

BIOCHEMISTRY

"Regulator" Controls Life Of Male Reproductive Cell

► ARTIFICIAL insemination of cattle and other animals, already a highly important factor in the livestock industry, may presently be made even more economical and certain through discovery by three University of Wisconsin biochemists of a "regulatory" substance in male reproductive fluid.

This "regulator" compound, source and chemical structure of which are still unknown, has the effect of speeding up the life-processes within the swimming male reproductive cell, at the same time making it age more rapidly, and thus shortening its useful life. If some way can be found to render it inactive at the inseminator's option, the practical storage period for seminal fluid, at present inconveniently brief, may be greatly lengthened.

The three-man research team, who report their discovery in the journal, *SCIENCE* (April 8), are Drs. Henry A. Lardy, D. Ghosh and G. W. E. Plaut.

Science News Letter, April 23, 1949

WILDLIFE

Alaska Bears Dig Holes In Roads To Get Dinner

► BEARS and ground squirrels give motorists in Alaska a real headache—not to mention the risk of broken bones. This is how:

Most Alaska roads are of gravel. Ground squirrels burrow into them to make their dens, as they would into natural gravel banks. Bears, a-prowl for their dinners, enthusiastically dig after them. A hungry bear is perfectly willing to dig a hole as big as a barrel to get one ground squirrel.

If you want to know what that does to traffic, especially at night, just ask an Alaskan truck driver—provided you have asbestos ears.

Science News Letter, April 23, 1949

CHEMISTRY

Vinegar-Atom Group Helps In Making of Rubber

► RUBBER is made out of vinegar—or at least out of the chemical compound that is the essence of vinegar.

Steps in the formation of rubber in the guayule plant that grows in the American Southwest were traced by means of "tagged" radioactive atoms by Dr. James Bonner of the California Institute of Technology. Dr. Bonner described his experiments before the meeting of the American Chemical Society.

The chemical group that is the essence of vinegar is known technically as the acetate molecule. In the experiments, such molecules were "tagged" with radioactive

carbon atoms, then fed to guayule plants. Very soon the bits of rubber in their stems were found to be radioactive. Progressive steps in the buildup of rubber (and related gums) were described by Dr. Bonner as: acetate, acetone, betamethylcrotonic acid, rubber.

The techniques of tracing through a plant any given element or compound that has been radioactively tagged was described before the meeting by Dr. Melvin Calvin of the University of California. The radioactive material is supplied to the plant, to be absorbed through roots, leaves or otherwise. After a measured time interval the plant is suddenly killed, so that movement of any materials in its body is promptly stopped right where it is. Then parts may be removed for analysis or for detection of radioactivity with Geiger counters or photographic film.

Science News Letter, April 23, 1949

METEOROLOGY

Freezing Point Studied By Weather Scientists

► WEATHER scientists who have already made artificial rain and snow by spreading dry ice in supercooled clouds are conducting experiments at the General Electric laboratories in an effort to learn more about how and why materials freeze.

They have already "super-cooled" water 71 degrees below the ordinary freezing point without its turning into ice, and they have super-cooled mercury 72 degrees below its freezing point; tin, 198 degrees; and gallium, 125 degrees.

Scientists have long known that water can be cooled far below the ordinary freezing point and still remain a liquid. More than proper temperature and pressure are required for freezing. There must be particles present about which material freezes. These are the so-called nuclei. The General Electric scientists who made artificial snow by scattering dry ice particles from airplanes into supercooled clouds supplied the necessary nuclei in the tiny particles of the solid carbon dioxide.

Water below its freezing point is often found in nature, and a common place is in clouds of what are called the supercooled type. If no nuclei are present to cause freezing the water does not turn to ice. The result of putting nuclei into such clouds is the formation of water droplets and snow crystals.

General Electric scientists report that they have now made "clouds" of super-cooled gallium, tin and mercury. To do this they dispersed these metals in their liquid form as minute droplets suspended in oil. Some of the droplets may contain nuclei, but the freezing that begins in them cannot spread through the oil. Those without nuclei can be reduced in temperature far below their freezing point without solidifying.

