

GENETICS

Atom Smasher Aimed at Tyny Heredity Bearers

► A TWO-MILLION-VOLT atom smasher has had its beam pin-pointed to such fine dimensions that it can strike just one or a very few of the microscopic carriers of heredity in the living cell.

Which part of the cell is most affected by radiation from atom bombs or other sources will be more precisely determined from these experiments, is the hope of scientists doing this work.

Results so far were reported by Dr. William Bloom and Prof. Raymond E. Zirkle of the University of Chicago at the meeting of the American Association of Anatomists in Columbus, Ohio.

The beam itself consists of nuclear particles called protons that are allowed to pass through a "super-pinhole" in a sheet of metal that reduces the beam to one twelve-thousandth of an inch in diameter.

When the beam is directed against only two or three of chromosomes in dividing cell, the irradiated chromosomes act as if glued together. The non-irradiated ones, instead of moving straight apart in the normal way, turn about the glued ones as if they were a hinge.

In some cases a chromosome bridge was left between two new daughter cells, and the nuclei squirted back and forth between the newly formed cells.

Different dosages of radiation caused different upsets in the process of cell division.

Science News Letter, April 11, 1953

PHYSICS

Soviet Influence Mines Can Menace U. S. Ships

► NEW METHODS of setting off naval mines on the approach of a ship are hinted at in the Army's Command and General Staff College *Military Review* (April).

These hints were coupled with a warning about the present Soviet awareness of both the potentialities and capabilities of mine warfare. Russia is building two fast minelaying submarines and has three more minelaying ships and 22 more minesweepers than has the United States.

Three kinds of "influence" mines, those which do not have to come into direct contact with the ship to explode, were used during World War II. These are magnetic, acoustic and pressure mines. They depend for operation on physical characteristics possessed in common by most ships.

"It requires a minimum of technical knowledge to realize that there are various other methods which might be used for the actuation of an influence type mine," Col. Paul L. Bates says. "National security precludes reference to this subject in detail."

Other physical characteristics possessed by most ships include the sending forth of heat waves and the cutting off of light waves from the sky in the sea directly

under and around them. These two could be utilized to set off influence type mines.

Pointing out that large areas of our coastal waters are ideal for the sowing of mines, Col. Bates says, "Faced with an aggressor having a large number of submarines, a sizable bomber force and an effective fifth column, the use of mines offers a near paralyzing capability."

The minesweeping capabilities of this country, he says, are "completely inadequate" when the length of the coast lines, the canals, and the rivers and harbors are considered.

Science News Letter, April 11, 1953

INVENTION

Plastic Helicopter Blades Invented

► HELICOPTERS WITH plastic rotor blades may soon be flying through the air with the greatest of ease as the result of an invention recently patented.

The patent, number 2,630,868, on a plastic rotor blade was granted to Francis R. Ellenberger, Cedar Grove, N. J., and assigned to the General Electric Company.

Mr. Ellenberger points out that the ordinary type of rotor blade has a longitudinal spar, sometimes used in combination with transverse ribs. His blade, shaped from a cellular plastic material, eliminates the expense and difficulties involved in building a rotor blade, requires less skill manufacturing and has more strength.

His blade carries nearly all the stresses on the outer skin, which is filled with a relatively weak cellular plastic material. This keeps the skin from collapsing and maintains the correct cross-sectional contour.

The plastic blades are formed by extrusion, molding or machining a piece of cellular cellulose material into a section of the desired airfoil shape, wrapping it with cloth impregnated with phenolic compound, clamping it in a mold and curing in an autoclave.

Science News Letter, April 11, 1953

AGRICULTURE

Predict Rice Production Will Top All Records

► WORLD RICE production will smash all records in 1952-53 (August-July), predicts the U. S. Department of Agriculture. This means more food for millions of hungry mouths.

The department's Office of Foreign Agriculture Relations estimates a world-wide yield of 357,000,000,000 pounds of rough rice for 1952-53, four percent above the previous record of 342,000,000,000 pounds in 1948-49 and seven percent greater than the pre-war average.

