MEDICINE

Parasite Poses Problem

Amebic dysentery, a tropical parasitic disease that riddles the intestines, may be more prevalent than suspected. Fear many are "carriers."

➤ A LARGE PORTION of our population may be harboring a dread tropical disease that bores into the intestines and makes chronic patients of its victims.

One million veterans and 15,000,000 men and women in civilian life may be playing host to amebic dysentery, the parasitic tropical trouble-maker.

This estimate, based on the findings made at the Veterans Administration's Tropical Disease Clinic, Winston-Salem, N. C., under the direction of Dr. Thomas T. Mackie, professor of preventive medicine at the Bowman Gray Medical School of Wake Forest College, appeared in an article by Chester S. Davis in the *Winston-Salem Journal* and *Twin City Sentinel* (Aug. 8).

(In Washington authorities pointed out that the results at Winston-Salem may apply only to the veterans examined and may not be typical of the nation-wide situation.)

Mr. Davis's estimates are based on the fact that of 330 veterans examined in this clinic in the past 18 months, 134, or 40.6%, had amebic dysentery. Another 46 veterans were found to have other tropical diseases. He states that "in less than one percent of the cases had these diseases previously been diagnosed, although most of the infestations already were four and five years old."

Men who came to this clinic for the most part had vague, undiagnosed complaints that refused to respond to treatment elsewhere but presumably they were suspected of having tropical disease when sent there and that may weigh the figures in these findings.

However, the magnitude of this problem has increased with the return of many men from service in tropical areas who may be unsuspected casualties of the disease. These are the facts presented by Mr. Davis:

A person may be chronically ill for many years before the true nature of his infection is discovered, for few doctors are trained to detect it. There probably are not more than 12 fully trained men actively practicing tropical medicine in the U. S. Many persons may be carriers, for the amoebae surround themselves with hard shells and these cysts are passed in the feces to find another victim. There is no cure for this intestine-riddling disease when allowed to progress too far.

A one-celled protozoa is the parasitic agent in this disease which over a period of time may riddle the intestine with small, round ulcers. In these aggravated cases the painful "bloody flux" is a common symptom. The amoebae may get to the liver via the blood vessels and there produce inflammation and abscessing that may lead to death.

Science News Letter, August 14, 1948

GEOPHYSICS

"Doodlebug" Hunts Oil

➤ THE INNER WORKINGS of the wartime "doodlebug" pest to German U-boats in the Atlantic were revealed at the Westchester County Airport, N. Y., by the Gulf Oil Corporation to a group of science writers. Its application to oil surveys was also demonstrated.

Its proper name is the magnetometer. It is a devise housed in a bomb-like structure which is trailed behind and below an airplane. Its delicate magnetic instrument reacts to magnetic influences below, even to a submarine concealed deep in the ocean. It was used during the war, and since, to locate hidden iron ore deposits. Its greatest use today is in the search for petroleum, even oil under swamps and in the ocean bed.

It has already been used in many surveys for oil, including an 85,000-square-mile area of the continental shelf in the region of the Bahama islands where other scientists, working under giant diving bells, used gravity methods. The magnetometer method is now being used to explore a great tract in Africa with American planes and American instruments. Many other surveys have been made over dry land and almost inaccessible swamps. One great value of the magnetometer is its ability to survey hard-to-get-at areas, and do it with great speed.

The magnetometer reacts to the earth's magnetism in addition to iron and steel objects and to deposits of magnetic ore. As explained by Gulf scientists, the earth's magnetic field varies in intensity. The variations of importance in oil explorations are those caused by differences in composition and proximity to the surface of the magnetic igneous rocks which comprise the underlying or basement rock found in all areas.

When the structural configuration, or form, of these basement rocks is such as to bring them relatively close to the surface, a magnetically high area will be indicated by the instruments. Thus, by the variations in these magnetic measurements the geophysicists secure information which permits them to make a contour map, which shows variations in the composition and structure of the earth's basement rock.

The overlying sedimentary rock may reflect a similar configuration, which can indicate the existence of geological conditions permitting the accumulation of oil.

The heart of the magnetometer is a magnetically sensitive element about the size of a cigarette. Its findings are transmitted to the instrument in the plane through the trailing cable. The air-borne magnetometer's success is due in large part to its ability automatically to orient itself at all times so that it is in perfect alignment with the earth's magnetic field.

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MEDICINE

Fever Plus Penicillin Has More Anti-Syphilis Effect

➤ A TEN PERCENT improvement in syphilis treatment is obtained when artificially induced fever is added to the seven and one-half day penicillin treatment, a group of doctors headed by Dr. Herman N. Bundesen, president of the Chicago Board of Health, reported in the *Journal of the American Medical Association* (July 31).

Penicillin alone rated 70% effective and

NERVE CENTER—Heart of the air-borne magnetometer, housed in a bomb-like structure which is lowered beneath a moving airplane, is the small tube-like piece being held by the hand in the photograph.

penicillin plus fever 80% effective, they report from six months studies at the Chicago Intensive Treatment Center.

The fever treatment does not cut down on the time required for penicillin treatment of syphilis. Neither does giving larger amounts of penicillin without fever prove more effective.

The 80% effective method consisted of an injection of sodium penicillin every three hours for 60 doses plus three sessions, each three hours long, of artificial fever on alternate days beginning 23 hours after the first injection of penicillin.

