

BIOCHEMISTRY

Joined Germs Show Secret of Penicillin

► A SIAMESE TWIN-LIKE JOINING of bacteria is opening to scientists the secret of penicillin's anti-germ action.

Apparently this first of the antibiotic, or mold remedies, stops germs by blocking the germ's production or use of ATP. This chemical, with the long name adenosine triphosphate, exists in all cells as a carrier of energy-laden phosphate.

Discovery of this part of penicillin's action, made by Dr. Robert C. Barnett of the University of Texas Medical Branch, Galveston, was announced by the American Cancer Society, which supports the research.

The Siamese twin-like bacteria were made that way by sublethal doses of penicillin. Under the drug's influence, Dr. Barnett found, a bacterium would divide up to the point where the mother cell became two daughter cells, but the daughters could not pull apart. They were stuck together end to end like Siamese twins.

The Siamese twin daughters in turn could continue to multiply, but neither they nor their progeny could pull apart so long as penicillin permeated the medium in which they were growing.

Dr. Barnett has grown enormous strings of such bacteria. Sometimes 300 or 400 would be stuck together end to end. The scientist found that, if he added to the cultures a bit of ATP, the string promptly broke up into normal individual bacteria.

Science News Letter, June 16, 1956

ACOUSTICS

Conversation Impossible For Jet Carrier Officers

► TO PROTECT THE EARS of an aircraft carrier's captain and other personnel from the noise of future jet planes, an island structure with a sound-proofed double wall is suggested by Dr. A. C. Pietrasanta of Bolt Beranek and Newman, Inc., Cambridge, Mass., after a study for the Navy's Bureau of Ships.

Even at present, it is difficult or impossible for important ship's officers to communicate by talking to each other.

In the future, jets are expected to make much more noise. With both turbojet engines at military power, the present jet airplane develops about 169 decibels, well above the limit of the largest power amplifier system and the threshold of painful noise. Jet planes of the next few years are expected to rise to about 190 decibels.

Most noisy time on a carrier's deck is while a jet plane is running up to full power for a take-off. Although a conventional airplane actually makes more noise at its maximum than a jet aircraft, and although, when the conventional planes take off, they leave every 15 seconds instead of every 30 seconds as do the jets, nevertheless, the noise is "on" more than three times as long during a jet runup

as during a conventional plane take-off. Comparatively speaking, the noise for landing operations is unimportant.

From the point of view of the "island" personnel, the noise from the port catapult is much worse than the noise from the starboard catapult, because the path of worst noise intensity travels out at an angle from the plane's tail.

These paths from the starboard catapult go over the side of the ship or cross it well forward of the island. From the port catapult, one noise pathway is lost over the side, but the other cuts directly through the island where officers are trying to talk.

During normal operations, all the planes in succession take off and land about every one and a half to two hours. On a "strike," operations continue from dawn to dusk and perhaps all night long.

Dr. Pietrasanta's study, reported in the *Journal of the Acoustical Society of America* (May), was made on the U. S. S. Franklin D. Roosevelt.

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MEDICINE

Seek Cancer Clues In Lung-Sick Sheep

► CLUES for an attack on lung cancer in humans may come from a study of a cancer-like lung disease in sheep.

The disease in sheep is called pulmonary adenomatosis. It affects the glandular part of the sheep's lung and, in this respect, differs from the commonest human lung cancers that attack the lining of the breathing tubes in the lung.

Because it may be a virus disease, a Yale University cancer virologist, Dr. Francisco Duran-Reynals, has joined Dr. Edwin Jungherr, professor of animal pathology at the University of Connecticut, in the research.

The sheep lung disease is rampant in such areas as the North American Rocky Mountains, the Peruvian Andes, the South African Veldt, Iceland, the wine country of France and parts of the British Isles.

It becomes apparent in sheep two and three years old, but it could be latent in them since birth. Only in the sheep in Peru is the disease a genuine cancer, adenocarcinoma. But in every country, the disease is contagious and invariably fatal.

It is a disease of the open range—seldom found on farms. In contrast, human lung cancer occurs most often in cities and industrial areas.

The Yale scientist uses conventional as well as several new methods of growing the presumed "lung cancer viruses" by injecting new-born lambs with extracts of affected lungs from diseased sheep. He will also determine whether other animals serve as carriers of the virus.

