

MEDICINE

False Positive Syphilis May Be Danger Signal

► **SYPHILIS TESTS** that turn out to be false positives are no reason for rejoicing. They may be a danger signal for other diseases.

During the past 10 years four scientists at the University of California at Los Angeles have performed 25,787 TPI tests, which distinguish false positive reactions in standard syphilis tests from those due to the venereal disease. TPI stands for *Treponema pallidum* immobilization.

They found that the incidence of biologic false positives has gradually increased during this decade from 54.2% to 70.7%.

There is increasing evidence that a number of acute diseases as well as chronic ones may cause this false positive reaction. Many of these false positive reactors fail to show evidence of other diseases at the time of the TPI test.

Such diseases as arthritis and other disorders of connective tissue, lung cancer and other malignancies, brucellosis and many other chronic conditions, may be reflected in a biologic false positive reaction to a standard syphilis test.

Individuals with biologic false positive syphilis tests, as demonstrated by the TPI, should have a medical check-up every six months, the UCLA scientists emphasized. An undetected disease process may be lurking somewhere in the body.

Dr. Charles M. Carpenter, Ronald A. LeClair, Dr. Ruth A. Boak and Dr. James N. Miller of the Schools of Public Health and Medicine at UCLA, reported the study.

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SPACE

Mental Effects of Long Space Flights Tolerable

► **ANXIETY, BOREDOM** and isolation probably will be factors in future long-duration space flights, but not major enough to inhibit the efficiency of astronauts.

Nevertheless, the possibility of such reactions to long confinement and separation from earth is receiving special attention at Brooks Air Force Base in San Antonio, Texas.

The Air Force has been given the nod by President Lyndon B. Johnson to launch its Manned Orbiting Laboratory (MOL), expected to circle earth for 30 days.

Psychologist Bryce O. Hartman, chief of the psychobiology division at Brooks, said research indicates that selected men with a high degree of training can withstand the rigors of extended space flight. MOL astronauts will spend some three months in biomedical training. Astronauts now receive only three weeks.

Dr. Hartman said the program will cover both physiological and psychological ramifications. Spacemen will be briefed on the symptoms and possibility of a mental breakdown. His group had previously recommended that medication for emotional disturbance be included on all flights, the psychologist said.

"There may be adverse emotional reactions," stated Dr. Hartman, "but not of sufficient intensity so the astronauts are unable to function. No psychological breakdown is likely."

In contradiction to this viewpoint, Air Force Brig. Gen. Benjamin A. Strickland Jr. believes that space flights of 30 days or more will generate problems of "isolation and monotony," as well as anxiety.

"I'm sure he is right," responded Dr. Hartman. But he emphasized that the only criterion for the Air Force is ability to function efficiently. If this is unimpaired, psychological difficulties can not be too great.

Moreover, according to Dr. Hartman, Gen. Strickland based his comments on studies testing men less qualified mentally and professionally than those actually selected for space flights.

The greatest difficulty an astronaut faces is "mission requirements," the psychologist concluded. "The work load itself is so demanding. It interferes with rest and he gets tired."

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MEDICINE

Level of Urine Enzymes Gives Clue to Cancer

► **A NEW METHOD** of screening people for cancer of kidney, bladder or prostate gland was revealed at the Clinical Chemists Convention in Chicago.

The process is simple enough to be performed as a matter of course on apparently healthy persons.

Dr. Warren E. C. Wacker of Harvard Medical School, Boston, reported that the level of two particular enzymes in urine are clues to cancer in the concealed urinary tract.

Elevated activity of one enzyme, lactic dehydrogenase, could indicate cancer of the bladder, Dr. Wacker said. Virtually all patients with this affliction show such elevation while the second enzyme, alkaline phosphatase, remains at normal level.

On the other hand, both enzymes have increased activity in 80% of patients with kidney cancer and in 60% to 80% of those with a diseased prostate.

Care must be taken, Dr. Wacker warned, to prevent urine specimens from becoming contaminated with bacteria that will cause false elevation and obscure the test.

The recognition and elimination of enzyme inhibitors cleared the way for measuring enzyme activity, the doctor said. Previously this could not be gauged with any accuracy.

Normal range for both enzymes has now been established. Lactic dehydrogenase seems to honor no sex or age difference, but alkaline phosphatase activity is slightly higher in women than in men.

Dr. Wacker, who is also associated with the Peter Bent Brigham Hospital in Boston, stated that the simple process of measuring enzymes in routine urine examinations "should lead to the detection of most occult and potentially fatal diseases of the genitourinary tract."

