

## BIOCHEMISTRY

**See Enzyme Cause of Athlete's Foot Itching**

► **DISCOVERY** of an enzyme that may be responsible for the itching and blisters of fungus skin infections such as athlete's foot is announced by Drs. C. N. D. Cruickshank and M. D. Trotter of the University of Birmingham Medical School, England, in *Nature* (June 9).

They studied a fungus called *Trichophyton mentagrophytes*. When material filtered from cultures of this fungus was incubated with thin slices of guinea pig ear skin for about two hours, the top layer of skin could be separated from the under layers with a forceps.

Other tests showed that the skin-splitting ability of the fungus is probably due to a protein-digesting enzyme. Protein digesting enzymes cause itching when injected into the skin, it has previously been shown by another scientist.

Besides incriminating the enzyme as the cause of fungus infection itching, the scientists believe it plays another part in fungus infections. As the fungus grows in the superficial layers of the skin, they suggest, the enzyme diffuses from it, and loosens the skin attachments. Consequently in areas exposed to friction, blisters readily appear.

Science News Letter, June 23, 1956

## METEOROLOGY

**Take Pictures of Snow Crystals With New Device**

► **A JAPANESE SCIENTIST**, Dr. Keiji Higuchi of Hokkaido University, has devised an instrument so simple and convenient to use anyone can take pictures of snow crystals—next winter, that is.

It consists of a portable dark box containing a holder for photographic paper and a small flashlight bulb, set about two feet apart. Several three-by-four-inch glass plates are prepared by treating the surface of each with silicone oil to repel water.

The apparatus and glass plates are cooled to outdoor temperature. After being exposed briefly to falling snow, a glass plate is put into the dark box directly on the film holder.

By opening the film holder and shining the light from above for a few seconds, shadows of the crystals are produced on the photographic paper.

The image produced is "nearly full size and very clearly shows" the crystal's outline, Dr. Higuchi reports in the *Journal of Meteorology* (June).

For anyone who wants his own shadow photograph of a snowflake, come next winter, that completes the outdoor procedure.

However, because Dr. Higuchi developed the new method to study the form, size and mass characteristics of snow at intervals of several minutes during a snowfall, he next warms the glass plate slowly. The individual snow crystals melt into hemispherical droplets.

The plate is again placed in the dark box and a shadow photograph taken by the same method. From the image's diameter, Dr. Higuchi can calculate the volume of each droplet.

He conducted his experiments in an igloo halfway up Mt. Tokachi and Mt. Taisetsu on Hokkaido, and obtained about 100 sets of records of the shapes and sizes of snow crystals.

Two kinds of snowflakes were found in the same snowfall, one made of crystals nearly the same size, the other containing crystals of various sizes. Studying combined crystals of two sizes, Dr. Higuchi notes, is important for investigating how snow crystals clump together, thus shedding light on the mechanism of precipitation.

The number of snow crystals in a snowflake about an inch and a half in diameter has been estimated to be about 4,000.

Science News Letter, June 23, 1956

## MILITARY TACTICS

**Urge Foxhole Diggers And Combat Shields**

► **THE MECHANIZATION** of foxhole digging and a return to the use of the shield in modern warfare are advocated by Col. Henry E. Kelly, U.S.A., retired.

In *Army* (June), a publication of the Association of the United States Army, Col. Kelly points out that the change in warfare thinking brought about by atomic weapons necessitates a corresponding change in the rectangular foxhole, popular with the infantryman since late in World War I.

Col. Kelly says the Army ought to ditch the box-like hole in favor of a round hole, 28 to 30 inches in diameter.

The circular pit, he states, was used effectively by the Germans in World War II. It offers the infantryman a 100% reduction in digging and increases protection against blast, flame, radiation and other combat dangers. Col. Kelly goes one step further, however, and states that the Army needs a mechanical foxhole digger.

"The circular hole is a bit more difficult to dig by hand, but mass production of such atomic foxholes seems feasible except by troops digging in under direct fire. The present commercial telegraph-pole digger, working as an earth-screw, can be redesigned to produce a 28-inch diameter hole four feet deep, in less than a minute."

Man-portable models of such an earth-digger, Col. Kelly says, could be helicopter-lifted where needed.

