

larval life in marine bottom invertebrates as related to larval transports and ocean currents," Gunnar Thorson (University Zoological Museum, Copenhagen, Denmark); "Surface films and their importance in exchange processes."

10 Sept. "Cycles of Organic and Inorganic Substances in the Ocean," AAAS Committee representative, Fritz F. Koczy (University of Miami); chairman, Y. Miyake (Central Meteorological Observatory, Tokyo). "Physical chemistry of sea water," Lars Gunnar Sillen (Royal Institute of Technology, Stockholm, Sweden); "Biologically active substances," C. E. Lucas (Marine Laboratory, Aberdeen, Scotland); "Primary production," J. H. Steele (Marine Laboratory, Aberdeen, Scotland); "Balance between living and dead matter in the oceans," W. D. McElroy (Johns Hopkins University).

11 Sept. "Cycles of Organic and Inorganic Substances in the Ocean" (continued), chairman, Thomas G. Thompson (University of Washington, Seattle). "Air-ocean," Erik Eriksson (Meteorological Institute, Stockholm, Sweden); "Sea-water and sediment," S. W. Bruljewicz (Institute of Oceanology, Academy of Sciences, U.S.S.R.); "Vertical and horizontal transport in the ocean," L. H. N. Cooper (Marine Biological Association, Plymouth, Great Britain).

Afternoon Seminars

31 Aug. "Shape and structure of the ocean basins and the forces involved," conveners, Maurice N. Hill (Cambridge University, Great Britain) and Harry H. Hess (Princeton University); "Physical chemistry of sea water and surface films," conveners, Dayton E. Carritt (Chesapeake Bay Institute, Johns Hopkins University) and Gifford C. Ewing (Scripps Institution of Oceanography); "Biogeography and environmental influences," convener, Joel W. Hedgpeth (Pacific Marine Station, Dillon Beach, Calif.).

1 Sept. "Shape and structure of the ocean basins and the forces involved" (continued); "Physical chemistry of sea water and surface films" (continued); "Bathypelagic organisms," conveners, A. Fr. Bruun and Torben Wolff (University Zoological Museum, Copenhagen, Denmark).

2 Sept. "History of sea water and the origin of life," convener, William W. Rubey (U.S. Geological Survey); "The influence of land masses on the distribution of organisms," convener, K. O. Emery (University of Southern California); "The role of ethology in oceanography," conveners, H. O. Bull (Dove Marine Laboratory, Great Britain) and T. J. Walker (Scripps Institution of Oceanography).

3 Sept. "History of sea water and the origin of life" (continued); "Epicontin-

ental sediments and nearshore sedimentary processes," convener, Robert S. Dietz (U.S. Navy Electronics Laboratory, San Diego, Calif.); "Primary production," convener, John H. Ryther (Woods Hole Oceanographic Institution).

4 Sept. "Stratigraphy of the deep sea and the marine climate record," conveners, Cesare Emiliani (University of Miami) and William R. Riedel (Scripps Institution of Oceanography); "Turbulent transports," convener, Willem V. R. Malkus (Woods Hole Oceanographic Institution); "Cultivation of marine organisms as a means of understanding environmental influences on populations," convener, Dixy Lee Ray (University of Washington, Seattle).

7 Sept. "Stratigraphy of the deep sea and the marine climate record" (continued); "Deep sea circulation," convener, Charles S. Cox (Scripps Institution of Oceanography); "Physiology of marine organisms in relation to their environment," convener, Otto Kinne (University of Toronto, Canada).

8 Sept. "Physical and biological processes in sedimentation," convener, E. L. Hamilton (U.S. Navy Electronics Laboratory, San Diego, Calif.); "Nutrient relationships," convener, Bostwick H. Ketchum (Woods Hole Oceanographic Institution); "Evolution and adaptation in the sea," convener, A. A. Buzzati-Traverso (Universita di Pavia, Italy).

9 Sept. "Physical and biological processes in sedimentation" (continued); "Estuarine and nearshore circulation," convener, D. W. Pritchard (Chesapeake Bay Institute, Johns Hopkins University); "Paleobiogeography," convener, Preston E. Cloud (U.S. Geological Survey).

