

BIOLOGY

Air Ions Kill Bacteria

► WHAT APPEARS to be the first scientifically substantiated success in killing bacteria with air ions, clumps of air molecules with an electrical charge, was reported at the First Congress of the International Society of Bioclimatology and Biometeorology meeting in Vienna, Austria.

There has been much talk about the possible use of air ions to provide germ-free air through air conditioning systems. However, a clear demonstration that air ions have germ-killing power has been lacking.

The biological experiments were performed under Dr. A. P. Krueger, University of California bacteriologist, and the engineering developments were achieved by W. Wesley Hicks and J. C. Beckett of the Wesix Electric Heater Company of San Francisco.

They reported air ions killed staphylococci bacteria under the special conditions of their experiments. Success resulted from the development of new microchemical techniques in which bacteria were suspended in minute droplets of distilled water.

The first experiments, in which bacteria were suspended in ordinary sized spray droplets of nutrient medium, failed.

The scientists later developed special techniques for making tiny droplets of only one

one-hundredth of a cubic centimeter. They also developed means of determining the number of bacteria in a sample and the number of ions hitting the droplet target, both important in scientific proof of the biological effect of ions.

The scientists said that in the larger droplets the bacteria apparently are protected, while in the smaller ones the agents rise to the surface often enough for the ions to have an effect.

The ions were generated in the exposure chamber by radioactive polonium-210 and tritium.

One billion ions per second could be made to hit a surface of one square centimeter compared to about 600 in each cubic centimeter of normal air.

About ten billion staphylococci were suspended in the exposure chamber at a time. Normally, there are about three million survivors after several hours. Air ions reduced the number of survivors as much as one one-thousandth of normal.

Dr. Krueger said it is premature to speculate on possible applications such as germ-free air through air conditioning, based on the new information.

Science News Letter, October 5, 1957

METEOROLOGY

Storm Shown In Three-D

► THREE-DIMENSIONAL pictures of the tornado- and rain-bearing thunderstorm systems known as squall lines were shown for the first time to scientists attending international geophysical meetings.

These systems are at most 250 miles across and last only six to eight hours. They are often too small to be detected by the network of Weather Bureau stations, Tetsuya Fujita of the University of Chicago told a joint meeting of the International Association of Meteorology and the International Union of Geodesy and Geophysics.

The drawings give a clear picture of the complex storm system, which near the ground resembles a miniature cold front.

The towering thunderstorm clouds are preceded by a shear of winds moving at right angles to them. This break in wind direction and temperature lessens with altitude and by 10,000 feet, the wind shear and cold front have disappeared. Still higher, the winds assume a writhing, snake-like path.

In vertical cross-section, the heart of the system is an atmospheric tube of violent downdrafts surrounded by gentle updrafts. Ahead of the thunderstorms are three layers of turbulent air, each a distinct cell with a center of dry air and a shell of moist air. Between each cell is an inversion, or layer, marking a sudden temperature increase. Air normally is colder with increases in altitude.

Mr. Fujita superimposed on each of his drawings illustrations of how the storm's

heart appeared on a ground radar screen for comparison with radar screen photographs of tornadoes. His aim in doing this is to arrive at new theories of how tornadoes are born.

To analyze the small storm systems, Mr. Fujita used the most complete mass of weather data then available for a small area, the 1947 Thunderstorm Project at Wilmington, Ohio. Measurements of temperature, relative humidity, winds and air pressure were made hourly to 40,000 feet by 10 stations spaced approximately seven miles apart.

Science News Letter, October 5, 1957

PUBLIC HEALTH

New Red Cross First Aid Book Changes Old Rules

► A NEW FIRST AID textbook, replacing the one that has been in use for the last 12 years, has been published by the American National Red Cross. (See p. 220.)

It contains the latest first aid methods, including those developed in the past few years, such as the "mouth to mouth" breathing for infant artificial respiration (See SNL, July 6, p. 5).

Some of the old first aid principles have been replaced by newer ones, found to be more beneficial.

A tourniquet, the new book says, should not be loosened once it is put in place. It

can be left on for up to two hours without causing further damage. Former advice was to release it every 15 minutes.

Danger from lockjaw, or tetanus, is now associated with all wounds, not just the puncture kind, and the wounds should receive medical attention and possible immunization against tetanus.

When first aid is given for frostbite, the present rule is to warm the affected part rapidly instead of slowly.

The first aid textbook contains many informative photographs, drawings and colored plates, which show the various organs and systems of the body, as well as the natural appearance of some poisonous snakes and plants.

Science News Letter, October 5, 1957

SCIENCE NEWS LETTER

VOL. 72 OCTOBER 5, 1957 NO. 14

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N.W., Washington 6, D. C., North 7-2255. Edited by WAISON DAVIS.

Subscription rates: 1 yr., \$5.50; 2 yrs., \$10.00; 3 yrs., \$14.50; single copy, 15 cents, more than six months old, 25 cents. No charge for foreign postage.

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Printed in U. S. A. Entered as second class matter at the post office at Washington, D. C., under the act of March 3, 1879. Acceptance for mailing at the special rate of postage provided for by Sec. 34.40, P. L. and R., 1948 Edition, paragraph (d) (act of February 28, 1925; 39 U. S. Code 283) authorized February 28, 1950. Established in mimeograph form March 13, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Reader's Guide to Periodical Literature, Abridged Guide, and the Engineering Index.



SCIENCE SERVICE

Member Audit Bureau of Circulation. Advertising Manager: Fred A. Moulton, 1719 N St., N.W., Washington 6, D. C., ME. 8-2562.

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