Human lung tissue affected with pulmonary adenomatosis and even cancer will also be used to see whether they contain a virus transmissible to animals.

The Yale scientist's investigation of the sheep lung disease will be supported by the American Cancer Society.

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IN SCIENCE

PLANT PATHOLOGY

Find Carrier of Strawberry Disease

► THE SOURCE of a strawberry disease that spreads mysteriously and makes the plants produce shriveled fruit has been found.

Two species of small insects called leafhoppers carry green petal disease from clover to strawberries.

Experiments by Dr. N. W. Frazier of the University of California and A. F. Posnette of East Malling Research Station, Kent, England, indicate the guilty leafhoppers are *Euscelis lineolatus* Brulle and *Macrostelus viridigriseus* (Edwards).

The disease, which occurs chiefly in England, has an American counterpart caused by the aster yellows virus. Green petal disease also may be caused by this virus, they report in *Nature* (June 2).

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INVENTION

Atomic-Bred Flower Given a Patent

► THE WORLD'S FIRST PATENT for an atomic-bred flower has been granted by the U. S. Patent Office.

The flower is a pure white carnation. It was developed "accidentally" at the Brookhaven National Laboratory, Upton, N. Y., by Dr. Willard R. Singleton, Miller professor of biology at the University of Virginia, and Alan Richter, a graduate student at the University of Wisconsin.

As yet unnamed, the atomic age flower is a mutation brought about by subjecting a carnation known as White Sim to the gamma rays from a cobalt-60 source.

The White Sim, Dr. Singleton said, has its white flower marred by red spots. During the course of experimenting with radiation doses and the color of carnations, the mutation "turned up."

What happened in their "accidental discovery," Dr. Singleton said, is that the red spots of the White Sim were eliminated. It is thought radiation changed the underlying constitution of the carnation from a normal red into white.

Three generations of the flower have been raised and they have all bred true and pure white, Dr. Singleton points out. The new carnation has a flower that is two and one-half to three inches in diameter, is long-stemmed and without thorns.

The flower was awarded plant patent No. 1,481. Dr. Singleton assigned the patent rights to the United States of America as represented by the U. S. Atomic Energy Commission.

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CE FIELDS

SURGERY

Graft Arteries to Both Kidneys for First Time

► THE FIRST SUCCESSFUL GRAFTING of the main artery to each kidney is announced by Drs. Eugene F. Poutasse, Alfred W. Humphries, Lawrence J. McCormack and Arthur C. Corcoran of Cleveland in the *Journal of the American Medical Association* (June 2).

The patient was a 15-year-old boy who suffered severe high blood pressure as a result of narrowing of both main kidney arteries. When two other patients, a 14-year-old boy and a 23-year-old woman, had died of the same condition, the doctors decided to try the artery grafting in the third patient.

The new arteries grafted to the boy's kidneys came from the hospital artery bank. The grafts were made in two operations two weeks apart. Six weeks after the second operation the boy was well, with his blood pressure over a period of five days staying at 130/76, compared to the 220/120 it had averaged when he first got sick. Both kidneys continued to function normally after the operation.

Three months after the second operation the boy continued to be in good health with normal blood pressure, though he had occasional attacks of abdominal pain.

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PHYSICS

U. S. Nuclear Program Is Not Lagging Behind

► THE UNITED STATES' nuclear power program was defended against claims it is lagging behind both Russia and Great Britain at the American Nuclear Society meeting in Chicago.

The United States may be behind on paper projects planned for far into the future, James A. Lane of the Oak Ridge National Laboratory said, but now the United States has already built more reactors than the rest of the world combined. This country has also pioneered in developing techniques leading to several new and different reactors.

Even by 1960, Mr. Lane pointed out, the U. S. will still have at least ten more research and power reactors than Russia, Great Britain and all other countries combined.

Claims the U. S. is lagging, Mr. Lane said, are valid "only if progress is measured in terms of projected nuclear electric capacities. On this basis, the U. S. program with an estimated 900 Mw (megawatt) of nuclear plant capacity by 1960 compares unfavorably with the 2000-2500 Mw capacities projected for the USSR and the 1200

Mw capacity projected for the United Kingdom."

Concentration on technical know-how has made possible three new reactor types that look promising, he said, a dilute solution homogeneous U-235 reactor, a liquid metal fueled reactor and an organic moderated reactor.

