

MEDICINE

Leprosy Germs Grown In Mouse Foot Pads

► THE PREVENTION and cure of leprosy appear closer because of drug and vaccine studies on white mice.

The testing of anti-leprosy agents was made possible through cultivation of human leprosy germs in the right rear foot pads of selected white mice in Atlanta, Ga.

The best temperature for experimental growth of leprosy germs is 68 degrees F., and the mouse foot pads provide a temperature slightly above this. The right rear foot was used only to be systematic.

Dr. Charles C. Shepard of the Communicable Disease Center, U. S. Public Health Service, Atlanta, who first cultivated the leprosy germs in mouse foot pads, has been assisted in studies of drug effects by Dr. Y. T. Chang of the National Institute of Arthritis and Metabolic Diseases, Bethesda, Md.

Eleven drugs tried so far include isoniazid and others used in treatment of tuberculosis.

BCG (Bacillus Calmette-Guerin), widely used against TB, and vaccines prepared from heat-killed tubercle germs have reduced the amount of growth of leprosy bacilli 30 to 60 times, but the investigation said the experimental results do not prove that humans would be protected by these vaccines. The experimental results in both vaccines and drugs are hopeful, however.

Leprosy, also called Hansen's disease, affects an estimated 15 million persons in the world. Although the U. S. has only about 2,000 cases, mostly in Florida, Louisiana, Texas, California and New York City, increasing contacts with tropical countries where the disease is common make drugs and vaccines of growing importance here. The California and New York cases are believed to be imported.

• Science News Letter, 83:88 February 9, 1963

BIOCHEMISTRY

Study How Bone Cells Regulate Gene Activity

► BONE CELLS turn certain genes "on" and "off" in response to changes in the immediate environment, and thus may regulate bone processes in disease and health.

Dr. Richard W. Young of the University of California, Los Angeles, Medical School has studied these processes at the microscopic levels at which they occur.

He injected extracts from the parathyroid gland which stimulates action of the parathyroid hormone. Dr. Young then studied degree of mineralization, proportions of organic constituents and microscopic organization of bone and calcified cartilage before and after the injection.

Changes that occurred suggest that bone cells respond to hormone increases in their immediate surroundings by either activating or blocking certain parts of the total genetic information stored in the cell nucleus.

The response to an increase of parathyroid hormone was an activation of the genes which cause bone destruction. Calcium salts in the bone were released to the tissue fluids at an increased rate. This re-

sembles the bone destruction in humans suffering from over-active parathyroid glands.

Similar mechanisms may be at work in bone repair processes following a fracture. In this case genes are activated which bring about increased deposition of organic material that eventually mineralizes at the site of the fracture.

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EDUCATION

Scientific Manpower High In Graduate Level Schools

► A MAJOR PORTION of scientific manpower in the more than 2,000 U. S. colleges and universities is concentrated in a small fraction of schools.

More than four-fifths of the nation's scientists and engineers, or 145,000, doing research and teaching were found in 306 institutions that offer graduate training, a National Science Foundation survey for 1961 shows. The 30,000 remaining serve in more than 1,700 undergraduate level institutions.

A large number of research and development scientists are employed by Federal contract research centers in connection with universities and agricultural research centers.

Emphasis in the physical, engineering and life sciences was on research and development, while in the social sciences and psychology the scientists spent more time teaching.

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SPACE

Nuclear Carrier to Take Men Into Orbit Designed

► A SPACE carrier that ferries between earth and orbit as the first step to the moon or planets is on the drafting boards.

The recoverable spaceship would be nuclear-powered and would carry two to 12 astronauts and a cargo of 50 to 75 tons, the Institute of Aerospace Sciences meeting in New York was told. The ship, designed by three scientists from Douglas Aircraft Company, Inc., Robert L. Gervais, Gideon Markus and Robert G. Riedesel, would be conditioned to duplicate man's natural environment on earth.

At no time during launch or re-entry would the spaceship be under an acceleration of more than twice that of gravity.

The vehicle would lift off vertically from the earth and then park in orbit. Then when its position is right in relation to the space station in orbit nearly 200 miles above the earth's surface, it would lift to make the rendezvous and its cargo transferred to it. The vehicle would remain in orbit until in the right position for re-entry at a predetermined site.