As for the return to shields, Col. Kelly points out that atomic warfare will mean the need for more overhead cover than ever before. By using the circular foxhole, a shield made of fireproof body armor material to fit over the hole would protect the infantryman against shell fragments, as well as blast, flash burns and some radiation. He foresees the shield designed to be carried by the infantryman and used as a packboard and battlefield shield.

Science News Letter, June 23, 1956



## BIOCHEMISTRY

**Enzyme Method Helps Detect Stomach Cancer**

► **AN ENZYME CHEMICAL** is being used in development of a stomach cancer test at the University of Michigan, the American Cancer Society announced.

Stomach cancer is difficult to detect in its earliest stages and, consequently, is one of the deadliest of all cancers.

The enzyme in the new test is chymotrypsin. It can digest the mucin in the stomach contents, making it easier to find any cancer cells present when the stomach contents are examined under the microscope.

In the test the chymotrypsin, and a mild alkaline solution are run into the stomach via stomach tube. The material is then sucked out via the tube, centrifuged and the sediment examined for cancer cells.

The method was developed by Dr. Robert J. Bolt. Although not foolproof, it is said to be as good as more complicated methods involving use of brushes, balloons or sponges to get cancer cells out of the stomach for diagnostic examination.

Science News Letter, June 23, 1956

## PHYSICS

**First Industrial Reactor Free of Restrictions****See Front Cover**

► **A NUCLEAR REACTOR** without a security clearance will be in operation at the Armour Research Foundation of the Illinois Institute of Technology.

Shown in the photograph on the cover of this week's *SCIENCE NEWS LETTER*, it is the nation's first peacetime private reactor designed solely for industrial research.

The reactor, housed in a new \$1,250,000 building, resulted from a unique financing plan between the Foundation and 24 American industrial firms. Under the share-the-results plan, each company put up \$20,000 toward the cost of the plant. In return all data resulting from reactor studies will be shared with the participating companies during the next three years.

The biggest problem in setting up the industrial reactor was the fact it is located in a highly populated section of Chicago's South Side. To protect the reactor's human neighbors, elaborate safety devices have been built in and around the atomic reactor.

A homogeneous water reactor, the 50,000-watt research tool was designed and built for the Foundation by Atomics International, a division of North American Aviation, Inc.

Science News Letter, June 23, 1956

# CE FIELDS

## MEDICINE

### Atomic Medical Test For Digestive Disease

► ATOMIC AGE MEDICINE has given doctors a new test for digestive tract disorders and a new way to study the functioning of stomach and intestines.

The new test is expected to help in diagnosing cancer of the pancreas, chronic and acute inflammation of the pancreas, some diseases of the small intestine, and nutritional abnormalities following operations for duodenal and stomach ulcers.

For the test, the patient eats a fat substance tagged with radioactive iodine in peanut oil. The fat substance is glycerol trioleate.

Four to six hours later, blood samples are studied for radioactivity. Eliminated material is studied over a 48-hour period.

In patients without gastro-intestinal disorders, radioactive levels are high in the blood and low in the waste material. Reversed levels indicate certain abnormalities in intestinal function.

The test may be used to study the value of certain types of treatment, as well as to investigate more clearly and more accurately certain physiological aspects of the intestine function.

The test was developed by Dr. George J. Baylin, A. A. Sanders, and Drs. Joseph K. Isley, William Shingleton and Julian M. Ruffin of Duke University School of Medicine, Durham, N. C. They reported it at the American Medical Association meeting in Chicago.

Science News Letter, June 23, 1956

## METEOROLOGY

### H-Bomb War Might Cut Earth's Solar Heat

► AN H-BOMB WAR might change the amount of heat the earth receives from the sun, but a meteorologist has found "no evidence" of a decrease in solar radiation during or following the Pacific thermonuclear tests in the spring of 1954.

D. Lee Harris of the U. S. Weather Bureau, Washington, told the American Meteorological Society meeting in Seattle it is "unlikely" that H-bomb explosions over coral islands or sea water produce radiation changes large enough to be detected against natural variations.

However, he said, radical changes in the design of explosions, as might occur in a thermonuclear war, could result in important differences in the earth's heat balance.

Foreign scientists, particularly in Japan, have charged that the Pacific H-bomb tests spewed sufficient dust into the air to interfere with solar radiation, and thereby changed Japan's weather in the summer of

1954. That enough particles high in the atmosphere do affect the amount of solar radiation reaching the earth's surface is known from volcanic explosions.

