

## MEDICINE

**Body Wastes Help Spread Protection From Polio**

► **BODY WASTES** can act as an "immunity bridge" in spreading protection against polio, a Tulane University researcher reported.

Doses of a safe, living polio virus vaccine were administered orally to one person in each of 56 families in New Orleans. Blood and body waste specimens from family members were studied for immune antibodies and for viruses. The results showed that individuals who did not receive the oral vaccine acquired the same immunity to polio as the individuals who did receive it, Dr. Henry M. Gelfand told scientists at the Federation of American Societies for Experimental Biology meeting in Atlantic City, N. J.

Viruses were spread in many cases by contact with objects or food handled by the vaccinated persons who did not wash their hands properly after using the bathroom.

The viruses spread to non-naturally immunized (susceptible) persons twice as frequently as they did to those who had some resistance due to prior exposure to polio, Dr. Gelfand said.

Economic status seems to play an important role in the spread of virus, he said. In the lower income class, 53% of those susceptible caught the virus, while only nine percent in the upper income families caught the immunizing virus.

The study indicated the spread was usually from child to child rather than from child to adult or adult to child. "One child carrying the virus spread it to two playmates in a period of two hours," Dr. Gelfand said.

Drs. John P. Fox and Louis Potash and Miss Dorothy R. Leblanc were associated with Dr. Gelfand in the year-long study.

Science News Letter, May 2, 1959

## PSYCHIATRY

**Pleasure and Pain May Be Related**

► **AS THE INTENSITY** of human pain grows, a certain pleasurable sensation may become associated with it.

This was suggested by Dr. Norbert Bromberg, associate clinical professor of psychiatry at the Albert Einstein College of Medicine, in describing his views on masochism, the derivation of pleasure as a result of physical or psychological pain. He spoke at the annual meeting of the American Psychoanalytic Association in Philadelphia.

To demonstrate his point, Dr. Bromberg used the example of the pain mechanism associated with the skin.

"Here," he said "the same nerve endings, when mildly stimulated, give rise to the pleasurable sensation of stroking, when more intensely stimulated produce itch, a combination of pleasure and pain; and when still more intensely stimulated, cause the sensation of pain."

Since it is a generally accepted physiological law that stimulation of a given sense organ causes only one specific sensation,

Dr. Bromberg suggests that some reaction in the brain might produce the pain-pleasure effect. Specifically, he thought that excessive stimulation might cause a "damming back" of the stimuli with attendant pain-pleasure feelings. He did not point out the exact nerve mechanisms that may be involved.

As far as the psychological pain-pleasure system is concerned, Dr. Bromberg theorized that a masochistic personality develops in the following way:

Whenever a child is subjected to severe and inescapable frustration or other painful experiences, he tries to extract from them whatever pleasurable sensations he can. He may learn to get satisfaction out of the sudden cessation of pain. Or a gradually diminishing pain-producing stimulus may become gentle enough to cause pleasurable psychological feelings.

In being forced to endure frequent psychologically painful experiences, the child may grow to adulthood seeking his pleasure from them.

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## METEOROLOGY

**Method Developed for Forecasting Sea Surges**

► **THE DAMAGING** sea surges that often smash into Barbados and other islands of the Lesser Antilles in the Atlantic can now be forecast two or more days in advance.

Drs. William L. Donn and William T. McGuinness of Columbia University's Lamont Geological Observatory suggested development of the forecast method to the U. S. National Committee for the International Geophysical Year. It would be based, they reported, on locations of large storms far from the islands, as shown on weather charts, following the appropriate travel time for the storm-generated swell.

Islands of the Lesser Antilles, particularly Barbados, the easternmost, have long been plagued by severe and damaging sea surges. These are swells having periods usually between about 30 seconds and one hour, mostly less than four inches high in the open ocean.

The sea surges may continue for a day or more. They arise with little warning and are unrelated to local weather. Attempts to explain them in terms of submarine landslides or earthquakes have proved unsuccessful.

Four occurrences of sea surges have now been explained by studies of data collected as part of the IGY island observatory program in the Atlantic. Intense North Atlantic storms in which the distance the wind blows over the water in a particular direction is specified can generate long-period ocean swells having periods of 15 to 20 seconds that spread toward the Lesser Antilles.

If the swell maximum arrives at low tide, much of its energy is expended on the outer reefs. If it arrives at high tide, particularly spring high tide, the long-period swell crosses the reef and develops high and damaging surf at the shore. If the swell maximum lasts a long time, surf conditions vary with the tide until the swell subsides.

