

## PHYSICS

# Nearing Absolute Zero

Hope of lowering world's record low temperature by the use of magnetic means seen in attack on disorder within the central portion of atom.

➤ ALTHOUGH the world's low temperature record is now within a thousandth of a degree of the unattainable absolute of cold, there is a good hope that it will be pushed still farther downward, Prof. Peter Debye, Dutch Nobelist in chemistry and professor and chairman of the department of chemistry, at Cornell University, made known in an address before the Pennsylvania State College chapter of the national society of the Sigma Xi, the first of a series of such addresses through the nation.

This will be done by "attacking the disorder hidden in the nucleus of the atom," Prof. Debye said, by use of the magnetic properties of the inner core of the atom instead of the cloud of electrons about it. The influence of a magnetic field upon the spinning electrons made possible the drop in temperature from about a degree to a mere fraction of a degree.

Cooling is explained as an approach to "a state of highest possible order" and at a degree above absolute zero the disorder connected with the motions of the atoms and molecules has been largely removed, Prof. Debye explained. The next step is to bring order within the nucleus of the atom in order to get to an even lower temperature.

The phenomenon of paramagnetism will be used in these experiments, not yet performed, just as it was used in pushing the temperature to its present low level. When a paramagnetic substance, like a piece of soft iron, is demagnetized by taking the magnetic field away from it, it absorbs heat. The trick has been to cause it to cool off under these circumstances by preventing it from taking up heat from its surroundings.

This method of getting temperatures lower than are attainable by liquefac-

tion of helium gas was proposed 16 years ago by Prof. Debye, then in Berlin, and Dr. William F. Giaque of the University of California independently, and applied a decade ago in several laboratories here and abroad.

In measuring temperatures just above absolute zero the low temperature gas pressure thermometers used at slightly higher ranges can not be used, but a satisfactory temperature scale can be based on magnetic measurements alone, Prof. Debye explained.

Absolute zero is minus 273.1 degrees Centigrade. Helium, the gas that is hardest to liquefy because its molecules have the smallest mutual attraction, boils at 4.2 degrees above absolute zero and by dropping the pressure to 1/200,000th of an atmosphere, a temperature of seven-tenths of a degree above absolute zero can be obtained. For lower temperatures, the magnetic method must be used.

*Science News Letter, February 19, 1944*

## MEDICINE

## Sulfa Drug in Ointment Helps Prevent Gonorrhea

➤SULFATHIAZOLE in calomel ointment has proved efficient as a prophylaxis against gonorrhea, two Naval medical officers, Capt. John B. Kaufman and Lt. Comdr. Ammon B. Litterer, report. (*U. S. Naval Medical Bulletin*, February)

The ointment was used at the central prophylaxis station at San Diego, Calif., and at the border station at Tijuana, Mex. Only two failures occurred in 2,016 treatments given a selected group who had not used any prophylactic measures prior to reporting for treatment. The two failures were in men who failed to report for treatment within two hours after exposure.

It is hoped that the addition of the sulfathiazole to the calomel ointment will not lessen the effectiveness of the calomel as a prophylaxis against syphilis. Further studies on this, the medical officers point out, would be desirable.

*Science News Letter, February 19, 1944*

## MEDICINE

## New Test for Sulfa Drugs Uses Newspaper and Acid

➤ A PIECE of newspaper and hydrochloric acid, familiar to every high school chemistry student, are the materials with which a new sulfa drug test has been developed by Capt. Robert



**FIRE-PROOFED**—Plywood is now being given a special treatment so that buildings, such as blimp hangars, can be made of wood without danger of fire. The wood is impregnated under vacuum pressure in heavy steel cylinders, so that the wood cells throughout the plies are filled with a flame-proofing combination of phosphate, sulphate and boron. The picture shows workmen applying camouflage paint to the plywood-pannelled doors of a West Coast hangar.

Hubata, S. C., A.U.S. The test is reported in *War Medicine* (January), published by the American Medical Association and the National Research Council.