Science News Letter, April 23, 1949

IN SCIENCE

BIOPHYSICS

Radiation Can Kill By Missing the Target

► ATOMIC "bullets" can make their "kills" by missing the target, which may be a bad or good living cell or germ.

This paradoxical behavior seems to have been demonstrated through bombardment of a bacteriophage with deuterons (heavy hydrogen particles) undertaken by Drs. Ernest C. Pollard and Frederick Forro, jr. of Yale University's biophysics division. The bacteriophage is on the borderline between living and non-living things and acts on one of the familiar coli germs.

Just how radiation, whether from an atomic bomb or lesser sources, acts on living material is of great importance, the scientists point out in their report to the journal, *SCIENCE* (April 15). The new theory suggests that the effect can be produced by secondary radiation from a path of the subatomic projectile that doesn't actually pass through the object affected.

Science News Letter, April 23, 1949

GEOLOGY

Interior Gases May Mingle With Earth's Fresh Air

► "HELL" sends its fumes constantly to mingle with the earth's fresh air, according to the latest geological theory advanced by W. W. Rubey of the U. S. Geological Survey, Washington.

The earth's hot and deep-seated interior is constantly supplying chemicals, carbon dioxide, water vapor and smelly hydrogen sulfide, to the atmosphere, Mr. Rubey contends.

Disagreeing with the two accepted theories concerning the gases in the atmosphere, he proposes that they escape at a constant rate through hot springs and steam vents.

One theory to account for the gases in the air holds that they have been present since the earth's formation, and that volcanic eruptions are merely a recirculation of the same material.

The other accepted theory is that gases are added to the atmosphere in large quantities at the time of volcanic eruptions, after which there is a lull when nothing is added except for minute quantities from hot springs.

Both of these theories fail to explain the continued existence of life and the presence of certain rock formations on this planet, Mr. Rubey believes. His explanation for the gases in the atmosphere is expected to cause some controversy among geologists.

Science News Letter, April 23, 1949

CIE FIELDS

PHYSICS

New Betatron Will Be Used To Extend X-Ray Technique

► RESEARCH using X-ray technique will extend to far greater ranges in the future at the National Bureau of Standards with a new "atom-smasher" ready for immediate installation. It is a 50,000,000-volt betatron, which will raise the Bureau's top limit from its present machine which gives 1,400,000 volts.

The Bureau of Standards has long played a leading role in developing standards for X-ray dosage measurements and standards development. The betatron is one of the electron accelerators which produce extremely high energies and frequencies. They have wide applications in medical, biological, industrial and nuclear fields. The new machine will widen the Bureau's activities.

The 50,000,000-volt betatron to be installed is a product of General Electric, and is now ready for shipment. It will be housed in a special building with a main chamber covered with several feet of concrete and earth. Sensitive measuring equipment will be in an adjoining room.

Science News Letter, April 23, 1949

PHYSICS

Ultraviolet Microscope Takes Three-Color Photos

► AN ultraviolet microscope, which uses different wavebands of invisible light to take photographs that can be projected as three-color pictures within a few minutes after taking, has been developed in the research laboratory of the Polaroid Corporation in Cambridge, Mass. First description of the new instrument is given in SCIENCE (April 15) by E. H. Land, president of the corporation, together with seven associates who worked with him in perfecting it.

Chief advantage of the new microscope is that it can obtain marked contrast effects in the images of different kinds of cells and tissues without the use of the chemical stains employed in visible-light microscope studies and photography. These stains almost always cause changes in the material studied, and as a rule it is necessary to kill living tissue before it can be stained at all. With the new color-translating ultraviolet instrument the only possible element of change present is the ultraviolet radiation itself; and exposures to this are usually so brief that little or no ill effect follows.

A further advantage of the new instru-

ment is that the lens system works as well with visible light as it does with ultraviolet, so that it is possible to set up and focus on a preparation with ordinary light before the more difficult job of ultraviolet photomicrography begins.

