SCIENCE NEWS

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THE NOBEL PRIZES IN PHYSICS

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DR. ISIDOR I. RABI, of Columbia University, to whom the award of the 1944 Nobel prize in physics was made, and Dr. Otto Stern, of the Carnegie Institute of Technology, Pittsburgh, Pa., describe below the work for which the awards were made.

Just as a century ago we were studying electrical and magnetic forces which culminated in great electrical and electronic industries, but could not foretell that fact with certainty, now these immensely more powerful nuclear forces may be turned to the advantage of mankind.

My work was directed toward investigating the magnetic and electric properties of the atomic nucleus. The purpose was to gain further knowledge of the nature of the forces that hold the nucleus together and contribute to atomic energy. In the course of these investigations my colleagues and I developed the "molecular beam magnetic resonance methods" which employed the effect of radio waves on beams of atoms and molecules. This method was a million times more sensitive than anything previously known.

Chief results of this work were the very precise measurements of the amount of spin and magnetism of a number of atomic nuclei, including the proton and the deuteron (the nucleus of heavy hydrogen). In addition it was discovered that the deuteron is shaped like a football spinning on its long axis. This fact has important consequences concerning the properties of nuclear forces.—ISIDOR I. RABI.

Finding that the magnetic moment of the proton was two and one-half times the value expected from the theory is fundamentally important because of the character of the proton as an elementary particle.

The molecular-ray method is much more sensitive than any other known methods for the determination of magnetic moments of atoms or molecules.

The method of molecular rays consists in preparing a stream of molecules by means of a system of fine slits. All molecules travel in the same direction in a highly evacuated apparatus.

Experiments with these molecular rays contribute to the solution of fundamental questions in atomic physics. Three examples may be mentioned: direct experimental proof for the space quantization of atoms by splitting a molecular ray of silver atoms in two beams in a magnetic field; experimental proof of de Broglie's theory that moving particles show wave properties by diffracting a molecular ray of helium or hydrogen molecules at a crystal lattice, and measurement of the magnetic moment of the proton by magnetic deflection of a beam of hydrogen molecules.—OTTO STERN.

ITEMS

SOME restriction in American lumber production will probably be necessary after the war, in the interests of good long-range forest policy, was stated by Edward I. Kotok, assistant chief of the U. S. Forest Service, at the meeting of the American Philosophical Society. The assumption that we can safely exceed our present war-accelerated cut of timber he declared fallacious. This restriction need not be permanent, however, if we take the saving stitch in time. "In the long run, America's forests have high potential capacity, if real forest management is undertaken with dispatch, and surpluses for export will be available, either as primary products or converted material."

A SIGNALING searchlight for American warships, tough enough to withstand the pounding of heavy ocean waves and the shock of big guns fired close by, has been developed and tested in the laboratories of the Westinghouse Electric and Manufacturing Company at Cleveland and is now ready for duty. A special glass, ten times stronger than plate glass, is used for the lens; it not only stands the severe shocks of the waves and the firing guns, but resists sudden changes of temperature. It is claimed that this glass can be heated to a very high temperature and then plunged into icy water without showing the slightest strain. The searchlight flashes its message in code by projecting a beam of light through a series of Venetian-blind shutters opened and closed by hand to simulate dots and dashes. It sends out a light beam visible on a clear night for many miles.

A NEW chemical, said to be better for acute asthmatic attacks than epinephrine, or adrenalin as it is also known, is reported by Dr. M. L. Tainter, of the Winthrop Chemical Company, and Dr. W. M. Cameron, Dr. L. J. Whitsell and Dr. M. M. Hartman, of Stanford University School of Medicine, in *The Journal of Pharmacology and Experimental Therapeutics*. Ethylnorsuprarenin is the name of the new chemical. It is a colorless, odorless, crystalline powder with a bitter taste, chemically described as 1-(3,4-dihydroxyphenyl)-2-amino-1-butanol. It may be injected under the skin, into the muscles or into the veins. It takes effect in from one to five minutes, the effect lasting from twenty minutes to an hour. Fewer reactions such as pain over the heart, nausea, vomiting and nervousness were observed in the same patients when this drug's effect was compared with that of epinephrine.

THE natural taste of fresh cider will be available throughout the year in a new apple juice developed by the U. S. Department of Agriculture. The new product is a full-flavored apple juice concentrate which can be reconstituted, by the mere addition of water, to an apple juice which tastes and smells just like fresh apple cider. It is made by heating fresh apple juice rapidly enough to avoid modifying its natural flavor, vaporizing the volatile flavoring constituents, and then collecting them as an essence from a simple fractionating column. The juice from which the flavoring constituents have been stripped is concentrated by evaporation and the flavoring essence added to the concentrated juice. This gives a full-flavored, self-preserving apple juice concentrate.