

RADIOLOGY

Radiation Protection Guides Not Reliable

► A NEW REPORT by the National Academy of Sciences on the safe disposal of radioactive wastes into Pacific coastal waters is based on standards and guides which no longer exist.

The Academy plan for safe dumping of low-level atomic wastes from the scientific and medical use of radioisotopes into the oceans without endangering marine or human life was based on safety limits set by the National Committee on Radiation Protection. The NCRP levels were the basis of radiation protection guides established by the Federal Radiation Council in 1961. The scientists, in their report, underscore their reliance on the NCRP.

However, the Federal Radiation Council has recently vetoed the use of the guides as standards of safety. The FRC said, "The Radiation Protection Guides are not a dividing line between safety and danger in actual radiation situations nor are they alone intended to set a limit at which protective action should be taken or to indicate what kind of action should be taken."

The FRC noted that radiation levels in some parts of the United States have approached the upper level of Range II and in one instance has exceeded this level. This had previously been considered by the public and most health authorities as the maximum permissible level of exposure. Above this level, it was believed, preventive health measures should be taken.

In its most recent statement, the FRC emphasized that it "does not recommend such actions" even though radiation levels have increased.

Exposures from total low-level radioactive wastes are much less hazardous than present levels of fallout.

• Science News Letter, 82:240 October 13, 1962

HORTICULTURE

Chemicals Spray Away Algae on Flowerpots

► NOW FLOWER lovers can concentrate on the plants instead of worrying about the green growth on pots. Two U.S. Department of Agriculture scientists have found an industrial and hospital disinfectant that eliminates the scummy algae growth from clay pots.

Algae, a continual problem to anyone who dislikes grubby flowerpots, can now be controlled with a chemical action similar to that of plant growth regulators. The pot may be dipped or sprayed with a ten percent solution of para di-isobutyl phenoxy ethoxy ethyl dimethyl benzyl ammonium chloride (a quaternary ammonium compound). This preparation protects the pot for about a half year from algae.

"It is safe for man, but fatal to algae," says Dr. Henry M. Cathey, who with Dr. Neil W. Stuart discovered the preparation's effects while comparing nitrogen compounds that do not affect plants with those that retard growth. The study was made at the

Agricultural Research Service in Beltsville, Md.

Although tests on plants, such as African violets and Easter lilies, grown in solution-dipped pots, show small variations in root growth, the appearance of the plant is not changed. However, the compound will nullify the effects of some other growth retardants.

The preparation, produced now on a large scale for hospital use, will soon be seen on a gardener's shelf under such names as "Algae-Go" and "Ex-Pel."

The research was reported in *Agricultural Research*, Oct. 1962.

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ASTROPHYSICS

Life Forms May Exist In "Hot Spots" on Mars

► SOME FORM of life may exist on Mars near "hot spots" caused by hot springs or volcanoes.

Even though the Martian environment is harsh by earth standards, the planet could be "life-bearing," Nobelist Joshua Lederberg and Dr. Carl Sagan of Stanford University, Stanford, Calif., believe.

Hot springs, fumaroles or volcanoes could break through the permafrost believed to cover the Martian surface, they suggested.

Permafrost is a permanently frozen layer of subsoil. Once this has been penetrated, a continued supply of moisture and heat should be available from deeper layers to maintain the "hot spots," near which life forms could have the environment necessary for survival and reproduction.

Drs. Lederberg and Sagan suggest that their idea be tested by the U.S. Mariner deep space probes that are scheduled to fly by Mars, starting in 1964. A closer look at the red planet than can be made from earth-bound telescopes is needed to learn about the Martian surface features.

If the hot spots exist, they would be the most likely places for later landings of instruments planned to detect biological activity, the scientists said.

Today's evidence for life on Mars is contradictory, they reported in the *Proceedings of the National Academy of Sciences*, 48: 1473, 1962.

Some terrestrial microorganisms can survive what are believed to be Martian-like conditions, but whether they can reproduce under such conditions is less clear. On the other hand, telescopic observations of Mars are more suggestive of life, including seasonal changes in color and evidence of carbon-containing compounds.

However, the astronomical evidence could have causes other than life forms, the scientists note.

Dr. Lederberg, who had his science interest sparked by youth activity in New York City just before World War II, was co-winner of the Nobel Prize in Medicine and Physiology in 1958 for his studies of bacterial genetics.