Three successive photographs are taken, on 35-millimeter film, using a different waveband in the ultraviolet for each one. The film is then automatically fed into ultra-rapid developing and fixing baths, which are kept hot to speed their action.

The finished and dried three-color frames are ready for projection in a matter of minutes. This high-speed work is of great importance under some circumstances, as in the examination of tissues suspected of being cancerous.

Associated with Mr. Land in this work were E. R. Blout, D. S. Grey, M. S. Flower, H. Husek, R. C. Jones, C. H. Matz and D. P. Merrill.

Science News Letter, April 23, 1949

AERONAUTICS

Jets for Civil Transports Not Expected Until 1960

► DON'T expect jet-propelled airplanes for commercial transportation in the immediate future, the Society of Automotive Engineers was told in New York by R. C. Loomis, Consolidated Vultee Aircraft Corp., San Diego, Calif. It looks now, he said, as if jet-propelled commercial transports will go into general service about 1960, or perhaps even later.

Present indications are that airlines will use turbine-propellers before they install jet powerplants, he stated. Jet-propelled craft will eventually be used, because they carry the same load faster for the same fuel dollar. The next great step in air transportation will be the conversion of existing equipment to turbine-propellers which, being lighter and more efficient, will permit increased pay-loads and improved performance.

The turbine-propeller combination, called turbo-prop for short, is a gas turbine which drives conventional propellers. High pressure gases of combustion are directed against vanes on a shaft and cause rotation in the same way as is done in the familiar steam turbine engine. The rotating shaft operates the propellers.

Before true jet propulsion can be used in commercial transportation, there is much to be done. As explained by Mr. Loomis, there is no way to stop heavily-loaded jet planes on wet and icy runways, and there is no system of air traffic control adequate for their speed. Also, there is no capital in the air transportation business with which to finance them. He pointed out that it will be at least 1960 or 1965 before complete traffic control procedures and equipment for high-speed straight-in approaches to landing will be in operation.

Science News Letter, April 23, 1949

AERONAUTICS

Many New Airports Needed For Increasing Aviation

► THE United States needs 4,977 new or improved airports for present and immediate future air service, the U. S. Civil Aeronautics Administration declares in its NATIONAL AIRPORT PLAN for 1949. Of these 2,794 are for completely new landing fields.

Actually, it is a three-year forecast of aviation needs. This is the third in a series of annual reports prepared by CAA in accordance with an act of Congress. The estimated cost for the new ports and the improvement of others would cost \$1,115,300,000 of which \$510,600,000 would be in federal funds.

In the report, copies of which may be obtained from the CAA office of information in Washington, new and improvement proposals are listed by location and classification. Airports are divided into classes based on the longest usable landing strip. Class I airports have runways from 1,800 to 2,700 feet in length; Class IV, runways from 4,500 to 5,500 feet. Class IX are 9,500 feet or over.

The 1949 report lists a total of 567 Class IV and larger airports, of which 24 would be new; a total of 608 Class III ports with 165 new and 443 for development. It lists a total of 1,048 Class II airports, 474 being new; and 2,358 Class I flying fields, including 1,777 which do not now exist. It is to be noted that the plan proposes a large number of small airports, particularly for smaller towns and the benefit of private fliers as well as for light commercial planes.

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WILDLIFE

Deers' Teeth Tell Age, Just Like Horses'

► DEER can now have their ages read by their teeth, just as horses can. A detailed series of descriptions and charts of both front teeth and molars of the white-tailed or Virginia deer, worked out by C. W. Severinghaus of the New York State Conservation Department, appeared in the JOURNAL OF WILDLIFE MANAGEMENT (April).

Mr. Severinghaus' method is based on the height of the teeth above the gumline and the amount of wear on their crowns, at all ages from newborn fawns to ten-year-old specimens. His studies were made on living animals, which as a rule had to be put to sleep temporarily with an anesthetic so that they would not kick and struggle while he pried open their jaws and made examinations and measurements with the aid of a dental mirror.

Studies were also made on the jaws of deer that had been killed. In all cases, only specimens whose ages were actually and demonstrably known were used.

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