10 Sept. "Nuclear processes in marine sedimentation," Johannes Geiss (University of Miami); "Sea-air interchange," convener, Erik Eriksson (Meteorological Institute, Stockholm, Sweden) and Bernhard Haurwitz (High Altitude Observatory, Boulder, Colo.); "Biologically active substances," convener, Luigi Provostoli (Haskins Laboratories, New York).

11 Sept. "Sea water sediment exchange: marine minerals," convener, Edward D. Goldberg (Scripps Institution of Oceanography); "Spectrum of sea level," convener, Walter H. Munk (Scripps Institution of Oceanography); "Balance between living and dead matter in the oceans," convener, Eugene Corcoran (University of Miami).

New Atomic Particle

The discovery of an atomic particle, the xi zero or neutral cascade hyperon, has been announced by a group of scientists at the University of California's

Lawrence Radiation Laboratory and by the Atomic Energy Commission. The discovery is unique in that it was dependent upon observation of two interconnected invisible "tracks" between sets of visible tracks in a photograph. Analysis of single invisible tracks has been common.

The particle completes the list of predicted particles of ordinary matter. A few predicted antiparticles remain to be seen.

The report on the xi zero appears in the current issue of *Physical Review Letters*, a publication of the American Physical Society, by the following group of researchers: Luis W. Alvarez, professor of physics at the University of California; Philippe Eberhard, physicist on leave from the Centre National de la Recherche Scientifique de France; Myron L. Good, physicist at the Lawrence Laboratory; William Graziano, graduate student; Harold K. Ticho, professor of physics, University of California, Los Angeles; and Stanley G. Wojcicki, graduate student.

The particle was discovered by means of the laboratory's 15-inch liquid hydrogen bubble chamber, which was exposed to a special beam of particles produced by the Lawrence laboratory's bevatron.

The particle has a mass about 40 percent greater than the proton. It has no electrical charge. Its lifetime is fleeting—about one ten-billionth of a second.

The investigators found only one photograph with evidence of the creation of the xi zero. This photograph was taken just before Christmas. It was one of 70,000 taken during an experimental run extending over a period of several weeks.

United States-EURATOM Program

The U.S. Atomic Energy Commission and the Commission of the European Atomic Energy Community have announced that the U.S.-EURATOM Joint Research and Development Board will begin meeting early in April to consider proposals under the U.S.-EURATOM Joint Research and Development Program. Proposals are to be submitted in response to the invitation issued by the AEC and EURATOM in December 1958.

The research and development program is centered on nuclear power reactors and is an integral part of the joint program contemplated by the Agreement for Cooperation between the United States and EURATOM that came into effect on 18 February. The over-all industrial objective is "to bring into operation within the European Atomic Energy Community (EURATOM)

TOM) large-scale power plants using nuclear reactors of types on which research and development have been carried to an advanced stage in the United States, having a total installed capacity of approximately one million kilowatts of electricity, by December 31, 1963 (except that two reactors may be selected to be in operation by December 31, 1965), and under conditions which would approach the competitive range of conventional energy costs in Europe."

No specific deadline for the submission of proposals is being established in this continuing program; however, those proposals which are on hand by 1 April will receive early consideration by the joint board. The guide for submission of proposals may be obtained by writing to the EURATOM-U.S. Joint Research and Development Board, 51 Rue Bel-liard, Brussels, Belgium, or to the Director, Division of International Affairs, U.S. Atomic Energy Commission, Washington 25, D.C.

Pioneer IV

At 11:30 A.M., Friday, 6 March, Pioneer IV, America's first artificial asteroid, sent its last message to earth. It had by then reached a distance of more than 410,000 miles from the earth and was traveling at a speed of almost 4000 miles an hour into an orbit around the sun.

Before the mercury batteries went dead, the asteroid had established a long-distance record for communication, after a lifetime of more than 83 hours. The Soviet Union said it had tracked its Mechta space probe—now in orbit round the sun—to a distance of 370,000 miles before the batteries became exhausted, after 62 hours of flight.

