

SEISMOLOGY

Seattle Earthquake Hits Earth's Weak Belt

► THE HEAVY EARTHQUAKE that shook the Pacific Northwest erupted along one of the major earthquake belts of the world, an area encircling the Pacific Ocean where the earth's surface is constantly moving under enormous pressures and strains.

The heavy earthquake was termed major, with a magnitude of around seven on the Richter scale, reported officials of the U.S. Coast and Geodetic Survey. The Richter scale uses numbers ranging from one to nine to indicate how large an earthquake is. The greater the magnitude, the greater the number on the scale.

The Good Friday Alaskan quake last year was 8.5 on the scale. The Chilean earthquake March 28, 1965 was of seven magnitude. The three big quakes occurred along the restless belt that extends around the Pacific Ocean, along the western coasts of North and South America, across the Aleutian Islands, through Japan and China into Indonesia and other Pacific islands.

Meanwhile, Dr. G. W. Housner, California Institute of Technology, Pasadena, reported in Washington, D.C., that the smaller quakes, because of their short duration, send out "jerky" waves, rather than the great swells that the larger quakes create. Thus, the smaller tremors are relatively more damaging to low stiff structures than to tall flexible structures, as was the case of the Agadir, Morocco, earthquake of 1960.

The greater swells of large tremors last longer than the shorter waves of the smaller tremors. Thus at a distance of 75 miles from the fault, as was Anchorage during the Alaskan earthquake of 1964, the 10 to 20 story buildings will be much more strongly affected than the one- and two-story buildings.

Dr. Housner reported during the first annual meeting of the National Academy of Engineering, Washington, D.C.

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MEDICINE

Tenderness May Indicate Breast Tumors in Women

► BREAST TUMORS are more likely to develop in women who persistently experience tenderness, swelling and heaviness in the breasts before menstruation.

Dr. Miklos H. Egyed of Cleveland, Ohio, told the North American Federation of the International College of Surgeons meeting in Las Vegas that "women exhibiting these symptoms are more liable to develop breast diseases at an earlier age."

After examining 551 women with proven breast changes, Dr. Egyed found that the premenstrual breast symptoms had occurred in more than 43% of them. However, in another group of 577 women who were free of breast disease, the frequency of premenstrual symptoms was only 17.8%.

Dr. Egyed suggested that women with premenstrual breast symptoms or a family

history of breast cancer be examined more frequently.

"We think that breast cancer is a curable disease if we remove its source five minutes before cancer develops," he said.

Most authorities agree that the premenstrual breast symptoms are due to an imbalance of hormones, mostly estrogen, the female sex hormone, Dr. Egyed told his colleagues.

The three most common diseases of the breast are fibro-adenoma, which is a hard but non-malignant tumor, cystic disease, which is also non-malignant, and cancer.

At the same conference, Dr. Jacob A. Glassman of Miami Beach, Fla., described a first in surgical history—a device to literally "sweep" elusive gallstones out of the body.

The new gallstone extractor uses a probe, basket and brush to dislodge stones from the small, pencil-thick tube or duct that leads away from the gall bladder.

The probe leads the instrument down through the duct so that it gets behind the stones. Then the instrument is withdrawn upwardly, dislodging, entrapping, gathering up and sweeping along the offending stones and other debris.

Dr. Glassman hopes that the new extractor will ultimately eliminate the need for routine X-rays of the bile duct to determine whether the stone is removed.

Development of gallstones is one of man's most common ailments. It is estimated that about 25% of all women and 10% of all men will develop gallstones before they reach the age of 60.

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NUTRITION

Heredity Determines Nutritional Needs

► SOME PEOPLE LIVE to old age in relative health in spite of the fact that they consume somewhat inadequate diets and drink substantial amounts of liquor, but others are vulnerable to disease on such food and drink.

The reason? The genotrophic principle. This means that the nutritional needs of an organism are determined by its genetic background, or heredity.

Some conspicuous diseases that may have roots in this principle include rheumatoid arthritis, gout, atherosclerosis, dental caries, alcoholism, epilepsy, cataract, acne, mental retardation, multiple sclerosis, muscular dystrophy, schizophrenia and mental depression, a report to the 102nd annual meeting of the National Academy of Sciences stated.

The report, by Drs. Roger J. Williams and Richard B. Pelton of the department of chemistry, University of Texas, Austin, pointed out that other causes of these diseases should continue to be considered.