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**IN SCIENCE**

## MEDICINE

**Police Have Another Tool To Identify Human Blood**

► **POLICE** investigators have been given a new scientific way to prove that the blood stain is human even when it is old, well-scrubbed, or invisible.

To get a positive identification of human blood, a way of activating the fibrinolytic enzyme system of blood stains was worked out by two scientists at the Medical University of Szeged's Institute of Forensic Medicine, Szeged, Hungary.

The method works even if blood-stained linen has been washed in warm water with soap so that no trace of the blood stain can be seen. In experiments, the washed linen pieces even gave a positive reaction two months later. Blood stains of various domestic animals, both mammals and poultry, did not give reactions. The test thus gives proof of human blood only.

The fibrinolytic enzyme system in blood can be activated outside the body by extracts of chloroform and bacteria.

"Knowing this," report E. Szollosy and B. Renegy in the German scientific journal, *Die Naturwissenschaften* (March 1), "we asked whether we could identify human blood traces."

Using the technique, the two scientists got a "very positive reaction" with human blood drops that had dried for eight months at room temperature on metal, glass, and linen. The scientists envision the new method could serve as an addition to customary serological examinations which have their "difficulties and possibilities of faults."

Science News Letter, May 2, 1959

## AERONAUTICS

**"Pancake" Airport Light To Be Tested Soon**

► **A NEW LIGHT** that looks like a pancake will be tried out experimentally at the May 9 "fly-in" to be held in Atlantic City, N. J., for owners of private planes.

The light is competing with several others under a research and development program of the Federal Aviation Agency aimed at finding better lights for commercial and non-commercial airports.

The pancake is designed to be installed along the center lines of taxiing areas and runways. It stands ¾-inch high and airplanes can land on it without harming their landing gear, the FAA said.

A channel in the fixture lets light from its 45-watt bulb shine fore and aft, but not to the sides.

The FAA said it has at least five other types under consideration.

Pilots attending the "fly-in" will be briefed on other developments, such as anti-collision lights, computers, simulators, and mock-ups of simulators.

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# E FIELDS

## RADIOLOGY

### Enzyme Systems May Be Radiation Damage Areas

► AN ENZYME system in the cell nucleus, rather than long-suspected genes, may be the critical area of radiation damage to certain sensitive tissues.

This is pointed out by Drs. Ole A. Schjeide, James F. Mead and Lawrence S. Myers Jr. of the Department and Laboratories of Nuclear Medicine and Radiation Biology at the University of California, Los Angeles.

Critical gene systems, which have been exposed to eons of background radiation and mutations, do not seem likely candidates for high radiation sensitivity, the UCLA scientists point out. Such exposure should have molded them into relatively radio-resistant structures.

More likely suspects for the focal point of radiation damage are supporting enzyme systems of the cell nucleus, possibly sulfhydryl containing enzymes. These enzymes, which are important to growth and cell division, normally lead a chemically sheltered life in the nucleus.

When they are exposed to chemical culprits known as free radicals, unleashed by radiation action on tissue water, they may be inactivated through oxidation and permanently lost to the cell nucleus.

If these enzymes can definitely be identified as the key system in radiation damage, steps might be taken to reverse the action, the investigators point out. Antioxidants will reverse the inactivation of the enzymes in the test tube. This gives hope that this might be accomplished in the nucleus of cells.

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## MEDICINE

### Lack of Exercise Suspected As Heart Disease Cause

► LACK OF EXERCISE is a threat to western civilization, five medical researchers reported.

The physical inactivity that is characteristic of western nations is being increasingly suspected of being one of the most important causes of heart and degenerative diseases and fatal heart attacks, the doctors, from four countries, reported at the meeting of the American College of Physicians in Chicago.

"In terms of the natural biological characteristics of the human race, as it has presumably existed for thousands of years, it is not the so-called 'athlete's heart' which should be considered abnormal but rather the degenerating, inadequate 'loafer's heart' of our present day civilized majorities," the five explained. They are Drs. Wilhelm Raab and Yvonne K. Starcheska, University of Vermont College of Medicine, Dr. Eiichi

Kimura, Japan Medical College, Dr. Paulo de Paula Silva, University of Sao Paulo Faculty of Medicine, Brazil, and Dr. Hans Marchet, University of Innsbruck, Austria.