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IN SCIENCE

PHYSICS

Natural Neutrinos Found In South African Mine

► **THE FIRST** naturally occurring neutrinos have been spotted by a research team from Case Institute of Technology in Cleveland and the University of Witwatersrand in Johannesburg, South Africa.

Seven of these neutrinos were detected in the world's deepest laboratory, located 10,492 feet deep in the East Rand Proprietary Mine near Johannesburg.

Neutrinos are nuclear particles having no mass or charge and, consequently, are extremely hard to detect. New knowledge about naturally produced neutrinos, as opposed to the man-made ones identified during the last decade, may lead to a deeper understanding of the nature of energy and matter.

The natural neutrinos are believed to result from the interaction of primary cosmic rays with the earth's atmosphere. Since cosmic rays are of much greater energy than those available from large particle accelerators, the study of natural neutrinos is expected to reveal new information about high-energy neutrinos and of the weak interactions associated with these particles.

Neutrinos move with the speed of light and can be detected only through their interactions with the nuclei of atoms. Such interactions are extremely rare because neutrinos readily pass through other nuclei. It has been estimated that the average high-energy natural neutrino would pass through 100 million miles of lead without being stopped.

However, occasional collisions do result, leading to the production of particles called "mu mesons," which can be detected. These mu mesons exist for only a few millionths of a second. This is long enough, however, for them to travel through considerable thicknesses of rock.

The Case Institute-University of Witwatersrand research team was led by Dr. Frederick Reines, head of the physics department at Case. It included Prof. J. P. F. Sellschop of Witwatersrand, and Drs. Marshall F. Crouch and Thomas L. Jenkins of Case. The scientists and their research associates report details of their discovery in Physical Review Letters, 15:429, 1965.

Funds for the research were supplied by the U. S. Atomic Energy Commission in grants totaling \$500,000. The special underground laboratory was provided by the Rand Mines Ltd. of South Africa.

Dr. Reines was co-discoverer with Dr. C. L. Cowan, now of Catholic University, Washington, D.C., in 1956 of the first man-made neutrino, the antineutrino, produced in an atomic reactor. Since then, three other kinds of neutrinos have been produced in high-energy particle accelerators.

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E FIELDS

GEOPHYSICS

Soliqueous Matter May Cause Earthquakes

► AN ENTIRELY NEW STATE of matter besides solid, liquid, gas and plasma may make up the earth's mantle and may be the origin of all earthquakes.

The new state, called "soliqueous," is a combination of the other four states of matter. It is maintained and controlled by pressure in the mantle, the 1,700-mile-thick layer between the earth's crust and core.

A mantle of soliqueous matter is the proposal of Prof. L. Don Leet and his wife, Florence, of Harvard University.

Data on whether the earth's mantle is solid, liquid or gaseous are conflicting or confused, the researchers reported in the *Bulletin of the Seismological Society of America* 55:619, 1965. Therefore, they suggested that perhaps the mantle is made up of a combination of all four.

Earthquakes, they propose, are caused by flow and rupture, mainly (or entirely) in this soliqueous mantle. Plastic rupture in shear is "the primary mechanism by which energy in the earth is converted to the vibrations of earthquakes," Dr. and Mrs. Leet reported.

"Our proposed mechanism seems to explain earthquakes better than the long-accepted faulting theory. With faulting as the basic cause of earthquakes, there should be a definite pattern of surface effects, but these are not confirmed by observations."

Hundreds of quakes each year have no surface effects and originate in the mantle, the researchers reported.

"In fact, when computational procedures are further refined, it may turn out that all earthquakes are basically mantle ruptures, even when some displacements are coupled to the surface," they said.

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PUBLIC SAFETY

Avalanche Disaster Not Likely in U.S.

► AN AVALANCHE DISASTER such as occurred in Switzerland is not likely in the United States because the snowy mountain areas where such huge slides of debris occur are largely uninhabited.

Avalanches on steep mountain slopes result when snow is sheared off, triggered by quick changes in temperature, or by vibrations or other conditions causing instability.

Despite increasing knowledge of the causes of avalanches, it is impossible to predict their occurrence accurately, either in the U.S. or Switzerland.

However, even when there is no large concentration of construction workers in the area, as there was in the Switzerland disaster, more and more persons each year are endangered by avalanches because of

the growing army of pleasure seekers climbing mountains and skiing on slopes.

Avalanches are one of the great destructive forces of nature. They have terrorized mountain people throughout history, particularly in the Alps.

