

## GENERAL SCIENCE

# Nobel Prize Winners

**Award in chemistry shared jointly by an English and a Russian scientist for studies of chemical reactions; physics prize shared by three Americans for transistor research.**

## See Front Cover

► ONE of industry's tiniest devices earned its three American developers one of science's biggest awards.

The Nobel Prize in Physics for 1956 has been awarded to Drs. John Bardeen of Champaign, Ill., Walter Brattain of Murray Hill, N. J., and William Shockley of Mountain View, Calif., for having invented and developed the transistor.

A very small electronic gadget, the transistor has revolutionized the radio and telephone industry and already become a household word in this country. In the short time since its development in 1948, the transistor has found its way into use in everything from portable radios to earth satellites.

The prize-winning development was made by the three scientists eight years ago when they were working at the Bell Telephone Laboratories.

Drs. Bardeen, Shockley and Brattain were studying semi-conductors, materials that take on the properties of both metals and insulators, depending upon the way in which they are treated.

In the study, Drs. Bardeen and Brattain found that two contacts on the semi-conductor surfaces and a connection to a germanium crystal resulted in the arrangement being an amplifier that acts very much like the larger triode vacuum tube. Since that time, transistors have replaced the vacuum tube in hundreds of electronic uses.

Made of germanium and silicon and, experimentally, of other rare metals, the transistor's small size and low power requirements make it an electronic engineer's dream gadget.

New uses for it are being found almost every other day.

Scientists trying to explain about what makes semi-conductors work talk not only about the electrons that conduct electricity, but "holes" where electrons have been and then left. Since electrons are difficult to visualize, picturing the holes that are where they were seems almost to defy the imagination.

The three American scientists who jointly shared in this year's Nobel Prize in Physics will split the \$38,633 in prize money, which will be presented in December.

They are shown in the photograph on the cover of this week's SCIENCE NEWS LETTER discussing the crystal structure of semi-conductors. On the left is Dr. Shockley, Dr. Brattain is in the center and Dr. Bardeen is on the right.

Science News Letter, November 10, 1956

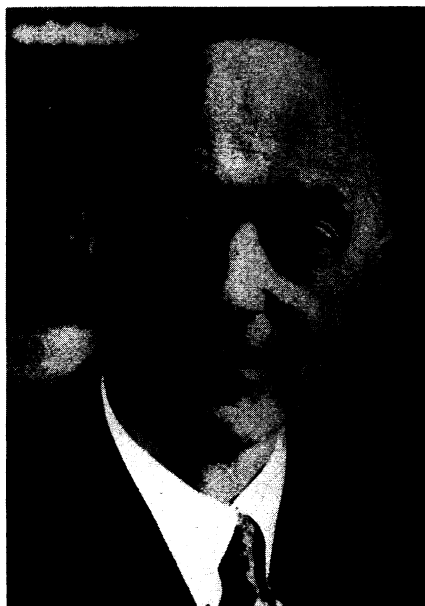
► THE SEEMINGLY SIMPLE REACTION of hydrogen and oxygen to form water was studied in great detail by the two scientists who were jointly awarded this year's Nobel Prize in Chemistry.

Sir Cyril N. Hinshelwood, Lee's professor of chemistry at the University of Oxford, England, and Prof. Nikolai N. Semenov, founder and permanent director of the Institute of Chemical Physics, Moscow, have investigated the various ways in which oxygen and hydrogen can combine. They have also studied the energy released by the different reactions.

Hydrogen and oxygen can combine in proportions other than the familiar H<sub>2</sub>O. These other compounds exist for a short time and lead to other reactions.

The interaction of hydrogen and oxygen can proceed in many ways. At ordinary temperatures, they combine when illuminated with sunlight. This is a chain reaction fundamental to photosynthesis. A number of energy changes take place one after another, the results being much greater than if the reaction had taken place in one step.

When hydrogen and oxygen react between 500 and 600 degrees Centigrade, they ignite. If the pressure is then lowered, they explode.



**NOBELIST IN CHEMISTRY** — Sir Cyril N. Hinshelwood, who shares with Prof. Nikolai N. Semenov the 1956 Nobel Prize in Chemistry, is shown in the photograph.

The reaction of the two gases is very sensitive to catalysts, chemicals that speed reactions although remaining unchanged themselves.

Science News Letter, November 10, 1956

## TECHNOLOGY

## Special Mirror Cuts X-Ray Danger to Patient

► HAVING AN X-RAY picture taken can be safer than ever, thanks to a mirror. With its aid, exposure of the patient to X-rays can be reduced 70% to 75%.

The mirror is the special feature of the new type of small-film chest X-ray machine developed by the X-ray department of General Electric Company, Milwaukee, Wis. The camera portion of the unit is produced by the Fairchild Camera & Instrument Corporation, Jamaica, N. Y.

The special mirror applies the same principle used by astronomers to photograph light from the distant stars. The reduction in X-ray exposure is made possible by the mirror's optical speed, which is between four and five times greater than that of refractive lens-type photo-roentgen cameras hitherto used in chest X-ray surveys.

The large-diameter mirror system, similar to those for large telescopes, is also said to produce sharper and clearer images than have hitherto been possible.

The new camera was developed by Fairchild in cooperation with the N. V. Op-tische Industrie (Odelca) of the Netherlands.

Unlike the conventional chest X-ray camera, the Fairchild-Odelca camera places the X-ray film between the fluorescent screen and the mirror-lens. The image of the chest thus travels first through the camera, passing the film on all sides, and then strikes the curved precision mirror at the rear, where the light is gathered and focused sharply and reflected back on to the film.

Because of its greater speed, the new X-ray camera helps cut down on re-takes caused by voluntary or involuntary motion on the part of the patient.

Science News Letter, November 10, 1956

## ANIMAL NUTRITION

## Eggs Give Biggest Food Research Puzzle

► THE HOUSEWIFE who worries over the price of a dozen eggs has nothing on the farmer and agricultural scientist.

They wonder why it takes almost seven pounds of feed for hens to produce a dozen eggs, when it should take only five pounds.

This "big puzzle" was stressed by Byron T. Shaw, administrator of the U. S. Department of Agriculture's Agricultural Research Service, at the meeting of the Animal Nutrition Research Council in Washington.

Farmers now need to feed less than 15 years ago to get a pound of weight gain on broilers, beef cattle, hogs and turkeys and for milk production. Improved laying rations, however, have not increased egg production as they should have.

Science News Letter, November 10, 1956