

MEDICINE

Stubborn Germs Killed By New Antibiotic

➤ ALL NEW ANTIBIOTICS are not cause for rejoicing, but Gentamicin, which traces its derivation to the mud of some lake bottoms and loam deposits, promises to kill many strains of stubborn bacteria.

Gentamicin comes from the fermentation of an organism called *Micromonospora purpurea*. Its name comes from the purple, or gential, pigment it produces.

Dr. Marvin J. Weinstein, director of antibiotic research at Schering Corporation, Bloomfield, N. J., said that the new antibiotic is still undergoing trials on humans and is not yet available. However, Gentamicin in injectible form has shown "particularly good" results against genito-urinary infection and has proved useful in treating certain pneumonias.

The new antibiotic appears unique in being highly effective against both pseudomonas and proteus, two stubborn bacteria types that are often resistant to all other antibiotics or antibiotic combinations.

Also reported at the Third Interscience Conference on Antimicrobial Agents and Chemotherapy in Washington, D. C., was Cloxacillin, a new synthetic penicillin first developed in England.

Trials on humans in the United States began early in 1963, following the usual animal experiments.

Dr. Paul A. Bunn of New York State University Upstate Medical Center, Syracuse, said that in staphylococcal disease he and his co-workers consider Cloxacillin, which is given by mouth, the drug of choice. As an injected drug it cannot yet be tolerated in humans, but the Syracuse researchers said this would be remedied shortly.

Cloxacillin is not much different from its predecessor, Oxacillin, in basic potency against many microbes, but its advantage shown in hundreds of human volunteers has been in a more dependable absorption from the intestinal tract after being given orally.

• Science News Letter, 85:8 Jan. 4, 1964

TECHNOLOGY

Coal-Fired Gas Turbine May Cut Electricity Cost

➤ THE NATION'S VAST coal reserves will have a new market, if a turbine powered by gas from coal now undergoing tests proves economically feasible for generating electricity.

Under the proposed system, the cost of electricity might be reduced, and central station electrical power plants, now using steam turbines instead of gas would increase their efficiency.

The new turbine could be used as an auxiliary with a steam turbine, or alone, for example, in an arid region where little water is available for cooling the steam turbines.

The first coal-fired gas turbine is now undergoing a 1,500-hour test at the central-station power plant in Morgantown, W. Va.,

under sponsorship of the U.S. Bureau of Mines.

Originally designed for railroad locomotives, the coal-fired unit has been modified for use in a power plant. Its 600 new blades, which are rotated by the force of the hot gas, are made from a tough chromium-cobalt alloy and have titanium carbide inserts to withstand wear and erosion from hot ash particles in the gas stream.

Gas turbines are heat engines for producing power from hot gases, while steam turbines produce their power from the heat energy stored in steam. Most power plant stations use a condensing steam turbine in which cold water is necessary to carry away the heat.

Theoretically, the steam turbine can convert more heat to electricity than the gas turbine, but the steam turbine cannot be run at a temperature higher than 1,050 degrees Fahrenheit.

The gas turbine can be operated at up to 1,500 degrees Fahrenheit and perhaps higher in the future, thus using heat energy the steam turbine cannot.

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RADIOLOGY

Chilling During Radiation Aids Cancer Treatment

➤ CHILLING THE SKIN during radiation treatment of cancers of the neck and head improves the effectiveness of the therapy, the American Roentgen Ray Society meeting in Montreal was told.

Chilling reduces damage to normal tissue so that the radiation dosage can be high enough to have a chance of destroying the malignancy without damaging the surrounding tissue beyond the patient's endurance.

Water cooling was first used by Dr. Edwin J. Liebner of the University of Illinois College of Medicine, who reported the treatment, but technical problems made this method unsatisfactory. Air cooling is being used and the Chicago radiologist expects to get even better effects when he begins to experiment with carbon dioxide and other gases.

In treating 35 patients, Dr. Liebner directed a jet of chilled air at the head or neck area before and during exposure to radiation from a 23-million-electron-volt betatron beam.

The air was cooled to 26.6 degrees Fahrenheit and chilled the skin from a normal 88 degrees to about 58 degrees over a small area.

The radiologist said he believed the skin would tolerate cooling to 38 degrees, which would increase the effect of the radiation treatment.

There were no side effects from the cooling, although exposure to the total of 6,000 to 8,000 roentgens that patients were given during a six- or seven-week period would normally cause severe skin reddening, inflammation and possibly open sores.

Although the cooling treatment was not an outstanding success, the results are encouraging.

