

## PHYSICS

# Heat Measuring Device

► A NEW heat measuring device so sensitive that it can detect one hundred-millionth of the heat given off by a 100-watt light bulb in an hour has been developed at the University of Chicago's Institute for the Study of Metals.

The device, called a microcalorimeter, was developed by Dr. Paul Gordon to study small amounts of heat given off by metals. It can detect temperature changes of three ten-thousandths of a degree Centigrade. The microcalorimeter differs from a thermometer in that it measures the total heat given off by an object, not merely its temperature.

It consists of two basic parts. One is an apparatus for maintaining a constant temperature around the object whose heat is being measured. For this purpose, Dr. Gordon uses a vaporthermostat. In this, the boiling, evaporating and condensing cycle of a fluid keeps a constant temperature at the boiling point of a liquid around the object. Dr. Gordon uses methyl benzoate to keep the temperature constant to three ten-thousandths of a degree Centigrade by the vaporthermostat.

The second part of the microcalorimeter is made of the actual heat-measuring device. This is a tall, insulated cylindrical chamber in which the metal sample to be measured is placed. Inside the cylinder is a thermopile, made up of 20 individual thermocouples of iron and the alloy constantan.

The temperature difference between one part of the thermopile, which reflects the constant temperature of the vaporthermostat, and the other, which reflects the temperature of the sample, induces a minute electric current.

The magnitude of this current is a measure of the heat flow from the sample. The latter is a hollow metal bead about an inch long. The minute amounts of heat Dr. Gordon measures result from the growth of grains in the metal as its structure changes, or from very small amounts of heat remaining in the metal after it is cold worked.

By measuring these amounts of heat, Dr. Gordon is analyzing certain aspects of basic structural changes within metals that affect their properties.

Science News Letter, February 28, 1953

## BIOLOGY

# More Babies Without Papa

► IF RODENTS were men—or rather, women—the latest sex news would be causing consternation.

For there are now four authentic cases of a rodent mamma having babies, then having still another batch of babies without the mamma even seeing the papa after the first birth occurred.

All this happened in a laboratory, and under the watchful eye of a scientist.

Dr. Florence L. Evans, microbiologist with the Baylor University College of Medicine, Houston, Tex., reported the cases of a white rat, two mice and a guinea pig who gave birth to two successive litters of young without having been bred a second time.

The white rat, typical of the four cases, was removed from a cage containing males when she was obviously pregnant. Two days later she gave birth to a litter of eight healthy young. You would think she had done enough; but 25 days later, although she had been completely separated from males all the while, she had a second litter, with 11 young.

Similar births were observed with two mice of different species and with a guinea pig, Dr. Evans said.

What is responsible for these unusual births? Dr. Evans rules out the likelihood of parthenogenesis, or "virgin birth," because offspring were of mixed sexes. Offspring from parthenogenetic birth could only be of one sex.

There are two probable explanations, Dr. Evans said: (1) several of the very early

embryos (blastocysts) failed to become implanted in the uterus wall until after the first litter had developed; (2) the embryos, although attached and growing on the uterus wall, developed at different rates.

Chances are, Dr. Evans said, that a combination of the two may account for the observed results. Thus, blastocysts of the second litter did not become attached to the uterus wall until later in pregnancy, and so were not fully developed until after the first litter was born.

Her report was made in *Science* (Feb. 13).

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## INVENTION

## Salt Water Freshener Becomes Fire-Retardant

► THE SAME sort of stuff that makes salt water fresh and hard water soft can make cloth, wood and wood products fire-retardant.

Such is the claim in a patent for a new fire-retardant substance granted to Dr. Walter Juda and Grinnell Jones, Cambridge, Mass., and Nathaniel Altman, Kew Gardens, N. Y. Dr. Juda has also invented a method of turning salt water into fresh water through the process of ion exchange.

In ion exchange, calcium salts in the water are exchanged for other, less harmful materials with the same electrical charge by trickling water through resinous materials.

Dr. Juda and his associates use the same resinous materials to produce the fire-retardant substance. It is the result of a reaction of basic, nitrogen-containing anion-exchange resins with non-oxidizing, inorganic acids, such as phosphoric acid.

Such products, the inventors say, are substantially non-flammable at flame temperatures of about 1,380 degrees Fahrenheit, and possess excellent fire-retarding and potentially heat-insulating properties. The substance is coated on or impregnated in such materials as fabrics, paper, wood, cardboard, wallboard and fiberboard.

Patent number is 2,628,946. It has been assigned to Albi Manufacturing Co., Inc.

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