

OCEANOGRAPHY

Huge Undersea Valley Found in Indian Ocean

➤ A 25-MILE-WIDE valley stretching for 600 miles under the Andaman Sea in the Indian Ocean has been discovered by scientists of the U.S. Coast and Geodetic Survey, as part of the International Indian Ocean Expedition.

Lying under one to three miles of ocean, the watery valley, called rift valley by oceanographers, is bordered by towering mountain peaks, some of which are entirely submerged, while others poke their tops above the ocean to form the islands of Barren and Narcondam.

The physical features of this valley were determined from soundings taken from the ship Pioneer last spring and summer by Survey scientists L. Austin Weeks, Reginald N. Harbison and George Peter.

The valley is part of a long mountain range which begins as far east as the island of Timor and forms the land rises of Java, Sumatra and Burma.

The undersea section of the valley runs between Sumatra and Burma, the scientists reported. The floor of the valley is covered with more than half a mile of muck and ooze, and the deepest point is about 15,000 feet under the sea.

This valley is similar to that extending down the middle of the Mid-Atlantic Ridge, a mountain range lying beneath the Atlantic Ocean.

These rift valleys were created by volcanic action. When the activity subsided, the ranges fractured as the earth settled and the rift valleys were formed.

The Andaman Sea rift valley was measured and analyzed through the aid of an instrument called a sub-bottom profiler or sparker, which uses sound waves to penetrate the murky sediments of the ocean floor. These sound waves are reflected from the rock bottom beneath the muck in such a manner that their depth and arrangement can be determined. The sound waves are converted to visual images to make a profile of the area on paper.

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PSYCHIATRY

Hospital Stays Shorten For Mental Patients

➤ MORE PATIENTS are entering state and county mental hospitals than at any time in history. The hospitals are turning them out faster, however.

The number of residents on any one day in these hospitals decreased in 1964 for the ninth straight year, dropping to below 500,000 for the first time in 15 years, the U.S. Public Health Service reported. The same year, however, there were more than 300,000 admissions.

The new tranquilizing or "psycho-active" drugs account largely for the short stay, officials of the National Institute of Mental Health, Bethesda, Md., said. Use of the drugs makes it possible to care for patients at home and makes them more receptive to treatment in the hospital.

Releases from the hospitals have more than doubled in less than 10 years. In 1955 there were 126,498 persons released, and in 1964 there were 271,506 released. There were 45,186 deaths in the hospitals that year.

There has been a steady increase in ratio of personnel to patients, which in 1964 reached the level of one full-time employee for every 2.5 resident patients. Maintenance expenditures for the care of these patients increased to \$1.1 billion, or an average of \$6.23 daily for each resident patient, more than double the \$3.06 spent in 1955.

A report titled Provisional Patient Movement and Administration Data, State and County Mental Hospitals, United States, 1964, is available from the Public Information Section, National Institute of Mental Health, Bethesda, Md. 20014.

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PHYSICS

Nuclear Blasts Yield Valuable Science Data

➤ UNDERGROUND NUCLEAR TEST blasts are yielding valuable information about the atomic nucleus in thousandths of a second that would otherwise take centuries to obtain.

Half a million bits of information were gathered during the first such successful test last Dec. 16, Dr. A. W. Hemmendinger of the Los Alamos Scientific Laboratory reported to the American Physical Society meeting in Washington, D.C.

He said engineers have now learned how to construct a vertical vacuum pipe that can be closed so fast it catches only the neutrons from a nuclear detonation. The pipe closes before any of the bomb debris or radioactive gases have had time to reach the surface.

Dr. Hemmendinger termed this speedy closing a "remarkable engineering feat." The pipe is 600 feet long and a foot in diameter, and brings a beam of neutrons from the underground fireball to the surface without any chance of radioactivity escaping into the atmosphere.

The new nuclear information was recorded in five-thousandths of a second after the blast. Dr. Hemmendinger estimated that it would take many centuries of continuous operation of a modern laboratory neutron source to obtain equivalent information.

This new technique for measuring neutron interactions also makes possible investigations of materials so radioactive that their own natural radiations would swamp out any effects that could be observed using laboratory sources.

