

# academy of sciences

## Gathered at the National Academy of Sciences' fall meeting at Dartmouth College

### RIBOSOMES

#### Turning on the reserve

Ribosomes are the sites of protein manufacture in all cells. Yet scientists at Dartmouth Medical School have found that if two-thirds of a mouse's liver is removed, the rate of protein manufacture in the remaining tissue nearly doubles, although the ribosome concentration stays the same.

To explain this Dr. O. A. Scornik traced radioactive leucine, an amino acid which, like all amino acids, is incorporated into protein.

By measuring the radioactivity of the leucine when it is introduced into the liver, as it is made into protein and when it finally comes out in a protein, Dr. Scornik learned that although the number of ribosomes remains constant, more of them are working. In a normal mouse liver, he reports, only one-third to one-half of them are active at any one time.

### GEOLOGY

#### An ocean ridge theory

Conventional theory holds that geothermal convection is responsible for the formation of ocean ridges. Intense radioactive heat is supposed to have caused the earth's mantle to flow in a convection current, pushing up the continuous ocean ridge system that runs from the Atlantic, past Africa, into the Indian Ocean and finally into the east Pacific.

Dr. Egon Orowan of the Massachusetts Institute of Technology suggests another origin. He sees the ridges developing as secondary effects of rifts caused by tension in the earth's crust. The crust swells along the rifts to form ridges, because olivine, the mineral that makes up most of the earth's mantle, expands when it combines with water admitted by the rift.

The original rift-forming tensile stress could be produced by local radioactive heating or by the impact of large meteors, he says.

### FLUID MECHANICS

#### Blood clot mechanism worked out

A team of physicians and engineers led by Dr. Arthur Kantrowitz of Avco Research Laboratory in Everett, Mass., has begun research on the fluid mechanics governing the formation of blood clots, on the surfaces of plastic prosthetic devices implanted in the circulatory system.

By mounting the carotid artery of a dog under a microscope, they observed that first a single layer of blood platelets is laid down on the plastic surface. This takes 30 seconds to one minute; the monolayer does not affect blood flow.

Next, white blood cells begin depositing around a single stagnation point and soon platelets aggregate where the white blood cells are attached, forming a thrombus.

### GEOCHEMISTRY

#### Improved dating method

Scientists at the U.S. Army Cold Regions Research Laboratory at Hanover, N.H., in collaboration with the University of Copenhagen, have developed a mathematical model and stable isotope method to determine the age of polar ice caps.

The method relies on the fact that the ratio of oxygen 18 to oxygen 16 in ice is different in summer than in winter, explained Dr. Chester C. Langway of the Hanover lab. Theoretically, to date a glacier, simply taking long samples and counting back seasons should do. But a glacier is a changing, dynamic system whose internal order can be disarranged. The new mathematical model considers all glacial movements, thus permitting a correct interpretation of the data obtained by the oxygen isotope method.

### ELECTROMAGNETISM

#### The masquerading electron

Physicists argue among themselves whether or not magnetic charges exist. Calculations by Nobel laureate William Shockley of Bell Telephone Laboratories, Murray Hill, N.J., show that a special type of electron has properties that permit it to masquerade as a moving pair of magnetic charges. Flowing in current loops, these electrons cause sideways motions of magnetized matter in an electric field, something a magnetic charge would be expected to do. This effect could be misinterpreted as indicating the presence of magnetic charge, or magnetic monopole, as it is called.

Dr. Shockley emphasizes that the existence of this behavior of the Dirac electron—named after Paul Dirac, the Nobel physicist who first postulated it—neither precludes nor supports the existence of magnetic charge, but merely explains how physicists might find effects that could be attributed erroneously to supposed magnetic charges.

### CRYSTALLOGRAPHY

#### Ice forms determined

Scientists recognize that ice has about a dozen different forms, or molecular structures, which result from changes in pressure and temperature.

The only forms determined with any certainty have been the hexagonal and cubic types, which usually form at normal atmospheric pressure and at temperatures at or below zero degrees C.

Dr. Barclay Kamb, a geologist at the California Institute of Technology, has used X-ray crystallography to work out the molecular arrangements of nine other forms, which result from high pressure and temperature change. The arrangements take a variety of geometric shapes, including rhombohedral, tetragonal and monoclinic.