

## PUBLIC HEALTH

## Smoker Must Be Studied To Explain Disease Cause

► INDIVIDUAL SUSCEPTIBILITY to disease needs study before statistical associations with cigarette smoking are accepted on face value, the scientific director of the Council for Tobacco Research—USA believes.

Dr. Clarence Cook Little, former president of the University of Michigan and director emeritus of the Jackson Laboratory, Bar Harbor, Maine, in the council's 1964-65 annual report, emphasized that the time is probably ripe for such research.

Three questions arise when an association between the incidence of some disease and cigarette smoking is reported, Dr. Little said in his report of research progress of the council.

1. Is cigarette smoking a cause of disease, or does it contribute in some way to its etiology? 2. Is it an indicator or concomitant of congenital characteristics that predispose to the disease or engender a pattern of living habits, one or more of which may cause, or predispose to the disease? 3. Is the association accidental or artificial due to technical operations?

"If either of the first two questions could be answered definitely," said Dr. Little, "the answer would probably suggest measures for prevention or control of the disease. A positive answer to the first might lead us eventually to some change in tobacco or tobacco smoke that would have protective value. On the other hand, a positive answer to the second question would suggest attention to the smoker rather than to the smoke."

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## BIOTECHNOLOGY

## Proton Beam Saves Sight Of Poor Surgical Risks

► A LEADING CAUSE of blindness, hemorrhagic disease of the retina, can be treated by use of proton beams with the patient under a local anesthetic. When the disease occurs in diabetics, surgery is often a high risk.

Dr. Raymond N. Kjellberg, associate in surgery at Harvard University School of Medicine, told the International Congress of Neurological Surgery in Copenhagen that the proton beam procedure involves destruction of the pituitary gland. The relationship of the pituitary gland secretions to the hemorrhagic disease of the eye is based on experience and is becoming increasingly accepted as fact. Stopping the pituitary gland's activity by surgery has previously proved effective for non-diabetic patients.

The progressive loss of vision in diabetic patients is associated with repeated hemorrhages in the retina of the eye. Although ordinary persons can be treated surgically, diabetic complications rule out any form of treatment other than by proton beams in more than half of the diabetics with the disease.

The protons, units of positive electricity,

emerging from the cyclotron at high speeds, pass in almost perfectly straight lines through small holes that fit the area of the desired radiation.

Slowed down by absorbers, the protons stop at predetermined brain targets and there liberate greater amounts of radiation than elsewhere along their path. This feature is known as the Bragg Peak. Very large amounts of radiation energy are concentrated in the brain target while largely sparing the surrounding brain tissue.

Dr. Kjellberg based his report on patients in two Boston medical institutions, the Massachusetts General Hospital and the Joslin Clinic. Summing up the results of their treatment, Dr. Kjellberg pointed out that 37% had improved sight, 34% had stable vision and 29% continued to experience visual loss.

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## AERONAUTICS

## U.S. Air Force Plane Is Fastest in World

See Front Cover

► A U.S. AIR FORCE fighter and interceptor, YF-12A, is the fastest plane in the world.

In May, the aircraft, seen on this week's front cover, set nine world speed and altitude records in a single day. It was flown at 2,062 miles per hour for the absolute world speed record and at 1,688 miles per hour around a closed course for the absolute world closed course speed record, any distance. It was flown at a sustained altitude of 80,000 feet for a third absolute world record.

In addition, six jet class world records were set by the titanium interceptor. These include the 500-kilometer closed course speed record of 1,642 miles per hour; the 1,000-kilometer closed course speed record of 1,688 miles per hour with no payload, with 1,000 kilograms internal payload and with 2,000 kilograms internal payload.

The straightaway speed and sustained altitude records are new world jet class marks, as well as being world records for any class of aircraft. The plane was built by the Lockheed Aircraft Corporation.

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## PUBLIC HEALTH

## St. George Island People Swollen Up With Mumps

► MORE THAN HALF the population of St. George Island off the coast of Alaska has had mumps since May. This means 107 cases in an island population of only 210.

The Morbidity and Mortality Weekly Report from Atlanta, Ga., stated that this is the first time mumps has occurred there since 1907. The oldest patient was 56 but the disease struck all ages. Two teen-agers are blamed for introducing the epidemic. One, aged 15, left school in Oregon on May 12. The other had left school on mainland Alaska earlier that month.