Dr. Sagan, an astronomer, is on leave from Harvard University and working with Dr. Lederberg at Stanford.

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IN SCIENCE

TECHNOLOGY

New Detector Spots Fish 1,200 Feet Below Surface

► A NEW FISH finder can spot a single fish 1,200 feet below the water's surface.

Far more accurate than earlier equipment, the detector will make location of fishing grounds possible despite varying sea depths, rough weather and the bobbing of the fishing vessel.

In contrast with older echo sounders used for locating fishing grounds, the device shows the height of the fish above the seabed. The equipment can be lowered two feet below the hull, allowing the sound beams to clear the disturbed water surrounding the ship.

The fish are seen in definite patterns rather than in the short-lived flashes of earlier equipment.

The British firm, Kelvin Hughes Division of S. Smith and Sons, developed the fish-detecting device.

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SPACE

Captured Asteroids Suggested as Bases

► A U.S. SPACE expert has suggested "plucking" small planets out of the heavens and using them for space bases.

The tiny planets, or asteroids, would be brought into an orbit around the earth as a source of raw materials and as a scientific base for space exploration, George M. Kohler, General Electric's missile and space division engineer, Philadelphia, said. His proposal was made at the International Astronautical Federation meeting in Varna, Bulgaria.

Mr. Kohler urged a world-wide cooperative program to find and examine the cosmic chunks.

Studying an asteroid would be a step toward clearing up the mysteries of the minor planets. Asteroids probably contain invaluable clues about the beginnings of the solar system and even the origins of life, he emphasized.

These "Cape Canaveral" in space could provide both launch and base facilities for space probes as well as such materials as oxygen and hydrogen for fuels.

The search for asteroids could be limited to certain selected regions in the sky. Since an asteroid shines by reflected solar light, the relative positions of the sun, observer and asteroid restrict the search area at all times.

In calling for an immediate cooperative effort by all nations, Mr. Kohler said that intensive observation of the asteroids could be followed by an unmanned spacecraft landing, with, in turn, either a "capture" effort or a boarding by man.

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E FIELDS

MEDICINE

Breast Cancer Diagnosis Proves Highly Accurate

► FAVORABLE results in a nationwide study were reported in Washington, D. C., in the development of an X-ray technique for an early diagnosis of breast cancer, an important cause of women's deaths.

A new film technique developed by Dr. Robert L. Egan at the University of Texas M.D. Anderson Hospital and Tumor Institute in Houston was investigated by 24 medical teams. It provides a clearer X-ray picture than was possible before.

Dr. Egan sparked national interest two years ago when he reported that his cancer diagnosis over a period of six years agreed 94.6 per cent with clinical diagnoses. Thirty radiologists throughout the country then worked with Dr. Egan and began independent studies. They reported 93.7 per cent accuracy in identifying cancer of 6,043 women between 1960 and 1962.

To get the needed information, Dr. Egan takes two X-ray films of each breast and one film of the armpit, where the lymphatic nodes which supply the breast are located. The films are taken from the side and the patient is shielded so that a minimal amount of radiation enters her body.

The Cancer Control Program of the U. S. Public Health Service has established projects in 24 medical centers since May 1961.

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TECHNOLOGY

Air Force and Navy Unite To Fight for Project Pluto

► THE UNITED STATES Air Force and Navy have united to fight for Project Pluto, the nuclear ramjet propulsion system for low altitude supersonic aircraft, which has been under development by the Atomic Energy Commission at the request of the Department of Defense since 1956. Indications are that the Department of Defense may abandon Project Pluto.

The great military advantage of a nuclear supersonic vehicle is that it is difficult to detect, even with radar, during flight. Although such a vehicle is not planned at this time, both Secretary of the Air Force Eugene M. Zuckert and Vice Admiral W. F. Raborn Jr., USN Deputy Chief of Naval Operations, testified in support of continued research on nuclear ramjet technology. More than \$7 million was spent on the program last year. Present plans call for an estimated additional \$24 million for fiscal 1963, the subcommittee on research, development and radiation of the Congressional Joint Committee on Atomic Energy was told.

The system also has important potentials for space flight. Dr. John S. McCollom of the Air Force Systems Command told the committee that much would be learned

from continued research on Project Pluto on vehicle operation under radiation exposures applicable to space environment.