The information concerning how neutrons interact with a nucleus is of critical importance in building the very high energy nuclear reactors now in the planning stage. Reactor designers need to know, for instance, just how much plutonium can be put together before a chain reaction starts.

How the critical point of plutonium and other materials changes as the temperature increases is among the factors being determined in the underground nuclear blast experiments, another of which is scheduled for June.

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IN SCIEN

CONSERVATION

New Ban Proposed On Wildlife Imports

➤ THE AGGRESSIVE noisy pink starling, the howling Indian wild dog, and the gnawing multimammate rat will most likely be barred from the United States.

New regulations have been proposed by Secretary of the Interior Stewart L. Udall to control the importing of wildlife into the United States, Puerto Rico and U.S. territories. The new rulings would be effective Jan. 1, 1966.

They would require special permits for certain creatures, complete identification of species, and would ban any release of the animals into the wild, a spokesman of the Fish and Wildlife Service said.

The undesirable animals would be given permits only if they are to be used for scientific, medical, educational or zoological exhibit purposes.

These tighter regulations apply in particular to the pink starling, or rosy pastor, scientifically named *Sturnus roseus*; the flying fox, or fruit bat, of genus *Pteropus*; the mongoose, or meerkat, of *Atilax* and other genera; the European rabbit of genus *Oryctolagus*; the Indian wild dog, red dog or dhole of genus *Cuon*, and the multimammate rat or mouse of genus *Mastomys*.

The use of scientific names is required to enforce the regulations, since many animals from various areas in the world have different common or colloquial names that are confusing.

Piranha fish and poisonous snakes could continue to be imported, the official said, but release into the wilderness would be strictly controlled. There are no strict bans on importing these creatures, he said, because there is very little possibility that they could adapt themselves permanently in the United States.

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TECHNOLOGY

Strongest DC Motor Helps Simulate Space Flight

➤ THE STRONGEST direct-current motor ever made in the Free World will be used to help astronauts simulate the forces of space flight.

The 18,600 horsepower motor will power a huge centrifuge with a 10-ton, three-man capsule spinning at the end of a 50-foot arm. While the arm is turning, the capsule can be tilted to any angle, and the atmospheric pressure, temperature, and flow rate can be varied to simulate different altitudes.

The motor will weigh more than 221 tons and will measure 17½ feet high and 15 feet in diameter. It will be manufactured by Westinghouse Electric Corporation.

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CE FIELDS

PHYSICS

Laser Light Used To Study Fluids

► THE INTENSELY BRIGHT light beam of a laser is being used to learn more about how liquids behave by scientists at Columbia University.

With a new instrument, a specialized laser spectrometer, Drs. Seymour S. Alpert and Edgar Lipworth, with Yin Yeh, are testing properties of liquids previously thought either too slow, too fast or too small to be probed.

They can measure minute particles, less than a 25-thousandths of an inch in diameter, suspended in liquids and determine rates of liquid flow as slow as one and one-half thousandth of an inch per second. Scientists can also, for the first time, measure the lifetimes of molecular droplets that exist only about one-hundredth of a second.

The "homodyne" spectrometer responsible for these achievements uses a helium-neon laser in a combined optical and electronic system capable of resolving light having frequencies differing by only one part in one hundred trillion. The frequency determines the color of light.

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GEOPHYSICS

Huge Meteors May Have Created Continents

► AMERICA, AFRICA, ASIA—all of earth's continents may be the remains of swarms of huge meteors that struck the earth billions of years ago, according to a three-man team of geologists.

Either that or the world is more than half a billion years older than was previously believed.

These theories are based on an exhaustive study of the nature and age of earth's oldest rocks, which showed that erosion by running water occurred on earth at least four billion years ago. This means that by that time the sun must have warmed the primordial earth to above-freezing temperatures. Previously, earth was thought to have remained frozen until at least half a billion years later.

Earlier studies of the thermal history of the earth indicated that the melting of silicates in the earth's mantle would not have occurred during the first billion years of the planet's history. At least a billion years, therefore, must have preceded the four billion years of above-freezing temperatures, making the earth five billion years old, if the continents were formed by the accumulation of melted rock from the mantle.

On the other hand, if the accepted estimate of the earth's age, four and a half billion years, is correct, then there was not enough time for "known geological

processes" to build up the continents. In that case, the continental masses must have originated as a "swarm or swarms of low-density meteoric material."