Highly competitive athletes, Austrian mountaineers, Alpine soldiers and sedentary individuals were examined and tested. The researchers found a marked decline in the heart protecting mechanisms in proportion to the decreasing exercise habits.

"Fortunately, this condition is reversible, and in 20 more or less sedentary men a six- to 12-week period of vigorous physical retraining restored the vagal tone (action of the nerve carrying impulses to the heart and other organs of the body) toward normal," they said.

Other influences on the heart are socioeconomic pressures and emotional conflicts and tensions.

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## CHEMISTRY

### "Missing" Enzyme Sought That Fools Cancer Cells

► HOW TO FIND the missing enzyme and end drug resistance in some cancer cells is the current project of research teams from two cancer research laboratories.

Cancer cells that lack a particular, as yet unknown, enzyme are resistant to several anticancer drugs, the researchers told scientists at the Federation of American Societies for Experimental Biology meeting in Atlantic City. They have discovered the exact mechanism by which one drug, 6 MP, kills cancer cells. Other drugs, the scientists believe, probably work in the same way.

What happens is this: inside the cancer cell, 6 MP attaches itself to a sugar-phosphate molecule with the help of the unknown enzyme. Together, the complex molecule of 6 MP, sugar and phosphate, resembles compounds needed by the cell for the manufacture of nucleic acids. The cancer cell, "fooled" into using the drug compound, no longer can make nucleic acid and eventually dies.

A few cells, however, lack the enzyme that attaches 6 MP to the sugar-phosphate and thus the drug is ineffective. In the living organism these resistant cells continue to multiply until they are the only ones left. When this happens the drug can no longer be used in cancer therapy.

This mechanism seems to explain why about one-third to one-half of the children with acute leukemia are helped by 6 MP and later suffer relapses.

Discovering a substitute for the missing enzyme or identifying it could provide a way to cure or permanently control acute leukemia, the scientists believe.

Drs. M. E. Balis, Dorris J. Hutchison and Josephine S. Salser of the Sloan-Kettering Institute for Cancer Research, New York, and Drs. R. W. Brockman and H. E. Skipper of the Southern Research Institute, Birmingham, Ala., reported the research. Dr. Alexander Hampton of Sloan-Kettering is currently attempting to synthesize a compound that combines the missing enzyme with the 6 MP-sugar-phosphate combination.

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## PHYSICS

### Operation of First U. S. H-Bomb Described

► HOW THE first U. S. hydrogen bomb worked has been figured out by a Canadian scientist.

It consisted of a uranium or plutonium fission bomb, surrounded by a liquid deuterium-tritium mixture that was, in turn, surrounded by a layer of natural uranium. The central fission bomb was exploded first, raising the temperature of the refrigerated deuterium-tritium liquid to at least 50,000,000 degrees, much hotter than the sun's interior. The heavy uranium outside layer held the refrigerated liquid in place until it was heated to this star-like temperature.

The U. S. Atomic Energy Commission exploded the fusion bomb device of Operation Mike in November, 1952, on an island in the Pacific Ocean. An intense source of neutrons was thus released, irradiating the uranium, which then formed many new substances. Two elements, now named einsteinium and fermium, were identified as a result of this test.

Dr. A. G. W. Cameron of Atomic Energy of Canada Limited, Chalk River, Ontario, says the Mike explosion was a "unique and important scientific experiment," because later fusion explosions did not produce the heavy concentration of neutrons available from the Mike device.

Although few details of the Mike explosion have been made public, Dr. Cameron's description is his educated guess.

Dr. Cameron reports in the *Canadian Journal of Physics* (March) that more recent fusion explosions have used mixtures of lithium and deuterium.

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## MEDICINE

### Case of Mistaken Identity For Unusual Tapeworm

► WHEN THE worm turns, if it is a tapeworm inside an animal or a man, there may be a problem of mistaken identity for the scientist to solve.

Two McGill University researchers report that the host, either a man or animal, may affect the size and shape of the tapeworm so greatly that the worm is not correctly identified. This has led, they said, to incorrect diagnosis of tapeworm infections.

An example of this is the report of two tapeworms taken from a young Indian boy. They were identified as fish tapeworms. Later, however, while the boy was hospitalized, a tapeworm said to be *Taenia*, found in beef and pork, was taken from him. Further examination revealed that this third tapeworm was also a fish tapeworm, only an abnormal one.

This may be a result of the treatment given the boy affecting the growth of the tapeworm, Gloria A. Webster and T. W. M. Cameron report in the *Canadian Journal of Zoology* (April).

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