The eruption of Krakatoa in 1883, Mr. Harris said, is estimated to have tossed some four to 13 cubic miles of earth into the air, of which perhaps one-eighteenth remained suspended as fine particles high in the atmosphere for more than a year. More recent records studied by Mr. Harris show a world-wide decrease in the "intensity of direct solar radiation" in the fall of 1953.

Mr. Harris believes this "nose dive of a few percent" is due to the eruption of Mt. Spurr, Alaska, in July, 1953. Dust from this volcanic explosion, still in the air in 1954, could have masked any possible effect from the spring Pacific H-bomb tests.

Mr. Harris' calculations on possible effects of future H-bomb explosions were based on scattering theory, the announced size of the Ivy Mike (Nov. 1952) crater and published information concerning particle sizes of dust thrown out of thermonuclear craters.

Science News Letter, June 23, 1956

## MEDICINE

### Ultrasonic Treatment For Pitcher's Elbow

► ULTRASONIC RAY TREATMENT plus hydrocortisone injections have completely relieved 97% of painful pitcher's elbow victims, Dr. John H. Aldes of Los Angeles reports in the official journal of the American Academy of General Practice, *GP* (June).

Pitcher's elbow is known medically as epicondylitis. Sportsmen also know it as tennis elbow, golfer's elbow, and badminton and squash player's elbow. Writer's cramp is another name for it.

It has attacked others besides athletes. Housepainters, bricklayers, carpenters, welders, plumbers, machinists and housewives have been its victims.

The ultrasonic treatment is performed by using a coupling agent, such as water or an oil of high viscosity, between the treatment head of the apparatus and the area to be treated.

Ultrasonic radiation creates a "micro-massage" of the cellular tissues. The mechanical vibrations increase blood supply, stimulate metabolism and cause pain to subside. Dr. Aldes said heat is present comparable to that produced by local application of shortwave diathermy.

The coupling agent in the first part of the ultrasonic radiation treatment is liquid petrolatum applied over the elbow and the forearm. The radiation is applied to the area of pain in the elbow by means of a cone-shaped applicator attached to a regular transducer.

The second part of the ultrasonic therapy is performed under water using water as the coupling agent. Treatment is given over the entire extensor area of the forearm and is administered with a gliding, rotating movement.

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## BIOLOGY

### Study Lobster Heart's "Miniature Brain"

► HOW COMPLEX SYSTEMS of nervous units act together to produce behavior is being studied in the "miniature brain" of lobsters' hearts.

The tiny clump of nine nerve cells that controls the lobster's heartbeat is being studied by Drs. Donald Maynard, S. Hagiwara and C. Terzuolo of the University of California at Los Angeles, under direction of Dr. Theodore Bullock.

By placing microscopic electrodes in the nerve cells, they have recorded the electrical activity generated by them. This energy comes from two groups of nerve cells, four small ones and five large ones.

The small cells apparently stimulate the large ones, which in turn cause the quick, rhythmic heart contractions. The nervous energy is fired in bursts.

It has been suggested a lobster's heart is a model organism capable of very simple behavior patterns—rhythmic, coordinated contractions. The "miniature brain" with its relative autonomy and spontaneous, integrated and patterned activity shows strong resemblance to a central nervous system.

These factors give hope, the researchers say, that the study of the lobster heart system may lead to a better understanding of the infinitely more complex system by which our brain sends commands to our muscles.

Science News Letter, June 23, 1956

## MEDICINE

### Sound Waves Used For Cancer Detection

► A KIND OF RADAR method to detect cancer of the breast and other soft tissues was shown in an exhibit at the American Medical Association meeting in Chicago by Dr. J. J. Wild, Dr. John M. Reid and Paul Wolf of St. Barnabas Hospital, Minneapolis, Minn.

Instead of radio waves, the cancer detection radar method uses very high energy sound waves.

The inaudible echo as the sound waves pass through the tissues is picked up electronically to give both a picture and a zig-zag line. For a given range or depth of tissue, cancer returns more sound than normal tissue.

Non-malignant tumors and cysts send back no sound. The contrast between cancer and normal tissue is called better than that obtained in X-ray pictures.

For breast cancer, the "echographic" or radar method can detect a cancer no bigger than a period.

The method is now being applied to the detection of such internal cancers as stomach, rectum, prostate and neck of the womb. Besides being used for cancer detection, the method is expected to give further knowledge of other conditions in the body.

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