Fusion of this material with the earth's mantle, combined with erosion and blending of the coastlines or continental margins into what is now the ocean floor, would create the impression that the land masses had been built up, instead of down.

Head of the research team was Dr. William L. Donn, research associate in geology at Columbia University's Lamont Geological Observatory, Palisades, N.Y. The other members were Dr. Donn's brother, Dr. Bertram D. Donn of the National Aeronautics and Space Administration's Goddard Space Flight Center, Greenbelt, Md., and Dr. Wilbur G. Valentine of Brooklyn College. The research was supported by a grant from the U.S. Steel Corporation.

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PUBLIC HEALTH

Three-Month-Old Babies Vaccinated for Measles

► BABIES, THREE MONTHS to six months old can be protected against measles by vaccination with "killed-virus" vaccine, to be followed later by "live-virus" vaccine, it was reported in the Journal of the American Medical Association, 191:1067, 1965.

A newborn child is usually protected against measles for the first months following birth by antibodies transferred from his mother's body during gestation. Their protective antibodies gradually disappear. Then measles becomes a fairly frequent and severe disease in the second six months of the baby's life.

In a study of 165 babies, the researchers found that those given the killed-virus vaccine early showed significantly higher resistance to measles and had fewer unfavorable reactions to the later vaccination at about nine months of age.

The report was prepared by Drs. Samuel Karelitz, Priya Kanchanavatee, Mitsuko Arai and Hedda Acs of Long Island Jewish Hospital, New Hyde Park, N.Y., and Dr. Ann Schluenderberg of Yale University School of Medicine, New Haven, Conn.

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ENGINEERING

Cell Converts Liquid Directly to Electricity

► A NEWLY DEVELOPED fuel cell battery can convert liquid fuel directly into electricity.

The battery, which is about 12 inches square, produces almost 100 watts of electricity from methanol, a petroleum-derived liquid. Developed by Esso Engineering Company, Linden, N.J., it operates at temperatures of 140 degrees Fahrenheit.

The silent fuel cells, which are in theory the most efficient machines constructed, may soon be important military power sources.

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MEDICINE

Operation on the Breast Does Not Mean Deformity

► FEAR OF DEFORMITY is keeping many women away from a breast examination for cancer, a Beverly Hills, Calif., surgeon reports.

Dr. W. John Pangman said that a woman's breasts have "a dual meaning." He added, "they are at once her symbol of sex and her symbol of motherhood. To threaten the breast is to shake the very core of her feminine orientation."

Certain procedures in breast surgery can lessen the deformity, eliminate it in some cases, and even improve on nature in others, he told the 30th annual convention of the North American Federation, International College of Surgeons meeting in Las Vegas.

"Understanding and implementation of these procedures on the part of the public and the medical profession could well save the lives of thousands of women," Dr. Pangman said. "By removing the fear they might seek help in time for cure."

He discounted fears that prosthetic implants may cause cancer. In his own series of 480 implants, in place from 10 to 13 years, Dr. Pangman found only one case of breast cancer, and said it had no connection with the prosthesis.

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PUBLIC HEALTH

Fastest Growing Killer Is Respiratory Disease

► CHRONIC RESPIRATORY diseases are the fastest growing cause of death in this country, a U.S. Public Health Service physician reports.

Dr. Claire F. Ryder told the Second American Medical Association Congress on Environmental Health Problems meeting in Chicago that deaths from pulmonary emphysema and chronic bronchitis more than quadrupled between 1952 and 1962.

These two closely associated disorders "constitute a health menace of major magnitude," the associate chief for care services, division of chronic diseases, said.

Studies in Great Britain and the United States have found that both smoking and air pollution are associated with the increase of chronic bronchitis, Dr. Ryder pointed out.

To prevent further rises, he said, patients must be encouraged "to give up smoking or not to start," and city officials must consider ways to control air pollution.

Emphysema occurs more often than tuberculosis or lung cancer and is responsible for more male invalids than other important cripples such as stroke and cancer, the physician noted.

During 1962, chronic respiratory diseases caused 27,000 deaths and contributed to an additional 43,000.

"As yet, little is being done to interrupt the mushrooming increase in chronic respiratory diseases by measures of early detection," Dr. Ryder said.

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