The entire mission, which would be completed within 36 hours, could be repeated three times a month, the scientists calculated. The nuclear reactor would be of the solid-core type and twice as powerful as chemical rockets.

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IN SCIEN

SURGERY

Serious Knee Injuries Repaired With Plastics

► A NEW OPERATION using a plastic substitute for a seriously injured knee ligament promises to put athletes back in the game.

Permanent disability usually results from injury to the cross-shaped front ligament, but Dr. Kenneth G. Jones of Little Rock, Ark., told the American Academy of Orthopaedic Surgeons at Miami Beach, Fla., that he had restored use of the knee in 11 patients, nine of them athletes.

Seven of the nine hurt their knees in playing football, one in broad-jumping and one in basketball. One football player returned to the game, but four gave up football for basketball.

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TECHNOLOGY

Lightweight Hot Rocket Engine Is Success

► A LIGHTWEIGHT glass fiber rocket engine withstood temperatures of 5,000 degrees Fahrenheit, hot enough to melt the toughest metals, for more than 19 minutes.

The engine has an "ablative cooling" process in which heat is absorbed by a plastic lining which covers the walls of the combustion chamber. The liner melts slowly as it soaks up the heat and is expelled with exhaust gases. This cooling method eliminates the need for heavy, bulky coolant tubing. The engine weighs 95 pounds and is 30 inches long. The rocket was fired at United Technology Center, Sunnyvale, Calif.

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PUBLIC HEALTH

Tiny New Instrument Tests Children's Hearing

► A TINY new instrument the size of a cigarette pack has revolutionized hearing tests in schoolrooms in Seattle. It can find hearing flaws in less than 20 seconds per student in place of 15 minutes by old methods, which required a large console with many dials and meters in a special room.

Dr. Clair N. Hanley of the University of Washington's Speech and Hearing Clinic, with the help of Bert Browne, electrical technician for the University's speech department, developed the device. It is a Single Frequency Audiometer, which checks just one frequency, 4,000 cycles per second. Medical research has shown that if the hearing is found to be normal at 4,000 cycles per second it will be normal at all other tones in more than 90% of the cases.

So far the instrument is in use only in Washington and Utah.

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CE FIELDS

MEDICINE

X-Ray Affects Muscles Like Muscular Dystrophy

► WHAT HAPPENS to the muscles in hereditary muscular dystrophy is similar to the effect of large doses of radiation, two Chicago scientists have discovered.

Weakness, with lowering of muscle potassium concentration and increase in sodium and chloride concentrations, resulted after X-ray dosage tests on rats, it was reported in *Nature*, Jan. 26, 1963.

Drs. Robert M. Dowben and Leon Zuckerman of the department of medicine, Northwestern University, Chicago, said their findings were best explained by a "transient increase in cellular permeability of muscle." Altered penetration, or permeability, of muscle cells has also been given as the cause of similar conditions in muscular dystrophy.

Although muscle makes up almost half of the body weight, it has generally been believed to resist radiation and to play an insignificant part in the bodily changes following irradiation. However, even with small doses of radiation, increased weakness and tiredness have been seen both in humans and animals.

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METEOROLOGY

Severe Winter Not Result Of Nuclear Explosions

► THE SEVERE WINTER in the U. S. and Europe is not due to the giant high-altitude H-bomb tests of Russia and the U. S. last year, even though they were comparable to the sunset-reddening 1883 Krakatoa volcanic eruption and the earth-shaking impact of the great Siberian meteorite of 1910.

Dr. Maurice Ewing, director of Columbia University's Lamont Geological Observatory, who reports in *Science*, 139:307, 1963, worldwide effects of three H-bombs exploded in Siberia and the Marshall Islands, told *SCIENCE SERVICE* "there is no evidence that large nuclear explosions change the weather nor is there any theoretical reason to expect there would be any change."

"Even the biggest" would have no effect, he said.

The Weather Bureau's official position is that there is no theoretical reason for believing atomic explosions could account for a significant change in the weather more than a few miles from the blast.

Dr. Ewing, with Drs. William Donn and Richard L. Pfeffer, also of the Observatory, find that nuclear explosions can be used to give clues to the structure of the atmosphere, however.

The very sensitive recorders of atmospheric pressure used to check on atmospheric explosions have given much knowledge of

how pressure waves travel in the atmosphere. It is these detectors that make policing a ban agreement on atmospheric tests very easy.