The score card on reactors as listed by Mr. Lane showed that, at present, the U. S. has 22 research and test reactors and seven power reactors and power prototypes. Other countries of the world have 15 and one respectively. By 1960, the U. S. will have an estimated 54 research reactors and 37 power reactors. The rest of the world will have an estimated 50 research reactors and 31 power reactors.

Mr. Lane is director of the Oak Ridge reactor experimental engineering division.

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MARINE BIOLOGY

Chemical Promises Lamprey Control by 1960

► SCIENTISTS have found an all-season sea lamprey poison which, if adopted for general use, may have the Great Lakes predators under control by 1960, SCIENCE SERVICE has learned.

The new chemical, whose name is still being kept under wraps, is as effective in very cold weather as in warm weather.

Chemists have been looking for a poison that will kill the blood-sucking lampreys without killing valuable fish. They have found only five such poisons from more than 5,000 screened. Four of these, including the seriously considered 3-bromonitrophenol, are sufficiently poisonous only when water temperatures are above 45 or 50 degrees. In colder water, so much poison must be used that fish as well as lampreys are exterminated. (See SNL, June 9, p. 359.)

U. S. Fish and Wildlife officials said the new poison will kill the costly trout-eating lampreys all year, not permitting them to survive during the winter.

If it is put into use soon, conservationists think they will be able to start re-stocking Lakes Michigan and Huron with trout about 1960. Some re-stocking is already underway in Lake Superior.

Scientists have run 1,726 tests on the cold-water chemical at about \$15 a test. University of Wisconsin Alumni Foundation scientists are testing the same chemical on birds and mammals. They have found that the slight amount needed to kill lampreys is harmless to people and livestock.

A way is now being sought to introduce the poison into Great Lakes streams, where the sea lampreys migrate. Five generations of the "vampire eels" normally live in a stream at one time.

The lampreys have killed so many trout in Lake Michigan that, last year, 1,600 miles of gill nets caught only eight of the fish. Before the lampreys moved in during the 1930's, the same number of nets would have caught about 37,000 pounds of trout.

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CHEMISTRY

Man-Made Minerals Filter Liquids

► FOURTEEN MAN-MADE MINERALS similar to the natural zeolites have been produced in an effort to learn exactly how such minerals can filter out gasoline-type liquids from a mixture of liquid hydrocarbons.

"Straight-chain" hydrocarbons similar to gasoline are known to pass through tiny channels in natural zeolite minerals, while liquid compounds of more complex structure are held back. This filtering action is believed due to difference in size between the molecules of the complex liquids and channels left in the filtering minerals when water has been driven out of the crystals that make up the zeolite structure.

Beginning with an attempt to synthesize naturally occurring zeolites, scientists in the research laboratory of Linde Air Products Co., Tonawanda, N. Y., have succeeded in duplicating 20 rare natural minerals, making compounds that have the same filtering properties as those dug from the earth.

In addition, the laboratory has produced 14 new minerals of similar type not yet found in nature. The achievement is announced by three chemists, D. W. Breck, W. G. Eversole and R. M. Milton, in the *Journal of the American Chemical Society* (May 20).

The man-made minerals are compounds of silicon and aluminum that, when combined with sodium or calcium, make rock-like materials similar to the zeolites used in water-purification systems. Analysis of the new products by X-rays showed the chemists details of their structure.

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PHYSIOLOGY

Tranquilizing Drugs Differ in Brain Effect

► NEW FINDINGS on the mechanism by which various tranquilizing and sedative drugs produce their effect were announced by Drs. Bernard A. Brodie and Parkhurst A. Shore of the National Heart Institute, Bethesda, Md., and Dr. A. Pletscher, guest worker at the heart institute from Hoffmann-La Roche, Inc., Basel, Switzerland.

The good effects of reserpine come through the brain chemical serotonin, the latest findings show.

Of many tranquilizing and sedative drugs tested, only reserpine and two other alkaloid chemicals from the rauwolfia plant caused sedation and affected serotonin. The two that acted like reserpine in these ways are rescinnamine and deserpidine, or rescanscine.

The other chemicals tested included many other rauwolfia chemicals, chlorpromazine, Frenquel, morphine, barbiturate sleeping medicines and scopolamine.

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