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# IN SCIENCE

## BIOCHEMISTRY

## Substance in Newspapers May Aid Insect Control

► NEWSPAPERS, magazines and other U.S. paper products contain a substance that stops normal sexual development in certain insects. A chemical compound in the paper inhibits normal sexual development for the vulnerable insects, opening the way for a possible new method for insect control.

Discovery of hormonal activity in paper from the U.S., but not from Europe, was made by Drs. Carroll Williams and Karel Slama of Harvard University.

During rearing, the European insects, *Pyrrhocoris apterus*, failed to transform into normal sexually mature adults at the end of the fifth larval stage.

Instead, all of 1,500 individuals continued to grow as larvae and formed giant but immature larvae that finally died without being able to reproduce. This event is one that would have been expected had the bugs been treated with their own juvenile hormone.

The foreign source of the hormone activity was finally tracked down to a small piece of ordinary paper toweling that had been placed in each rearing jar.

Samples of the wood of seven evergreen trees were obtained, ground up and tested.

The Harvard scientists concluded that the familiar pulp tree, the balsam fir, is the principal source of the hormonally active factor in American paper pulp. The scientists extracted, from towels and old newspapers, an active material, one ounce of which, when purified, would block the metamorphosis and cause the death of three billion *Pyrrhocoris* insects.

The active principle in the paper materials has proved to be totally inactive when tested on a number of American insects, suggesting that the extract could be used as a selective control method.

Prof. Williams emphasized that insects would have little defense against a chemical of this sort, nor would they find it easy to develop a resistance or insensitivity to their own hormone the way they do to DDT and other ordinary insecticides.

The reasons why the balsam fir and certain other evergreen trees produce a potent form of the juvenile hormone of the *Pyrrhocoris* are unknown but one possibility, suggested by Drs. Slama and Williams, is that the active material is a "biochemical memento" of the juvenile hormone of an insect that formerly fed on these trees. This former predator is now either extinct or has shifted its diet to avoid lethal contact with these evergreen trees.

Among the pieces of U.S. newspapers and journals showing high juvenile hormone activity were the New York Times, Wall Street Journal, Boston Globe and Science.

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# E FIELDS

## MEDICINE

### Cancer of Esophagus Can Be Detected Early

► **CANCER OF THE ESOPHAGUS** can now be detected in its early stages with the aid of radioactive phosphorus, which is readily attracted to cancerous cells.

In a new technique developed by Dr. Robert S. Nelson of the University of Texas M. D. Anderson Hospital and Tumor Institute in Houston, patients receive an injection of the substance. Then a tiny Geiger counter on the end of a long tube is passed over suspected areas through an esophagoscope, an instrument for viewing the interior of the esophagus. Heavier than normal concentrations of recorded radioactivity will reveal a malignancy.

The new technique has been almost 100% accurate in test cases and promises to improve the cure rate for this type of cancer through earlier diagnosis.

Difficulty in swallowing is one of the first signs of this cancer, thus the patient himself is the real key to early diagnosis and treatment, Dr. Nelson emphasizes. All persons who have trouble swallowing should report to their physician immediately, he said.

"All too often we see patients who have delayed two or three months until all they can swallow is liquids," he said. "Then it may be too late."

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## TECHNOLOGY

### Data Library Will Aid Scientists and Doctors

► **AN INFORMATION RETRIEVAL** system for scientists and technologists, in the form of a compact box for desk mounting, may result from a three-year research project to be initiated by the Medical Research Council of London.

The work is to be conducted at the Bio-engineering Laboratory of the human physiology division of the Council. If successful, the system could have a profound impact on research organizations and industrial development groups in Britain. It is operated by the user, when the work is close at hand, and functions with a minimum amount of delay.

In practice, the user would have a small microfilm store and viewer, a special pack of reference documents called feature cards, and a special vocabulary. The vocabulary is comprised of a list of words and phrases making it possible to describe with a high degree of precision a particular piece of information.

The feature card pack consists of a specially designed set of punched documents. It differs from conventional punched card retrieval in which one card carries one item of information and a library of 10,000 docu-

ments may require 10,000 cards. With feature cards there may be as many as 10,000 usable coding positions.