The greatest recorded single avalanche catastrophe occurred in 1962 when a mass of ice slid from the north summit of Huascarau in Peru. Flowing at a speed of about 65 miles per hour, the glacier ice covered 10 miles and buried eight villages, causing the deaths of more than 4,000 persons.

Travelers on highways and ski enthusiasts in the U.S. have had increased protection from avalanches in recent years. The Forest Service of the U.S. Department of Agriculture is responsible for providing avalanche warnings.

Teams of experts check potentially dangerous areas, and often deliberately set off a slide before allowing visitors.

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MEDICINE

Three on Hospital Staff Get Rubella from Babies

► THREE HOSPITAL STAFF members in Grace-New Haven Community Hospital got German measles, or rubella, from the babies they attended during last year's epidemic. One of them was a pregnant nurse who suffered a spontaneous abortion as a result of the disease.

Added to the usual heart and eye abnormalities with which babies of mothers with rubella are born have been 13 cases of a generalized disease in which hemorrhages in the skin cause a bluish appearance. The disease, called thrombocytopenic purpura, affects the platelets, which aid in blood clotting.

Two babies died as a result of this and other complications.

A group of Yale University physicians reported in *The New England Journal of Medicine*, 273:474, 1965, a study of 20 cases of the rubella syndrome in babies born at the hospital. The mothers of 16 had had rubella in the first three months of pregnancy.

Drs. J. E. Banatvala, D. M. Horstmann and L. Gluck, with research associate M. C. Payne, reported the study, which emphasized the fact that thrombocytopenic purpura has been described only rarely in association with congenital rubella.

Other abnormalities in the babies studied include cataracts and patent ductus arteriosus, in which the channel between the pulmonary artery and the aorta is open.

Last year, during the largest U. S. epidemic of German measles in 20 years, more than 20,000 cases were reported to the Connecticut State Health Department. A conservative estimate of unreported cases puts the actual number at closer to 200,000 of Connecticut's population of approximately 2.5 million.

Although usually a mild disease, its importance lies in the 15% to 20% incidence of damage to the fetus when rubella occurs in the first three months of pregnancy.

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ZOOLOGY

High DDT Levels Found in Midwest Fish and Birds

► HIGH CONCENTRATIONS of DDT in fish and fish-eating birds in the Green Bay and Lake Michigan waters off Wisconsin's Door County have been found by University of Wisconsin scientists.

Prof. J. J. Hickey and L. B. Keith of the university, with F. B. Coon, Wisconsin Alumni Research Foundation, said they sampled lake mud, aquatic animals in the mud, fish from herring gull stomachs and gulls that had been nesting in the area.

Insecticides, washed off plants and into streams and lakes, accumulate in the lake mud. They get into the bodies of tiny animals that are eaten by fish, then into the birds that eat fish, building up to higher concentrations in each stage of the cycle.

Mud contained some one-hundredth part per million of DDT-related chemicals, the researchers found. Small aquatic animals in the mud were found to contain 30 times as much, fish taken in the waters and in gulls had 10 times more than the small animals, and herring gulls were found to have 27 times as much DDT in the breast muscle as was present in the fish.

The scientists said that high concentrations of DDT in the nervous system caused death in gulls and other creatures. Still unanswered are questions about the level of DDT in gull diets throughout the year, how often the chemical would kill a gull, and what stress conditions cause DDT to transfer from body fat to the nervous system.

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BIOTECHNOLOGY

Tiny Heart Pacemaker Takes Up Small Space

See Front Cover

► A GREATLY MINIATURIZED heart pacemaker that takes up so little space that it can be implanted in a child's abdomen has been developed at the National Heart Institute in Bethesda, Md.

Weighing 1.8 ounces, the tiny pacemaker takes up about three by four and one-half inches of space under the skin. Its small size is also useful in adults.

Collaborating in the manufacture of the pacemaker were Dr. Peter B. Mansfield of the cardiovascular physiology branch of the Institute, and Addison Cole of the Adcole Corporation, Waltham, Mass. Mr. Cole plans to start manufacture for public marketing.

Seen on this week's front cover is the small pacemaker on the right, with a normal-sized pacemaker on the left, also shown in the white portion of the X-ray.

The new pacemaker delivers a regular electrical impulse to hearts whose own natural pacemaker is faulty. It contains a single battery that can remain in use more than three years, delivering impulses through wires to the heart. The pacemaker can be replaced easily after it approaches its life expectancy.

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