The Navy policy is to encourage all research in this field because of its possible application both to surface ships and submarines. Admiral Raborn pointed out that among the advantages of a sea-based nuclear ramjet system, in addition to the detection difficulty it affords an enemy, are mobility and concealment because of its global range. The great range of the nuclear ramjet allows surface ships to be spread over the oceans of the world, thus confronting a potential enemy with a search problem "which, although less severe in principle than the problem of locating submarines, nevertheless is quite difficult in practical terms," he said.

Thus far the reactors tested for Project Pluto have proved successful. Work on a flying prototype, named Tory IIC, is under way and proceeding satisfactorily, according to an AEC spokesman. However, if the program is to continue, an industrial reactor contractor now is necessary. No attempts will be made to negotiate for such a contractor until the DOD makes its views on Project Pluto known. The general feeling among committee members is that abandoning the Project now would be a step backward.

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SPACE

U. S. Space Lead Depends Upon Saturn C-5 Rocket

► UNITED STATES chances to lead in space now are tied completely to the advanced Saturn C-5 rocket, a booster designed to give seven and a half million pounds of thrust and larger than any booster the Russians now have. However, the Saturn C-5 has yet to be flight-tested.

This fact was emphasized by Administrator James E. Webb, National Aeronautics and Space Administration, in a speech at Hartford, Conn. All NASA planning is based, he said, on the assumption that the United States can develop such booster power before the Russians.

No changes, therefore, will be made in the U. S. space program, no matter what spectaculars the Soviets may achieve in space in the future, unless they come up with a booster either equal to or superior to Saturn C-5. The Saturn C-5 is not expected to be available for manned space flight before 1964.

If the Soviets can make a booster better and faster, Mr. Webb said, this "would make it necessary for us to reassess our own efforts." In addition to superior booster capability, the Russians have shown guidance and control of manned and unmanned vehicles in space that thus far the United States cannot match.

The United States still cannot impact the moon, orbit around it, or pinpoint the landing of earth-orbiting spacecraft. Mariner II, the space probe now speeding to Venus, is a major indication, however, of a continued improvement in U. S. guidance and control of boosters and space vehicles.

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SPACE

Radiation Instruments Carried by Schirra

► ASTRONAUT Walter M. Schirra was the first U.S. astronaut to wear dosimeters to measure radiation exposure during his orbital mission.

The dosimeters were used to see how much radiation Astronaut Schirra would receive from the artificial radiation belt and from normal cosmic radiation at high altitudes. The orbit, which reached a high of 176 miles, carried him into the lower edges of the artificial radiation shell part of the time.

Data are now being analyzed to determine the dosage. It is expected that the total exposure will be less than that received during a chest X-ray, Dr. Charles A. Berry, Air Force medical officer who is chief of the Aerospace Medical Operations Office, National Aeronautics and Space Administration's Manned Spacecraft Center, said.

The dosimeters are made of solid-state lithium fluoride with a polyethylene coating. Each is about as thick as the lead in a lead pencil and more than two inches long.

Apparently the flux levels of the artificial band of radiation are lower than previously estimated.

Dr. Berry also said that the H-bomb atmospheric test Oct. 2 did not impose any danger to Astronaut Schirra. Dr. Berry's authority for this statement was the Atomic Energy Commission.

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PSYCHIATRY

Mental Disease Related To Brain Chemical Supply

► MENTAL patients may soon be treated by balancing the supply of a brain chemical in the human body.

New York State physicians have spotted a definite relationship between mental disease and over secretion of the pituitary gland. The pituitary gland, located at the base of the brain, regulates body growth.

X-ray studies of the skull and hands of 1,000 mental patients at the Veterans Administration Hospital, Northport, N. Y., showed a high amount of pituitary activity in nearly two out of every five cases.

No correlation has thus far been found between the high degree of endocrine activity and the severity of the psychosis.

Dr. Ernest Kraft, chief of the Northport VA hospital's radiology service, Dr. Arnold A. Schillinger, director of the hospital, and Dr. Nathaniel Finby, radiological consultant, reported the findings to the American Roentgen Ray Society meeting in Washington, D. C.

They urged that skull films become a routine part in admission examinations for mental hospitals and that possible endocrine therapy be part of treatment of patients with endocrine imbalance.

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