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PHYSICS

Impurities Need Removing

► A NEW PROBLEM in harnessing the hydrogen bomb's fiery reactions for peaceful purposes was suggested to the American Physical Society meeting in Stanford, Calif., by Dr. Richard F. Post of the University of California's Radiation Laboratory in Livermore.

The problem is impurities in the experimental gases, usually hydrogen, which scientists are now using in experiments aimed at taming the energy of fusion for controlled power.

The impurities in hydrogen gas and the difficulties they cause can be likened to the impurities in uranium impeding the progress toward controlled atomic fission in the early experimental work in that field. Before the first atomic pile could be built, indeed before it could even be considered a possibility, scientists had to make extensive measurements on uranium of a purity then undreamed of.

Dr. Post reported only a small percentage of impurities in the hydrogen gas with which scientists are now experimenting in their attempts to control fusion would result in a great increase in unwanted radi-

ation at the high temperatures necessary.

What scientists want to obtain from the thermonuclear process is extra neutrons, which will be formed only at temperatures of several million degrees. Reports that these extra neutrons have been achieved by the British recently and by the Russians about a year ago could be true, yet the neutrons could be of a "bad kind, not a good kind," Dr. Post said. The bad kind would be unwanted, interfering with the desired process.

At temperatures required to attain nuclear fusion, in the neighborhood of a hundred million degrees centigrade, hydrogen turns into an electrically charged gas called a "plasma." Dr. Post reported on a radiation process in a high temperature plasma and how the technical problems encountered in experimental work in this field influence the course of future research.

The side effects caused by impurities in hydrogen may be important in future experiments on harnessing extremely high temperature reactions, he said.

Science News Letter, December 28, 1957

Questions

ASTRONOMY—What is meant by inferior conjunction? p. 407.

MEDICINE—What relation has been found between injury and coronary disease in rats? p. 411.

PHYSICS—How big in circumference is the alternating gradient synchrotron under construction at the Brookhaven National Laboratory? p. 403.

TECHNOLOGY—How can the device for reading handwritten numbers be adjusted to identify handwritten letters? p. 405.

Photographs: Cover, Stanford Research Institute; p. 403, United Press Telephoto; p. 405, Bell Telephone Laboratories, Inc.; p. 412, Eastman Chemical Products, Inc.

BIOLOGY

"Internal Clock" Times Squirrel's Hibernation

► **SQUIRRELS** seem to have some kind of "internal seasonal clock" that sets them hibernating only at the right time of year, two Canadian scientists report in *Nature* (Dec. 14).

For nearly two years Eric T. Pengelley and Kenneth C. Fisher of the department of zoology, University of Toronto, kept a squirrel under controlled conditions of temperature, light and availability of food. Kept in a room with a mean temperature of about 35 degrees Fahrenheit, with unlimited food and water, ample bedding and 12 hours of artificial daylight, the squirrel persisted in hibernating during October through May. Eight other golden mantled ground squirrels were tested for shorter periods under varying conditions and all showed the same tendency to hibernate only during the autumn-winter season.

A large drop in weight, caused by denying food during June through September, forced hibernation. However, the scientists report, the animal cannot survive this for long. Access to an exercise wheel in the autumn tends to delay hibernation, but the animal does not hibernate for a longer time to make up for the lost "sleep."

Variations in noise level, barometric pressure and the water content of the air are discounted by the scientists as factors that trigger a squirrel's hibernation.

Instead, they report, it seems necessary to conclude that the species possesses some form of internal seasonal clock which determines periods of hibernation and activity.

Science News Letter, December 28, 1957



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