With this technique cards are selected with features that seem appropriate for an inquiry. The selected documents are superimposed in order to determine if there is any coding common to all of them, thus indicating that all the requirements of the inquiry are satisfied.

Novel features of the MRC study are the way documents are prepared, and the vocabulary and abstracting service organized. Information about library material is entered on coding forms that list the 500 descriptive components of the vocabulary. These are used for processing by punched card equipment to produce up-dated feature cards.

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## TECHNOLOGY

### Swedes Feed Paper Bills To Pump to Receive Gas

► **A MASTER AUTOMAT** for controlling several different gasoline pumps at once allows a driver to fill his own tank after hours by putting paper money in the slot.

Twenty-five of the devices, produced by a small Swedish firm, Autotank A/B, were to be installed around the country by the Svenska Shell Oil Company, which tested the new automat in Stockholm.

The customer places a 10 kronor (\$1.93) bill horizontally under a plastic lid, pushes a button for the type of gasoline desired, and gets his money's worth, with a stamped receipt from another slot. A photoelectric scanner rejects false notes or those of wrong denomination.

The \$3,000 unit has an electronic "memory" that registers what the customer has paid and passes an impulse to the premium or regular gas or diesel oil pump. A flip of a switch lets the filling station manager change over to manual operation.

Coin-operated gas automats have been used in Sweden for some time but have been found less practical, especially for long-distance drivers, because of the number of coins needed to fill a nearly empty tank.

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## TECHNOLOGY

### New Ideas Sought For Navigation Satellites

► **NEW IDEAS** that could be applied to future satellites in order to provide immediate, worldwide and all-weather communications for ships and aircraft and also aid exact location determination and traffic control are being sought by the National Aeronautics and Space Administration.

NASA has been studying a number of satellite techniques to meet the increasing demands of modern trans-oceanic transportation. Tests with Echo, Relay and Syncom satellites have proved so successful that NASA would like to develop other ideas "for possible flight on future spacecraft," the American Astronautical Society meeting in San Francisco was told.

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## SPACE

### Adaptation of Medicine To Space Conditions Seen

► **LONG SPACE FLIGHTS** of the future will affect astronauts like a long bed rest.

Optimism about health hazards during 30-day flights was expressed in Philadelphia by Brig. Gen. Benjamin A. Strickland Jr., assistant deputy commander for bioastronautics, Air Force Systems Command Headquarters, Andrews Air Force Base, Washington, D.C.

The disease problem of a new breed of human, the spaceman, can be most appropriately based on physical medicine, one of the most ancient forms of specialization in the healing arts, Gen. Strickland said.

As an example of the adaptation of ordinary treatment to conditions of space, Gen. Strickland said a glass boot that he had used at Walter Reed Hospital in 1939 to give relief to Gen. John J. Pershing of World War I fame could offset the effects of weightlessness on heart and circulation in prolonged space flight.

"The approach, when redesigned to include the lower torso," he explained, "provides the organism with the same form of blood pooling in the lower extremities as that generated by gravity."

The lower pressure developed from the waist down generates a compressive thrust through the long bones of the legs, providing a form of artificial gravity to part of the skeleton, he said.

"Such a device might consist of a barrel-like container sealed around the waist, utilizing a pump to create negative pressure," he stated. "It will probably incorporate some kind of foot and leg ergometer apparatus to exercise the lower extremities while they are inside it." Research versions are already in use.

However, the overall respiratory system could be badly affected, Gen. Strickland said, if prolonged sedentary position is required, as is now expected.

"The absence of strenuous motor exertion, with its demands for increased respiratory excursions, could, through the atrophy of disuse, disrupt the elasticity of the cartilaginous connections of the rib cage," he pointed out.

Muscular efficiency and elasticity of the diaphragm and vertebrae also could be affected.

Among numerous other problems to be faced are those of the inner ear and redistribution of body fluids, overlap of anxiety, monotony and isolation," as well as the potentially physiologically significant changes in circadian rhythm," Gen. Strickland said.

In man's assault on the universe, Gen. Strickland reported, the art and science of medicine and its allied disciplines must prepare and sustain him.

Collaborating with Gen. Strickland in the reported research was Dr. Theodore Marton of the missile and space division, General Electric Company, Philadelphia.

The report was given at a joint meeting of the American Congress and American Academy of Physical Medicine and Rehabilitation.

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