• Science News Letter, 85:8 Jan. 4, 1964

IN SCIEN

GEOPHYSICS

Electrons From Radiation Belts Cause Auroras

➤ SPYING by satellite on the radiation zones encircling the earth and on auroras, or northern lights, show auroras are caused by storms of electrically charged particles dumped from the radiation zones.

The satellite's equipment looked at the same time not only down at auroras but up at the radiation region.

Discoverer of the radiation belts, Dr. James Van Allen, State University of Iowa physics professor, said in Washington that information from Injun III's instruments showed a direct relationship between the downpouring of electrons and the auroras. The satellite, launched Dec. 13, 1962, furnished data until October.

Still a mystery is how the electrons, whose basic source of energy is the sun, become as energetic as they are in auroras.

The radiation belt studies were done by a group in Dr. Van Allen's laboratory, where the instruments that first detected the radiation region some five years ago were built.

The radiation region encircling the earth has two zones, an inner one from about 300 miles to 2,800 miles and an outer one from about 2,800 miles to 50,000 miles on the side facing the sun. On the dark side of the earth, Dr. Van Allen said, the zone may extend 100,000 miles—exactly how far is not known.

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PHYSICS

High Energy 'Stars' May Be Created on Earth

➤ A WAY of creating small, highly energetic "stars" here on earth to harness and tap the immense power of the hydrogen bomb possibly has been discovered at least in theory.

A British physicist, Dr. E. R. Harrison of the National Institute for Research in Nuclear Science at Chilton, Didcot, England, reported in New York to the American Physical Society that he believes if matter particles as big as grains of dust were smashed with extreme energy into droplets of heavy hydrogen, the stuff of the thermonuclear bomb, there would be formed little volumes of what actually keeps the sun and other stars stoked.

It would not be easy and Dr. Harrison realizes that his idea may not work. But he hopes that it will be tried as a different approach to the attempt at nuclear fusion in a gas plasma which has occupied many scientists in the U.S., England and Russia for more than five years. The particles would need to be accelerated to 6,000 miles a second, a thousand times as fast as the speed of an artificial satellite.

• Science News Letter, 85:8 Jan. 4, 1964

CE FIELDS

RADIOLOGY

Radiologists' Death Rate High From Blood Diseases

► RADIOLOGISTS have higher than average death rates from three fatal blood diseases, including leukemia, a California Institute of Technology biologist reported.

Dr. Edward B. Lewis attributed the high death rates to the accumulated dose of radiation these workers receive over the years in their occupation.

"Diseases of the blood-forming and lymphatic systems seem to be very susceptible to damage by radiation," Dr. Lewis reported in *Science*, 142:1492, 1963, following a study of death certificates of 425 male radiologists, aged 35 to 74.

The blood diseases singled out were leukemia, defined as cancer of the white blood cells; aplastic anemia, caused by defective formation of red blood marrow; and multiple myeloma, which is cancer of the plasma cells—the cells that make antibodies.

• *Science News Letter*, 85:9 Jan. 4, 1964

GEOLOGY

New Jersey Coast Sinks More Slowly at Present

► THE NEW JERSEY coast is subsiding at the present time at the rate of approximately 50 inches (1.2 to 1.4 meters) every thousand years.

But the drop in land level for the millenia between 6,000 and 2,600 years ago was approximately twice that amount, Drs. Minze Stuiver and Joseph J. Daddario of Yale University's geochronometric laboratory, New Haven, Conn., determined by means of radiocarbon dating.

The measurements were made on Brigantine City, one of several barriers consisting of marshes, bays and mudflats that line the southern New Jersey coast, they reported in *Science*, 142:951, 1963.

Other reports have shown that New England, too, is subsiding at about the same rate.

• *Science News Letter*, 85:9 Jan. 4, 1964

TECHNOLOGY

Radiation Counter Helps Ascertain Human Growth

► AN INSTRUMENT used to measure the amount of radiation in the human body is helping nutritionists to establish body growth requirements.

The whole body counter has been used by scientists to monitor the amount of radiation from fallout that accumulates in man, as well as the effects of radioisotopes that have been purposely administered.

Nutritionists can also use the low level scintillation counter to study the amount of certain elements required by the body for

growth. By measuring the amount of potassium-40, a radioactive isotope comprising 0.012% of natural potassium in the body, they can calculate the exact amount of chemical potassium in the body. From this value, the amount of other elements can be derived.

Studies have established the amount of fat, nitrogen and calcium required by the body at different ages. The whole body counter technique has shown that dietary weight reduction in young adults involves a change in the amount of fat only, and that the amount of nitrogen required for growth is really rather small.

