

plained, neutrons can penetrate dense substances such as lead but are absorbed by lighter materials such as tissue which is rich in hydrogen. Since their discovery, it has been hoped that they would prove a potent weapon against cancer, but proof of this has so far been lacking.

Dr. Lawrence and associates compared the killing or growth-checking effect of neutrons and X-rays on wheat seedlings, drosophila eggs, fern spores, a transplantable breast cancer of mice and whole normal mice. The neutrons were more effective than the X-rays in every case, but in different degrees. They were two times as effective on drosophila eggs, five times on wheat seedlings, four times on normal mice, five times on the breast cancer, and two and one-half times as effective on fern spores.

The results of these studies seem to indicate that neutrons may be able to single out from the rest of the body and destroy the cells of some kinds of cancers.

#### Bronchial Disease Yields

About half of a group of 55 patients suffering from a troublesome bronchial disease were relieved, and some apparently cured, for periods ranging from one to five years after X-ray treatments, Drs. Maurice Berck and William Harris of New York City reported.

The disease is known medically as chronic suppurative bronchiectasis. Paroxysms of coughing with copious expectoration and fetid breath are the chief symptoms. The condition is one in which the bronchi or a single bronchus have become dilated, often as a result of infection.

X-ray treatment of this disease was carried out on a group of patients over a period of five years at Mt. Sinai Hospital, the physicians reported. The improvement in about half the cases varied from "moderate to practically complete cessation of symptoms."

#### Radium Detective

A radium detective which aids in the discovery of lost or stolen radium was described by Dr. Robert B. Taft of Charleston, S. C. Radium is so expensive that the loss of even a small amount is a matter of considerable concern.

"Radium gets into strange places," Dr. Taft commented. "I recently aided a radiologist who was rowing around in a boat trying to detect his radium in a pond."

"Much of the work of seeking the radium in former times was done with an electroscope. Now the Geiger-Muller



NEW ISLAND

*From the muddy waters of San Francisco are already appearing, at left, the mile-long man-made island which will mark the site of the Golden Gate International Exposition of 1939.*

counter, an instrument for detecting small amounts of Gamma and some other rays, which is a sealed tube containing a gas compressed at sub-atmospheric pressure, is proving highly successful as a radium detective.

"The entrance of any radiation into the tube breaks down the space between the electrodes, causing an impulse which may be magnified to operate a loud speaker. These counter tubes are so super-sensitive they can even record cosmic rays.

"Radium may be detected through water, through dirt and stone and brick. We experimented in an indoor swimming pool, and found that the counter showed the presence of radium.

"To find the radium with the counter you simply walk around the suspected area and when the tube shows a double amount of activity over the usual detection of cosmic rays, counting the impulses in the tube leads to the discovery of the metal."

Radium, because of its value, is sometimes stolen. The radium detective may help recover it in such cases, too, but Dr. Taft warned against seeking the radium openly in suspected houses, saying that failure to find the elusive metal might lead to lawsuits.

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#### ENGINEERING

### Build Mile-Long Isle In San Francisco Bay

**T**HIRTY million cubic yards of black bay sand have been sucked from the bottom of San Francisco Bay and pumped into a giant seawall enclosure to make the site of the Golden Gate World's Fair of 1939.

The result is a man-made island a mile long and nearly a mile wide, located between the towering Golden Gate Bridge and the seven-mile San Francisco-Oakland Bridge.

"Treasure Island," as the Exposition site has been named, was reclaimed from the shoals of the largest land-locked harbor in the world. Work on the island began in February, 1936, when United States Army Engineers, in cooperation with Exposition workers, started America's largest dredging job. Eleven giant dredges, 1,000 men, and a daily 24-hour schedule were employed for a year and five months to suck 100,000 cubic yards of sand each day from shoals beneath the Bay and pump it into a huge square rimmed by a stone seawall more than three miles around. The island rests on a shoals area from six to twenty-five feet under water, and



#### HOW IT WILL LOOK

*Artist's conception of the completed fair grounds which will be reached by a causeway from the San Francisco-Oakland Bay bridge. The only permanent structures on the island will be two airplane hangars seen at right foreground. The island eventually will become San Francisco's airport.*

extends thirteen feet above the surface.

Today it stands 100 per cent. completed, with only the final surfacing yet to be done. Before this surfacing is undertaken, however, the island will be given a bath. To make way for a \$1,300,000 landscaping and horticulture program, sand in the island must be "unsalted" before trees, shrubs and flowering plants can be successfully transplanted. This will be done by a process called "leaching," which consists of keeping the ground continually

soaked and drained with fresh water until the last grain of salt has been sent back to the sea.

Already the huge structure has brought about a noticeable effect on tides and currents in the Bay. U. S. Army Engineers and experts of the U. S. Coast and Geodetic Survey, after taking daily measurements of tides and currents for the last month, report that the unnatural square mile of earth has perceptibly changed their flow.

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#### PHYSIOLOGY

## "Iron Lung" In Reverse Used to Study Breathing

**A**RTIFICIAL fever and an apparatus working like the so-called "iron lung" in reverse are now making possible new studies on what happens when animals like dogs, cats and rabbits use their specialized type of respiration known as panting. Allan Hemingway, Yale University chemist from the school of medicine, described how the animal's intake of air was measured by the "reverse" iron lung, before the meeting of the American Chemical Society in Rochester, N. Y.

The animal lies in the metal chamber with only its neck protruding through

an air-tight seal. Every time it breathes it forces air in and out through special valves. The flow of air can be accurately measured.

While in the chamber the animal is subjected to artificial fever from diathermy machines. Soon the animal starts panting to establish a constant body temperature despite the excessive heat. Faster and faster the animal inhales and exhales the air to evaporate moisture from the tongue, mouth tissues and the upper part of the throat. Only these small areas, said Mr. Hemingway, provide the surface by which the animal

must maintain even temperature. In man and horses, in contrast, sweat glands all over the body secrete water whose evaporation controls temperature.

Object of the Yale experiments was to study the effect of the rapid flow of air on the blood in the dog's panting method of keeping cool. One bad effect is that a too rapid motion can blow carbon dioxide out of the blood. Some carbon dioxide is needed in the blood stream in the form of the mild carbonic acid. When the carbonic acid content of the blood is reduced the normal acid-alkali balance in the blood stream is changed. In severe cases of carbon dioxide loss tetany develops; a morbid state characterized by intermittent muscular spasms.

The new Yale apparatus was designed to provide exact knowledge of the conditions in which tetany may occur. The project is part of a more general program of research on the chemical and physical temperature regulating mechanisms of the animal body and the ability of these mechanisms to withstand heat changes.

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#### PHYSICS

## Heat Instead of Light For Heavy Weather Signals

**F**OG, shipping's deadliest enemy, appears one step nearer defeat with the announcement of successful heavy weather signaling by means of the Hayes Radiometer.

Tests have proved the practicability of the radiometer, originally invented as an extremely sensitive device for measuring heat radiation, its inventor, Hammond V. Hayes of Boston, reports (*Review of Scientific Instruments*, September).

The instrument makes practical the long hoped-for means of signaling by use of heat radiation instead of light. Heat rays penetrate foggy and thick atmosphere much more strongly than does light.

Boston harbor during the last winter was the trial ground for the radiometer, which is being improved as a result of the first experiments. Signals were sent successfully a distance of more than a mile and a half on days when visibility was so poor that objects situated much nearer than the heat source could not be picked out.

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Firm tomatoes may be stored for 20 days without losing much Vitamin C, it is found.