However, underground tests cannot be easily distinguished from earthquakes, thus requiring the inspection.

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PHOTOGRAPHY

Laser's Random Pulses Give Light for Photos

► ENOUGH LIGHT can now be focused to enable scientists to take motion pictures of very fast events such as the damaging collapse of microscopic bubbles against ship propellers.

The random pulses of a laser have been converted into uniform, repetitive pulses of up to 500,000 a second with power in the light beam equivalent to about 20,000 hundred-watt bulbs. Dr. Albert T. Ellis of the California Institute of Technology designed this instrument to photograph for the first time many extremely rapid phenomena.

The pulses of the laser, besides providing ample light, can also be used in effect, as a camera shutter for filming at the rate of up to 500,000 frames a second. Exposure times as short as one-billionth of a second are possible. The resulting film can be projected at any desired speed, enabling closer study of such events as high velocity explosions, shock waves and the collapse of cavitation bubbles, which has been a major problem on ships' propellers and pumps for 100 years.

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CONSERVATION

World Save-the-Rhino Movement Proposed

► RHINOS—thick-skinned, sturdy creatures that they are—need protection, three worldwide wildlife preservation societies report.

Five species of rhinoceroses are subject to extinction due to killing of the animals because their horns are thought to have magical powers against poisons. Governments of the countries where rhinos are still found are being urged to set up more rhino reserves.

Present-day estimates of world rhino populations throughout Africa, India and Southeast Asia are: Black Rhino of Africa, 11,000 to 13,500; White Rhino, the largest, 2,500 to 3,000; Great Indian Rhino, an especially nervous one, 600; Sumatran Rhino, 100 to 150, and the Javan Rhino, 24 to 50.

Many of the rhinos live in isolated pockets in their native homelands. The First World Conference on National Parks recommends that these countries establish additional parks in the rhino populated areas.

Societies supporting the save-the-rhino movement are the World Wildlife Fund and the Fauna Preservation Society, in cooperation with the Survival Service Commission of the International Union for the Conservation of Nature.

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PSYCHIATRY

Illness of Homosexual Similar to Neurotic's

► THE MENTAL ILLNESS of a homosexual is similar to neurotic disturbances, studies of 100 Australian prisoners convicted of homosexual acts have revealed.

The homosexual resembles the neurotic, but is not as self-confident and conforming. Yet the sensitive homosexual cannot be classed with callous criminal psychopaths.

Dr. Raymond B. Cattell of the University of Illinois and John H. Morony of the Department of Prisons, New South Wales, Australia, in a joint study, compared the personality traits of homosexuals with those of other disturbed people.

The comparisons were based on scores from the Sixteen Personality Factor Questionnaire, a psychological test used to diagnose and predict the course of mental illnesses.

They reported their research, done in connection with the Australian Commission to Study the Problem of Homosexuality, in the *Journal of Consulting Psychology*, 26:6, 1962.

• *Science News Letter*, 83:89 February 9, 1963

MEDICINE

Birth Control Pill Increases Blood Clotting

► TESTS IN NORWAY have confirmed the fact that the birth control pill Enovid increases blood clotting.

The report of a study in Oslo may further clarify some findings of an international conference of specialists at the American Medical Association headquarters in Chicago last September. These experts vindicated the drug as having any relationship to the cause of thrombophlebitis, a vein disorder in women, which caused the death of 31 who had taken Enovid in this country.

Dr. Frances O. Kelsey, director of the new investigational drug branch of the Food and Drug Administration, told *SCIENCE SERVICE* that this new report would be of interest to the meeting of blood coagulation experts called to Washington in February by FDA. Enovid has been cleared by FDA but could be taken off the market if it proved to be unsafe.

G. D. Searle & Co., the pharmaceutical firm that produces Enovid and which promoted the Chicago meeting, said that no representative of its company had been invited to the Washington meeting.

Dr. Lee D. Van Antwerp, Searle's assistant medical director, said the Norway report raises a question of varying results of tests, since American scientists have not been able to find a relationship between Enovid and increased blood clotting.

The Norway report, by Drs. C. Egeberg and P. A. Owren of the Institute for Thrombosis, University Hospital, Rikshospitalet, Oslo, appeared in the *British Medical Journal*, Jan. 26, 1963, which last year raised questions concerning the effect of Enovid (spelled Enavid in the London journal).

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