At perihelion, its closest approach to the sun, which it reached on 17 March, Pioneer IV was 91.7 million miles from the sun, or 1.2 million miles inside the earth's orbit. At aphelion, its farthest point from the sun, it will be 106.1 million miles from the sun, or 13.2 million miles outside the earth's orbit. It will reach that point on 29 September. It will circle the sun every 394¾ days, traveling in its orbit at an average speed of 60,000 miles an hour, as compared with the 66,000-mile average for the orbital speed of the earth.

Pioneer IV is expected to produce more scientific information than Mechta. From Pioneer's radio, NASA personnel got information about temperatures, radiation, and cosmic rays. NASA scientists said that, according to information already evaluated, no major band of radiation has been encountered above the two previously discovered by the United States' Explorer satellites.

Congress Asked for Larger Science Budget

Alan T. Waterman, director of the National Science Foundation, has strongly protested the Administration's reduction of the foundation's budget and has suggested, further, that the present \$280-million level of government support for basic research be increased by about 50 percent. In testimony presented on 12 March before the House Select Committee on Astronautics and Space Exploration, Waterman reported that the NSF budget for the coming fiscal year had been cut from the \$206 million that had been requested to \$160 million. Most of the \$46-million reduction was in the programs for support of basic research and for construction of new research facilities.

Pointing out that universities and non-profit research institutions could no longer afford to modernize or replace their facilities, Waterman said that some laboratories "have become obsolescent to a point which is detrimental to the country's research effort." He then described a number of the foundation's programs that would have to be sharply curtailed, or eliminated completely, if more funds were not provided. Included was the program for building university nuclear research reactors and computer centers.

Test Detection Study

It has been reported that a panel of leading United States earthquake specialists, assembled by the Government to map a program aimed at foolproof detection of underground nuclear blasts, has recently completed its work.

The group met in secrecy. Its recommendations, now being transmitted to the White House, may not be made public for several weeks or months. The group, known as the Panel on Seismic Improvement, is an offshoot of President Eisenhower's Science Advisory Committee, headed by James R. Killian, Jr.

The task of the panel was to evaluate the most recent detection techniques and to report to the White House on an appropriate research program. Its recommendations may have a crucial bearing on the progress of the East-West talks in Geneva on the banning of nuclear arms tests. The negotiations appear deadlocked on the issue, among others, of inspecting regions where detection has suggested the possibility of a blast. The Soviet Union has charged that such inspection could be used to cloak espionage. The problem primarily concerns underground explosions, since it is difficult to distinguish between the shock

waves of earthquakes and those produced by bomb blasts. Surface and aerial shots can be observed in a number of ways and with sufficient accuracy so that on-the-spot inspection is not essential. If an equally foolproof system could be devised for underground blasts, the Geneva log jam might be broken. However, such a system seems some time off.

Science Honor List

The University of Bridgeport, Bridgeport, Conn., will have a "Science Wall of Honor" in the Charles A. Dana Hall of Science that is now under construction. A roster of 25 names will be chosen, and suggestions are invited. Any individual in the world's history may be nominated, except that only those who have been deceased at least 10 years will be considered. Recognition in all instances will be limited to accomplishments in the fields of natural science—not in philosophy, history, or the social sciences.

To be considered, an individual must have made a fundamental discovery regarding the laws of nature or have been responsible for an invention not based on a previously known fundamental law of nature. The discoveries and inventions will be rated on their general value to mankind as well as on their contribution to man's knowledge. In most cases preference will be given to those who made discoveries, rather than to those who followed with practical applications.

After the selection of the original 25 names, one additional name may be added every year for 25 years until such time as there are a total of 50 names on the wall. At that time, only one name may be added every 5 years.

News Briefs

The World Health Organization has announced that World Health Day is scheduled for 7 April. Its theme this year will be "Mental Illness and Mental Health in the World of Today." Although generally more acute in countries of high economic development, mental illness is an international problem, one that no nation escapes. And it may become greater as the world level of industrialization and technology rises.

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The Atomic Energy Commission has announced that the public is now permitted to participate in consideration of the safety aspects of all reactor projects in the commission's Power Demonstration Reactor Program. Heretofore, the public has had opportunity to take part in the review of safety aspects of only those reactors in the program that were