The greatest gain in rice production this year was seen in Asia, up six percent from last year. India planted one of its largest acreages of rice, and good weather has helped in higher yields.

Science News Letter, April 11, 1953



VETERINARY MEDICINE

Stepping on Old Nail Endangers Livestock Too

► STEPPING ON an old nail carries just as serious a threat of lockjaw, or tetanus, to livestock as to humans, the American Veterinary Medical Association warns. Farmers should have regular barnyard clean-up campaigns to get rid of old nails, pieces of wire and other objects that can cause dangerous puncture wounds in which tetanus germs thrive.

Attempts at home medication or surgery on animals, if proper sanitary measures are not taken, may also result in tetanus infection, the association warns.

The tetanus germs live and multiply in the soil.

Dogs apparently are immune to the infection and cattle are relatively immune. Horses, swine and sheep, however, have no such protection.

Science News Letter, April 11, 1953

MEDICINE

Radiogold Fights Prostate Cancer

► CANCER OF the prostate gland, a leading killer of men, now is being fought with radioactive gold. About half of 160 patients given this treatment within the past 20 months are still free of symptoms.

Whether they have been cured will not be known for another three years or so. One-fifth of the men have died in spite of the treatment, and about a third are still alive but with obvious cancer. These results were announced by the American Cancer Society which supported the research leading to this use of radioactive gold.

The method of using it for cancer of the prostate was developed by Drs. R. H. Flocks, H. Dabney Kerr, H. B. Elkins and David Culp of the State University of Iowa.

The radioactive gold in colloidal form is mixed with hyaluronidase and the adrenal gland hormone, epinephrin, or adrenalin.

The hyaluronidase is a body chemical sometimes called the "spreading factor" because it makes substances spread through tissues. This makes the radioactive gold spread through the gland where it is injected and into surrounding tissues that have been invaded by the cancer.

The epinephrin causes blood vessels to contract and is used to check in this way the spread of the radioactive chemical to normal tissues.

The radiation from the gold destroys the cancer. The short penetrating distance of most of this radiation, however, makes it relatively sparing of adjacent normal tissue.

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CE FIELDS

PHYSICS

Electron Synchrotron Starts Work This Spring

► NEW LIGHT on how the atom is put together is expected from operation at Cornell University, Ithaca, N. Y., of what is believed to be the most powerful electron synchrotron in existence.

Scientists are scheduled to begin this spring shooting a beam of electrons with energies up to one billion electron volts at a target, releasing great quantities of gamma rays for experiments probing the atom's structure.

In synchrotrons, electrons, traveling at relatively low velocities in a chamber from which nearly all the air has been pumped out, are given a carefully timed "kick" which accelerates them to much higher energies. The new "supersynchrotron" was designed by Dr. Robert R. Wilson, director of the Cornell Laboratory of Nuclear Studies, and is being built with Office of Naval Research funds.

The usual method of electromagnetic focusing may be replaced by the "strong focusing" system, recently developed at Brookhaven National Laboratory, that cuts down considerably on the magnet weight required to get a given energy level.

Science News Letter, April 11, 1953

ENGINEERING

Pump Heats and Cools in Season

► YEAR-ROUND AIR conditioning has worked well in three houses using experimental air-to-air heat pumps, the American Power Conference in Chicago was told.

Gerald L. Biehn, Westinghouse design engineer, reported that houses in Lynchburg, Va., Miami, Fla., and Fort Worth, Tex., all turned in good records in recent tests.

The tests were designed to prove the worth of an experimental heat pump system. In moderate climates, air-to-air heat pumps may become as popular as coal or oil furnaces.

Air-to-air heat pumps cool houses in the summer, expelling the household heat into the outside air. In the winter the cycle is reversed. Even though the outside temperature may be a little below freezing, the devices still can extract enough heat from the outside air to warm houses comfortably.

Although it may not feel that way, plenty of heat remains in 30-degree air. It is this heat that the device pumps into the house.

Owners of the test houses pronounced this heating aspect "satisfactory." One owner said he thought it was even better than

other hot-air systems. It produced no drafts and, though the air was warm, it was not dry, he said.

