposedly naturally moist soil in lander 1's first test yielded a second peak of 96 c.p.m. Heat could be a factor—the latest test was about 5° C warmer than most of the earlier runs—but one lander 1 cycle produced a second peak of 28 c.p.m. despite an operational error that exposed its sample to a temperature that was 8° C higher still. The biologists' task is getting no easier, and Viking's continued failure to detect naturally occurring organic materials is not helping.

An important goal of the "walk" of orbiter 2 was to permit close-ups to be taken of the Martian north polar cap, which was only poorly seen by Mariner 9. "These," says Carr, "lived up to their expectations." Huge, dark gashes slice across the cap's stark whiteness, signs of seasonal—and sometimes epochal—melts and flows. Sweeping, curved ice fronts, some adorned with frozen fingers like ice traces on a gigantic window pane, stand cliff-like in apparent relief (although, Carr says, it is often difficult to tell without stereo images "what is up and what is down"). Perhaps most intriguing of all in the crisp photos, however, is the clearly defined layering. Ice . . . dust . . . ice

... dust: alternating strata of frozen water and wind-blown Martian surface material, winters and summers on an alien world. In some places, one of the higher strata can be seen to dip downward, cutting off the layers beneath while new layers form on top of it. "That," says Carr, "is the kind of thing we're looking for in these pictures, because [it] tells us that there was a climatic change." There may, in fact, be no better place on the planet to try to find out whether, as has been suggested by some researchers, the climate of Mars has had, on a billion-year scale, its ups and downs. "We may well be able to determine . . . to what extent there have been climatic changes in the past," Carr says, "and even at what time these climatic changes took place." □

Soviets abort Soyuz space mission

The latest attempt by the Soviet Union to send two cosmonauts to the orbiting Salyut 5 space station ended in failure on Oct. 16. Soyuz 23, carrying Lieut. Col. Vyacheslav Zudov and Lieut. Col. Valery Rozhdestvensky of the Soviet Air Force returned to earth after a malfunction prevented it from docking with the Salyut.

Soyuz 23 landed in Tengiz Lake near the city of Tselinograd in Kazakhstan at 8:46 p.m. Moscow time or 48 hours after it had blasted off from the launching station at Baikonur. The splashdown, which took place during a blizzard, was apparently not intentional, but an emergency necessity, according to the latest reports. The Soviets have usually landed their cosmonauts by parachute on hard ground; splashdowns are a specialty of the American space agency, but NASA's splashdowns take place in tropical waters, where snow and temperatures of -17°C are not probable hazards. Amphibious craft aided in the rescue of the cosmonauts. Apparently it took some time to find them since reports of their safe recovery were delayed several hours. □

PCST members

President Ford has named nine members to the President's Committee on Science and Technology Policy (PCST), which will conduct a two-year study of federal science support, chaired by Simon Ramo (SN: 8/21/76, p. 116).

The members are: William Baker of Bell Labs, vice chairman; Otis Bowen, governor of Indiana; W. Glenn Campbell, Hoover Institution, Stanford University; Edward David, Gould, Inc.; Elizabeth Leduc, Brown University; Fritz Russ, Systems Research, Inc.; Charles Slichter, University of Illinois; Charles Townes, University of California; W. Bradford Wiley, J. Wiley and Sons, Inc. □

First ban on porpoise killing imposed

In one of the most dramatic actions taken in the long series of disputes over how best to protect potentially endangered animal species, the National Marine Fisheries Service this week exercised for the first time its authority to stop entirely the killing of porpoises in connection with tuna fishing. The agency maintains that the action is necessary to comply with provisions of the Marine Mammal Protection Act of 1972, but American tuna industry spokesmen counter that the ban may only shift more business to foreign fishermen, and not help the porpoises at all.

For years, tuna fishermen have relied on the porpoise to help locate schools of yellowfin tuna, which last year accounted for 60 percent of the American tuna catch. As the porpoises prey on the yellowfins, they are sometimes caught in the long nets hauled behind fishing trawlers. The nets keep the porpoises from surfacing for so long that they drown. The Fisheries Service has set a quota of 78,000 porpoises a year that may be killed in this way, and when that limit was reached this week, it instituted a ban for the rest of the year.

Theoretically the tuna fishermen could still go after bluefin or skipjack tuna that do not associate with porpoises, or they could try to locate yellowfin schools that had not yet attracted porpoises. But August J. Felando, general manager of the American Tuna Boat Association told SCIENCE NEWS that these are hardly viable options this late in the season. Although the catch has been quite good this year, he says, rising costs of production mean that unless the fishermen are allowed to continue catching yellowfin the quickest way they can, they will lose money.

Perhaps the critical factor is the uncertain effect the ban will have on foreign fishermen. The Fisheries Service has imposed an embargo on *any* tuna caught after this week through following porpoises. Foreign companies must have certification by their governments that their tuna exports to the United States fall within these restrictions. But Felando points out two weaknesses in this scheme: First, other nations do not have the ability to monitor their vessels carefully enough to make the certification meaningful, and second, past threats to impose embargoes have sometimes run afoul of other political considerations and have been aborted.

The ban may simply be a "windfall for foreign operators," concludes Felando, resulting in higher prices for American consumers and threatening the very existence of the United States tuna fleet.

About the only ray of hope that both the Fisheries Service and the Tuna Association can agree on is a family of new nets designed to help porpoises escape unhurt. By using a finer mesh near the top, which is more easily detected by the

porpoise's sonar and is too small to catch on the porpoise's nose, the rate of porpoise killing can be reduced by as much as two-thirds. But these are still experimental and may have to be enforced through international treaty.

In the final analysis, the current ban does illustrate a growing commitment toward protecting threatened species, but it also highlights the increasing complexity and cost of wildlife conservation in sensitive commercial areas. □

Quake prediction council set up

The U.S. Geological Survey this week announced the establishment of a five-member Earthquake Prediction Council to review data that could warn of an earthquake and to recommend issuance of any prediction. It is the first federal group of its kind to be set up in the United States. The USGS said it considers the action a major step toward development of a system for the orderly and effective issuance of earthquake predictions. The agency has statutory responsibility for warning of geologic catastrophes where possible.

The council's work will begin at the first indication of new data that could lead to a prediction and ends if a prediction is not formulated or if a recommendation to issue a prediction is sent to the USGS director. He then would issue the authorized prediction.

The scientists on the council are Jerry P. Eaton (its chairman), Robert Wallace, Peter Ward, Robert Page and Jack Evernden. All are at the agency's Menlo Park, Calif., earthquake studies office.

V.E. McKelvey, director of the USGS, emphasizes that there is yet no operational capability for reliable earthquake prediction but says "such a capability is possible in the near future." □

Agencies to ban fluorocarbon sprays

The Food and Drug Administration (FDA) last week proposed elimination of nonessential uses of fluorocarbon propellants in foods, drugs and cosmetics. The FDA regulates about 80 percent of products now sold in aerosol containers. During the phaseout, the agency will require a warning on cans to alert consumers that the contents include a fluorocarbon that damages the environment.

Under the new Toxic Substances Control Act (SN: 10/16/76, p. 244), the Environmental Protection Agency may ban fluorocarbon propellants for products other than foods, drugs and cosmetics.