They described ten experiments with 280 rats involving four different strains. In one experiment the baby rats were each fed a diet solely of enriched white bread, and as a result, their weight gains varied from two grams to 212 grams. The normal weight of a mature rat is 400 grams.

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IN SCIENCE

PHYSICS

Site Evaluation Set For 200-Bev Accelerator

► THE ATOMIC ENERGY Commission has entered into an agreement with the National Academy of Sciences for the evaluation, by the end of this year, of sites for a proposed new national accelerator laboratory consisting of a proton accelerator in the 200 billion electron volt energy range with associated support facilities.

The Commission has outlined criteria for the sites and is receiving specific proposals.

The planned circular accelerator would be about a mile in diameter and require six to eight years for construction at a cost of about \$280 million.

The proposal for a proton accelerator in the 200 Bev energy range was contained in the Atomic Energy Commission's Policy for National Action in the Field of High Energy Physics forwarded to the Joint Committee on Atomic Energy early this year by President Lyndon B. Johnson.

The long-range program provides that the AEC seek authorization for initiating the final design of the 200-Bev accelerator in the Federal Budget for Fiscal 1967. It is for this reason that the Commission must select a site in calendar 1965.

A desirable site would contain at least 3,000 acres owned by, or reasonably available to, the U.S. Government; have the potential of delivering a firm electric power load of several hundred megawatts and a minimum of 2,000 gallons a minute of high quality water; be reasonably close to a commercial and industrial center which includes research and development activities; and be reasonably close to communities having adequate housing, cultural and educational facilities for some 2,000 scientific and technical personnel and their families. Also, the site should be close to adequate surface transportation systems and a major airport with frequent service to major U.S. cities.

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TECHNOLOGY

Improved Device Studies Pulse From Artery

► AN IMPROVED "pulse-sensing" device has been designed by Merlin Davis, an engineer at the National Bureau of Standards.

The sensor can be positioned over an artery to study a patient's pulse, which will be recorded automatically on a chart. It will be useful for diagnosis of aging processes and cardiovascular disorders affecting elasticity of arterial walls and in physiological and pharmacological research.

The Veterans Administration supported the research as part of its program for the development of new techniques for measuring blood pressure and flow.

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CE FIELDS

PHYSICS

Michelson Honored By Naval Academy

➤ WHEN THE SPEED of light was first measured accurately 87 years ago by Albert A. Michelson, the scientist was unwittingly designing the award that would be used in 1965 to commemorate his achievement.

Michelson's experiment, performed in 1878, showed the speed of light to be 299,944 kilometers per second, plus or minus 50 kps. The currently accepted value is amazingly close to that figure, 299,860 kps, or 186,324 miles per second.

Michelson performed the speed-of-light experiment while he was a physics instructor at the Naval Academy. Later, in 1907, he became the first American to win the Nobel Prize in physics, for "the methods you have discovered for exactness of measurements."

A painstakingly accurate reproduction of Michelson's original handwritten report on the experiment, complete down to the smudges and fingerprints on the paper, was presented to Secretary of the Navy Paul Nitze in ceremonies at the U.S. Naval Academy. The presentation was made by Michelson's daughter, Mrs. Dorothy M. Stevens of New York.

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MEDICINE

Sugar Best Preservative In Quick Freezing Blood

➤ COMMON SUGARS, such as dextrose and sucrose, promise to be the best preservative agents in the rapid freezing of human blood for almost indefinite periods.

Dr. Gabriel Rapatz, research professor at the American Foundation for Biological Research, Madison, Wis., told the Biophysical Society in San Francisco, that such sugars would do the minimum damage to blood cells if these were quick frozen to minus 148 degrees Fahrenheit in less than five seconds.

Other preservatives, glycerol and dimethylsulfoxide (DMSO), now being used in freezing blood, are impractical because they have to be "washed" out of the blood by centrifugation before the blood can be given to patients. In the event of rapid freezing, these agents also cause greater damage in freezing than the sugars in that they cause ice to form inside the cells and later may cause the cell to burst.

In order to safely use the blood for transfusions, the damage to the cells should be less than three percent, or kidney failure results in patients given the blood, Dr. Rapatz told SCIENCE SERVICE. It is possible to keep cell damage down to this low level in quick-freezing with the sugars but not with other preservatives now used.