At local power rates, it cost about \$30 a month to run the five-horsepower unit at Lynchburg. Due to higher power rates and a different climate, it cost a little less than \$40 to run the same size unit in Fort Worth. The Miami unit, only three horsepower, cost \$10 a month to operate.

Engineers hope to cut these costs through equipment improvements and by insulating the houses better.

Science News Letter, April 11, 1953

HERPETOLOGY

Rattlesnakes Can Take Only 20 Minutes of Sun

► RATTLESNAKES ARE often associated with the hot summer sun of the desert, but on a balmy day of 85 degrees with a breeze blowing, a rattler becomes helpless if it stays in the sun more than 20 minutes.

Dr. Raymond B. Cowles, University of California at Los Angeles zoologist, reports this fact in connection with a special investigation of rattlesnakes under a \$15,000 grant from the Richfield Corporation.

The rattlesnake has a very limited temperature range at which it can operate. Below 50 degrees, the snake is torpid and prefers to lie motionless in a hole. Above 90 degrees, it becomes uncomfortable and may die unless it can find shade and cool off. Dr. Cowles points out, however, that temperatures at a snake's level may be higher than at a human being's shoulder level.

It is up to the rattler to maintain his own body temperature by alternating between sun and shade, Dr. Cowles points out. Thus, if the snake becomes too cool in the shade, it may bask in the sun for a while. Often a rattler lies coiled under a bush with just enough of his body exposed to the sun to keep a fairly constant temperature.

Science News Letter, April 11, 1953

INVENTION

Low Cost Planetarium For Schools Patented

► A RELATIVELY low-cost planetarium which can be economically used in schools or even in the home to teach or demonstrate astronomical phenomena has been invented by Armand N. Spitz, Lansdowne, Pa. Mr. Spitz points out that the planetariums now in operation in connection with museums are highly complicated and quite expensive because of the high degree of optical precision employed.

He gets around this by projecting his stars on the dome merely in the form of the projection through pinholes of various sizes of the images of concentrated filament lamps. For the usual necessities of teaching or demonstration, this is quite adequate, Mr. Spitz says.

His patent number is 2,632,359.

Science News Letter, April 11, 1953

BIOCHEMISTRY

Liver-Function Test Is Faster, More Accurate

► THREE TIMES as fast and more accurate than present techniques, a new test to measure how well the liver is functioning has been devised by two University of California at Los Angeles Medical School doctors.

A modification of a clinical test used since 1925, the new test is the result of research by Drs. Raymond D. Goodman and Alvin E. Lewis at the West Los Angeles Veterans Administration Center.

It measures how rapidly the liver can remove an intravenously injected dye, bromsulfalein, from the blood within a 15-minute period. Three small blood samples are taken from the individual during this period. The samples are then analyzed in a spectrophotometer. From these data the rate of dye removal by the liver can be calculated.

The new test is an improvement over older techniques because it only requires one-third the time. This eliminates possibility of dye absorption in the small intestine, a source of error in previous tests. It also makes a direct measurement of the blood volume, a factor in the computation of dye removal. Previous methods used an average value for the tested individual's blood volume based upon his weight.

More than 100 patients having known diseases of the liver as well as those having normal livers have been studied with the new technique. In all cases differences in rate of dye removal from the blood between normal and diseased livers were clearly indicated by the new test.

Science News Letter, April 11, 1953

PHYSICS

Water-Finding Gadget Outclasses Forked Stick

► THE WILLOW limb divining rod of legend and literature has a modern successor: an electromagnetic device that not only locates water but also indicates its quality.

The new "divining rod" is an application of electromagnetic techniques used in ore prospecting. It was developed by Don Hansen of the Institute of Geophysics at the University of California at Los Angeles.

The technique, designed to locate underground water sources in the water table region, has proved accurate in preliminary tests. It uses two wire coils to locate water-bearing strata. One coil induces an electric current into the ground. The other measures differences in the induced current as it flows through the ground.

Water-bearing strata, such as tightly packed silt and clay or loose sand and gravel, are identified by their degree of conductivity of the electric current. The conductivity pattern also reveals geological formations such as buried river channels.

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