The doctors reporting the study with Dr. Bundesen are: Drs. George X. Schwemlein, Kettering Foundation for Medical Research, Cincinnati; Theodore J. Bauer, U. S. Public Health Service; Robert M. Craig, Dayton, Ohio; and Jack Rodriquez, Chicago.

Science News Letter, August 14, 1948

AERONAUTICS

Cross-Wind Landing Gear

➤ LIGHT AIRPLANES, equipped with relatively new types of cross-wind landing gears, can take off and land across the wind as safely and with no more skill required than in ordinary into-the-wind operations, the Civil Aeronautics Administration revealed in a recent report.

This government agency initiated an investigation of the possibilities of cross-wind landing gears for airplanes in 1945. One objective is to save costs in airport construction. Modern ports at the present time must have sufficient runways to enable airplanes to be landed directly into the wind, or not more than 22.5 degrees from directly into the wind, for all winds in excess of four or 10 miles per hour. This means extensive tracts of land for airfields and much heavy expensive construction.

The report, entitled Cross-Wind Landing Gears, covers tests made with two light planes, a Fairchild PT-19 and the Piper J-3. Several other planes with cross-wind landing gears have also been tested and will be covered in a later report.

Basically this cross-wind landing gear consists of castered wheels with castering restraint. The idea is not new. The Bleriot plane, which made the first flight across the English Channel, in 1910, was equipped with one type. An American patent was issued Bleriot in 1911 for his so-called undercarriage.

Also some early planes were equipped with the tricycle type undercarriage which incorporated main fixed wheels behind the center of gravity of the plane and a castered nose wheel. This might be termed a cross-wind landing gear.

Prior to World War I, the castered and tricycle type undercarriages had been almost universally discarded in favor of undercarriages having two fixed wheels ahead of the center of gravity and a castered or steerable tail-skid or V-wheel.

The present cross-wind landing gears were not designed by the government but by individual airplane manufacturers at the suggestion of the CAA. The two covered in the present report have been flown by some 200 pilots, none of whom gave an unfavorable report on either landing or take-off characteristics. Cross-wind landing gears for heavier planes, including transports, are expected soon.

Science News Letter, August 14, 1948

ENGINEERING

Home Heating Studied

➤ A SPECIAL BUILDING to study home heating stoves and furnaces now in operation, in London, has many unique features all designed to provide accuracy in the research activities. It is called a calorimeter building because calorimeter cabinets, in which individual heating appliances can be installed and tested, constitute its principal feature.

The building is a four-story brick structure occupying a ground area of about 3,000 square feet at Greenwich. Its four calorimeter cabinets, about the size of living rooms in small houses, are centrally mounted within larger rooms in which the temperature can be kept constant. The cabinets are designed so that heat from within passing through the walls, floor and ceiling is automatically measured.

The cabinets are of air-tight construction with specially balanced draft arrangements to eliminate leakage and to enable the amount of incoming air to be measured. The total useful heat from the heating appliance can thereby be determined by direct measurement. It is also possible to measure separately radiant heat, warmed air from convection jackets, and heat to the boiler water.

These calorimeter chambers are on the ground floor. Above them are smoke-testing rooms. The chimneys from the cabinets pass through these upper rooms. They are equipped for smoke measurements. The rest of the building is occupied largely by laboratories and the equipment to keep the constant temperatures required surrounding the calorimeter cabinets. For summertime use, and for appliances of high heat output, cooling is provided by a refrigerator system.

The calorimeter cabinets are constructed of quarter-inch plywood panels, covered on both sides with copper sheeting divided into two by 1.5 foot sections. Differential thermocouples are embedded at the midpoints of each copper section, directly opposite each other on the inside and outside of the plywood panels. This permits the temperature difference across the walls, floor and ceiling to be measured and recorded electrically.

In order to measure the smoke in the smoke-testing rooms, a beam of light is sent through each flue through special windows for the purpose. The intensity of the smoke is measured by a photocell. Smoke samples can be taken from each flue for other tests by means of a smoke sampler which can be inserted into the flue and then removed.

Science News Letter, August 14, 1948

PHYSICS

"Superfluid" Is Neither Liquid, Solid Nor Gas

➤ A "SUPERFLUID" which leaks through the tiniest openings and apparently defies gravity by flowing uphill was described by a Massachusetts Institute of Technology scientist.

The "superfluid" is helium, the second lightest element, cooled to 457 degrees below zero Fahrenheit. At that temperature, within a degree of absolute zero, helium is neither a liquid like water, a gas like steam, nor a solid like ice. It is a fourth state of matter, called superfluid.

Prof. Laszlo Tisza, Hungarian physicist at M. I. T., describes the strange behavior of helium at very low temperatures in *Physics Today* (August), a publication of the American Institute of Physics.

Here are some of the startling properties of this superfluid:

It conducts heat better than any other known substance.

It leaks between two pieces of optically-ground glass pressed together.

Slightly heated, by a flashlight bulb, it squirts out of a tube to form a fountain eight inches high.

Part of it will creep up the side of a container.

Unlike any other known substance, it will not freeze at temperatures near absolute zero.

Prof. Tisza suggests that this fourth state of matter might also be called "quantum liquid," because it supports the quantum theory that molecules move at absolute zero. Classical theory held that all motion should cease at absolute zero.

Helium with an atomic weight of three instead of the usual four should, according to the laws of quantum physics, prove even more weird in its behavior. It may not form a liquid at all or may form a liquid with entirely strange properties. Attempts are being made to obtain rare helium three in large enough quantities to make experiments.

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