PHYSICS

Nobel Physics Winners

For finding ways of learning some of the secrets locked in the nuclei of atoms by tuning in on radio frequencies, Drs. Felix Bloch and Edward M. Purcell are awarded Nobel prize.

➤ A WAY of tuning in by radio frequency on the heart or nucleus of the atom to determine the mysterious and strange forces within it has won for two American physicists the 1952 Nobel prize for physics. Nuclear properties of the atom are keys to future atomic progress.

Independent work along the same lines was done by Dr. Felix Bloch, Stanford University professor of physics, and Dr. Edward M. Purcell, Harvard University professor of physics (see p. 319), who share the prize worth about $33,000.

Atomic particles spin and carry electric currents. They thus behave like small magnets. Placing these invisible magnets in an alternating magnetic field gives rise to electric forces which can be measured by short radio waves. New information about the structure of matter has been discovered by varying the electric and magnetic forces to which atomic magnets respond, and measuring the time necessary for the tiny magnets to respond.

One application of the method by Dr. Purcell was the prediction of invisible hydrogen gas in the space between the stars of the Milky Way and the detection of its radiation with a radio telescope.

The phenomenon is known as nuclear induction or nuclear magnetic resonance induction. Amplified radio frequencies reproduced on an oscillograph screen show the observer what frequency the atom responds to. Each element has a characteristic frequency to which it resonates in a magnetic field under the influence of radio-frequency electric current.

Dr. Bloch was born 47 years ago in Switzerland and came to this country from Germany in 1933. Dr. Purcell is 40 and a native of Illinois with his undergraduate degree from Purdue.

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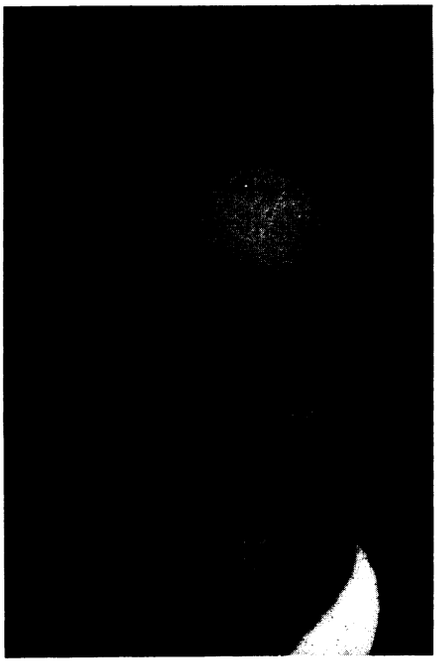

NOBELIST EDWARD M. PURCELL—For his work in helping to unravel the mysterious forces of the atom's nucleus, Dr. Purcell of Harvard University, was awarded the 1952 Nobel prize for physics.

CHEMISTRY

Nobel Chemical Awards

Two British biochemists, Drs. R. L. M. Synge and A. J. P. Martin, receive Nobel prize in chemistry for development of chromatographic separation processes.

➤ CHROMATOGRAPHY, THE process developed by British biochemists Dr. Richard Lawrence Millington Synge and Dr. Archer J. Porter Martin, this year's Nobelists in chemistry, is fundamentally as simple as blotting ink or mopping up spilled milk. The fibers take up the liquid, as everyone knows. Only the scientist stops to ask how this happens and where the liquid goes.

Drs. Synge and Martin adapted chromatography and extended it to produce new information about albumin and other life substances. Chromatography is a process in which colored extracts, originally of grasses and flowers, are observed to separate into two or more bands of different colors as they trickle down inside a long glass tube filled with some kind of insoluble filtering material, similar to fine sand.

In this form, the principle was used by the Russian botanist, Michael Tswett, in 1904, to learn the constitution of the green coloring matter of grass and leaves. Newer adaptations of the method are used for many colorless substances, but the name chromatography has stuck with the process.

As used by Drs. Synge and Martin, the tube of sand is replaced by the fibers of fine filter paper. A drop of solution taken up by a strip of such paper will spread along the fibers.

Just as the green grass extract separates into different bands of greens and yellows as it trickles down the sand-packed column, the solution of albumin, in their experiments, separates as it travels along the filter paper until what started as a homogeneous mixture ends as a series of bands each composed of a pure substance.

The mixture has sorted itself out because each of the substances in it has its own rate of travel. When enough time has gone by, the zones of paper containing the separated substances may be chipped apart and the substances recovered by dissolving them in suitable liquids, or they may be tested in other ways while still on the paper. The spread-out material on the paper is called the chromatogram.

Refinements of the process consist of enclosing the apparatus so as to keep the material in an atmosphere where the concentration of solvent is high, so the solution will not dry out too quickly, and using a wide variety of solvents to keep the boundaries of the separated materials moving as the researcher wishes.

NOBELIST RICHARD L. M. SYNGE—Honored with Dr. Archer J. P. Martin for the seemingly-simple discovery that ordinary filter paper may be used for chemical analysis was Dr. Synge.

Dr. Martin, 42, is now at the National Institute for Medical Research, London, and Dr. Synge, 38, is at the Rowlett Research Institute, Scotland.

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