

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.