Because some of the officially recommended protein allowances are too high in relation to the amount actually absorbed, the body must excrete the excess. Whether such excessive metabolic and excretory demands should be required of a healthy body is questioned in *Nutrition Reviews*, 21:321, 1963, by Dr. Gilbert B. Forbes, department of pediatrics at the University of Rochester School of Medicine and Dentistry, Rochester, N. Y.

• *Science News Letter*, 85:9 Jan. 4, 1964

PHYSICS

Pictures of Human Sounds Aid to Deaf Children

► PICTURES of human sounds on a television-like device, the oscilloscope, may help deaf children learn to speak.

The pictures form a natural phonetic alphabet, illustrating standard pronunciation as well as accent and dialect. Its two California inventors have named it calligraphy—*the beautiful writing of sounds*.

George W. Barton Jr. of Lawrence Radiation Laboratory, University of California, Livermore, and Stephen H. Barton of Rancho Romero School, Alamo, Calif., made their discovery in attempting to produce roulette figures by using a modern high-gain oscilloscope, they reported in *Science*, 142:1455, 1963. In attaching a frequency modulation tuner output to the network, they found they could "read" the pictures.

Experimentation with the voices of a normal family with three children—an eight-year-old boy, a nine-year-old girl and an eleven-year-old boy—produced five pictures of each of the 14 sounds contained in the phrase, "the forms of sound."

Comparison of the five different pictorial versions showed that some of the sounds were easy to recognize from the others. The consonants "th," "v," "z," "n" and "r" varied from subject to subject, depending on the amount of nasal quality, the presence of braces on two of the children and the absence of four baby teeth on the other child. But none of the differences were any greater than the differences in their handwriting, the Bartons reported.

This same experiment with its widespread possibilities can be reproduced by anyone at low cost, since the unusual parts plus the oscilloscope kit can be purchased for less than \$60. A clever teen-ager can assemble them in a couple of evenings, they reported.

The experiment was submitted by Stephen Barton in the 1963 Alamo, Calif., Science Fair.

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BIOCHEMISTRY

Find Tumor-Inhibiting Chemical in Body Waste

► TINY AMOUNTS of a chemical that stop the wild growth of cancer and tumor cells in mice have been isolated from the urine of children.

The availability of this material called retine opens the way to large-scale preparation, believes Dr. Albert Szent-Gyorgyi, the 1937 Nobel Prize winner in medicine.

With purification methods involving evaporation, chilling, extraction, filtering and other procedures, Dr. Szent-Gyorgyi and his co-workers processed over 264 gallons of urine to obtain .000012 ounces of material containing 8,000 retine units, they reported in *Science*, 142:1571, 1963. One unit is the amount of retine needed to inhibit cancer or tumor growth by 50%.

Drs. Andrew Hegyeli and Jane A. McLaughlin of the Institute for Muscle Research, Marine Biological Laboratory at Woods Hole, Mass., aided the Hungarian born Dr. Szent-Gyorgyi, research director at the institute.

Smaller doses of retine inhibit tumor growth, while larger doses make the tumors regress, they said. The present studies were aimed not at the detailed study of retine action but at its final isolation.

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SPACE

Polka-Dotted Explorer-19 Only Faintly Visible

See Front Cover

► AMERICA'S NEWLY-LAUNCHED polka-dotted balloon satellite originally called "the Christmas Star" shines only feebly in the sky.

At its closest approach to the earth the satellite, seen on this week's front cover, is no brighter than the dimmest star in the handle of the big dipper—about the brilliance of a third magnitude star. It is not visible to the naked eye except under the most favorable atmospheric conditions.

The satellite, which has a 12-foot diameter, is designed to orbit the earth from pole to pole every two hours at altitudes ranging from about 375 miles to 1,875 miles.

Officially called Explorer 19, the satellite was built by the National Aeronautics and Space Administration. The white painted polka dots serve to keep the satellite from becoming overheated by sunlight.

Purpose of the satellite is to gather more information on the earth's atmosphere and its density at extreme altitudes.

Although the density of the atmosphere diminishes rapidly as one moves away from the earth's surface, enough gas molecules are distributed at heights of 300 to 500 miles above the surface to provide very small amounts of resistance, called drag, to spacecraft moving through them.

The 17-pound, inflatable satellite is considered ideal for drag measurement at the fringe of the atmosphere. Its spherical shape makes calculations more accurate since the same area always is exposed.

• *Science News Letter*, 85:9 Jan. 4, 1964