A method for freezing human blood, especially rare types, is very much needed since blood can be stored just above freezing (39.2 degrees F.) for only up to three weeks. How long frozen blood can be kept and still be usable is not definitely known at this time. Dr. Rapatz said that the Chelsea Naval group in Massachusetts has preserved frozen blood for as long as five years with little deterioration or damage.

The method used by Dr. Rapatz and his associate, Dr. Basile Luyet, consisted in placing the blood in glass tubes or between layers of foil which were then immersed in a freezing bath of isopentane at temperatures as low as minus 238 degrees F.

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PHYSIOLOGY

Germ-Produced Enzyme Causes Lethal Damage

➤ DEATH in persons severely burned is due to infection by the bacterium *Pseudomonas aeruginosa*. But the damage is believed done by an enzyme called elastase that the bacterium produces, the American Society for Microbiology meeting in Atlantic City was told.

Debilitated persons and children with leukemia also are believed harmed by the enzyme, Dr. Walter S. Callahan, chief of the bureau of laboratories of the District of Columbia Health Department, said.

Dr. Callahan experimented with mice while he was working with Dr. John D. Mull at the University of Michigan, Ann Arbor. The scientists infected the mice by injecting them with strains of the bacterium that produce elastase, at the same time using control mice that had been injected with bacterial infections from strains free of detectable elastase.

A diseased condition almost invariably developed in the small arterial branches of the mice injected with the *Pseudomonas* that produces elastase. The control mice, however, did not develop diseased lesions in their blood vessels.

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GEOPHYSICS

Radar Will Be Used To Probe Polar Ice

➤ A METHOD of looking through the great sheet of polar ice that covers Antarctica—bouncing radio waves off the bottom of the ice—will be used to chart the ground beneath the icecap.

The technique using radar could also be used to chart the land beneath Arctic ice. With the radar method, scientists are able to make virtually instantaneous measurements, which often required a full day with the older seismic method of bouncing shock waves off the bottom.

Dr. Charles R. Bentley of the University of Wisconsin heads the group that perfected the radar technique. It was tested at South Pole Station, where ice depth is known from seismic soundings to be 9,100 feet, about average for a large part of Antarctica.

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ZOOLOGY

Sea Lions Use Eyes By Day, Clicks by Night

➤ SEA LIONS depend on their visual sense to detect underwater objects, but on moonless nights emit clicks as radar to find their way.

Two captive female California sea lions showed preference for the smaller of two targets placed underwater by continuously swimming to it, Ronald J. Schusterman, Winthrop N. Kellogg and Charles E. Rice of Stanford Research Institute of Menlo Park, Calif., reported.

The sea lions pushed against the smaller target in order to obtain small pieces of herring as rewards, the researchers said.

In general, the preference for a small target over a large one is consistent with the notion that in new situations, animals tend to avoid large amounts of stimulation and to approach low or decreasing degrees of excitation.

The clicks or pulses emitted by sea lions during the moonless nights, similar to the sonar clicks of the porpoise, are ideally suited for echo detection of objects under water, when visibility is low.

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GENERAL SCIENCE

Automation Not as Bad As Many People Think

➤ AUTOMATION has created many problems in our modern society, but it is not nearly as bad as many people think it is.

This is the belief of Dr. Jerome B. Wiesner, dean of the School of Science, Massachusetts Institute of Technology, Cambridge, and formerly President John F. Kennedy's Special Advisor on Science and Technology.

Automation is giving us more time and more manpower to concentrate on solving such problems as pollution, transportation, education and medical care, Dr. Wiesner said. Rather than spending most of their time working to feed and clothe themselves, people now have more time to do research.

"Automation is good for us; it is helping us to go in the direction we have been trying to go."

In his recently published book entitled "Where Science and Politics Meet," Dr. Wiesner explained that at present we must be very concerned with the fact that automation has put many people out of work.

"Yet, in an evolutionary sense, automation represents another important step in the continuing effort to increase individual productivity, and consequently, the general economic level of the country," he said.

The problem of a large unemployed work force, coupled with a serious shortage of highly trained people, is ever-growing.

"The jobs need more people and more people need jobs, and only education can bring them together," Dr. Wiesner said in his book.

"Improving the quality of education is the most urgent single step we can take to insure continuing vitality and well-being of this country."

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