The simple test will be valuable, Capt. Hubata believes, in determining whether or not a person has taken a sulfa drug.

It is made by moistening a small area on a blank strip of newspaper with a drop or two of a specimen of urine from the person being tested. A small drop of dilute hydrochloric acid, one part acid in four parts of water, is then placed on the center of the moistened

area. The immediate appearance of a yellow to orange color shows the presence of a sulfonamide compound.

The method is based on the color reaction in the presence of acids between crude cellulose, such as newspaper, match sticks or pine shavings, and the arylamine group. Paper from refined pulp, for example white bond, will not give the reaction.

The color varies from orange yellow to orange, the yellow color, or one plus reaction, being obtained from persons who have recently stopped taking a sulfa drug.

*Science News Letter, February 19, 1944*

years which show that scarlet fever consistently follows this pattern of reaching a high point in February, March and April and falling off sharply in May.

Scarlet fever is caused by a germ of the streptococcus family. Children can be immunized against it, but because the reaction may be severe, public health officials feel they cannot advise it for all children. They believe the matter should be decided in each case by the parents and physician.

Production of a relatively new type of material for scarlet fever immunization, a precipitated toxin, has been de-

#### GENERAL SCIENCE

## A. A. A. S. To Meet

**American scientists to discuss war and post-war problems in Cleveland in September, after two years without conventions because of the war.**

► THE AMERICAN Association for the Advancement of Science and its numerous affiliated scientific societies will hold their first full-dress wartime meeting in Cleveland next autumn, during the week beginning Sept. 11, Dr. F. R. Moulton, permanent secretary of the Association, informed Science Service. For two years these meetings have been suspended because of the war, but it is felt now that so many scientific problems of importance to the attainment of victory and especially in the setup of the post-war world require full discussion that a gathering of this size is justified.

For many years, A.A.A.S. meetings have been held during the week after Christmas. The last one to be held, at Dallas, Texas, was during the tense Christmas week following Pearl Harbor; it had been arranged long in advance and could not well be cancelled or postponed on short notice. However, holiday-season meetings were then given up for the duration by general consent. A meeting in the early autumn is not expected to place too much of a strain on transportation or hotel accommodations.

*Science News Letter, February 19, 1944*

#### PUBLIC HEALTH

## Scarlet Fever Epidemic

**Number of cases is mounting throughout the nation. Pacific coast states report three times as many cases during past January as the same month last year.**

► SCARLET FEVER cases are on the increase in all parts of the country except New England and the west south-central states of Texas, Arkansas, Louisiana and Oklahoma, reports from state health officers to the U. S. Public Health Service show.

The number of cases mounted from 4,936 the week of Jan. 29 to 5,365 for the week ending Feb. 5. The five-year median figure for the first week in February is 4,037. The three Pacific coast

states reported three times as many cases during January, 1944, as during the same month last year.

The cases in the current outbreak are very mild, according to information reaching the federal health service. The peak of the epidemic is expected this month or next, with cases continuing at a high level until May, when a sharp decline is foreseen. This unusually specific prediction for the course of the epidemic is based on records for many

## SCIENCE NEWS LETTER

Vol. 45 FEBRUARY 19, 1944 No. 8

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

Subscriptions—\$5.00 a year; two years, \$8.00; 15 cents a copy. Back numbers more than six months old, if still available, 25 cents.

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Entered as second class matter at the post-office at Washington, D. C., under the Act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices, indexed in Readers' Guide to Periodical Literature, Abridged Guide, and in the Engineering Index.

The New York Museum of Science and Industry has elected SCIENCE NEWS LETTER as its official publication to be received by its members.

Member Audit Bureau of Circulation. Advertising Representatives: Howland and Howland, Inc., 393 7th Ave., N.Y.C., Pennsylvania 6-5566; and 360 N. Michigan Ave., Chicago, STAt 4439.

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