earth sciences

GEOPHYSICS

Earth's spin slowing irregularly

Layers in fossilized mollusc shells, like rings in a tree, can be used to evaluate cycles in the passage of time. Using this system, two Yale University researchers have determined that although the earth's spin on its axis is indeed slowing down, as some geophysicists have found, it is not doing so at a uniform rate.

By measuring the thickness of shell layers in some 22,000 molluscs from different geologic periods, paleontologists Giorgio Pannella and Copeland MacClintock found that the number of days in the lunar month has been decreasing. In the Cambrian period, 500 million years ago, earth turned on its axis about 31.56 times each lunar month, the scientists report, compared to only about 29.17 rotations at present.

The rate of slowdown, however, has not been constant, according to the researchers, both of whom are with Yale's Peabody Museum of Natural History, New Haven, Conn. Following the Upper Pennsylvanian period, 280 million years ago, the slowdown seems to have slowed down, until about 75 million years ago it resumed a more rapid rate.

GEOMAGNETICS

Man-made clouds 20,000 miles up

Barium clouds some 43 times higher in altitude than any ever produced before by the space agency will be attempted jointly this year by NASA and the German Federal Ministry for Scientific Research, in an effort to make visible the earth's magnetic field lines 20,000 miles out in space.

About 30 pounds of barium copper oxide mixture will be ejected into space from a U.S. Scout rocket, producing a glowing ionized cloud expected to be visible from the ground over much of the Western Hemisphere. Besides making visible magnetic and electrical fields in space, the technique can be used to simulate the interaction of the solar wind with an ionized comet tail.

Previous flights from the Wallops Island, Va., test station have reached altitudes of between 155 and 465 miles.

OCEANOGRAPHY

History, life cycles studied on cruise

Scientists from 12 colleges and universities are embarking on an 84-day, 7,000-mile research cruise in Caribbean and South American waters, to investigate the history of, and life cycles in, the ocean.

Aboard the Duke University research vessel Eastward, studies will include research on sea-floor sediments at depths of down to 6,000 feet to determine the age of different parts of the ocean bed. Lower sea levels in geologically ancient times, as well as the rising and falling of land masses, will be traced by analysis of submerged reefs around several Caribbean islands.

Rich concentrations of algae from San Juan to Martinique will be studied, along with their role in the marine ecological food chain. Other sea animals will be captured and studied along the 800 miles between Nassau and San Juan. The microscopic life forms and nutrients in the Florida current will be analyzed near Key West or in the Gulf of Mexico.

MINEROLOGY

Japan on seabed search

Prospecting almost 10,000 feet beneath the Pacific waves will be the mission of a converted Japanese whaling vessel when it sails in March to seek deposits of nickel, manganese, copper and other minerals on the ocean floor southeast of Hawaii.

The sea bottom will be investigated using a long nylon rope equipped with a number of steel scoops to carry mud up to the ship. The device has already been tested in Japan's Suruga Bay, but is currently being modified to make it operate completely automatically. It will be used aboard the 700-ton whaler, No. 2 Tokai Daigaku Maru, chartered by the Sumitomo Shoji Co.

OCEANOGRAPHY

Two mini-subs join the armada

Two new small research submarines have been launched, including one that may play an important role in the search for an earlier mini-sub, the Alvin, which sank in 4,700 feet of water Oct. 16 (SN: 11/23/68, p. 515).

The two 21-ton submarines were built by Electric Boat division of General Dynamics Corp., at its Groton, Conn., yards. They are capable of operating 6,500 feet down, putting the two vessels within reach of 16 percent of the ocean floor, according to Rear Adm. Thomas B. Owen, Chief of Naval Research.

One of the subs, the Turtle, will be assigned to the Navy's Atlantic Underwater Test and Evaluation Center in the Bahamas, following sea trials. The other, the Sea Cliff, will be operated for the Office of Naval Research by the Woods Hole Oceanographic Institution, Woods Hole, Mass. It is both "very likely and entirely fitting," says Adm. Owen, for the Sea Cliff to help in the recovery of the Alvin, now 120 miles south of Cape Cod, since Alvin, too, was operated by Woods Hole for ONR.

SEISMOLOGY

Earthquakes in Chile, Colombia

A group of four seismological monitoring stations is being installed in Chile, as part of an earthquake early warning network to extend throughout South America, and possibly into Central and North America.

Placed at corners of an imaginary 75-by-125-mile rectangle, the stations will automatically transmit their readings to a central fifth station, where they will be correlated and analyzed. Besides aiding in prediction of mainland and marine quakes, the stations will be used in scientific studies of the upper layers of earth's crust.

A station is also being set up at the foot of the Galeras Volcano in the Colombian Andes. Geologist J. Emilio Ramírez of the Colombian Geophysics Institute says that 35 percent of Colombia's quakes stem from the Galeras Volcano epicenter. Several portable stations will also be used.