PHYSICS-CHEMISTRY

Debye, Hess and Anderson Win Nobel Prize Laureates

Cosmic Radiation Research, Discovery of Positron, Findings on Electric Behavior of Liquids Honored

JOINT award of the 1936 Nobel physics prize just made to Dr. Carl D. Anderson of California Institute of Technology and to Prof. V. F. Hess of the University of Innsbruck, Austria, resulted from research on the penetrating cosmic radiation that still holds many mysteries.

Dr. Hess receives the prize for his discovery of cosmic radiation in 1912. Dr. Anderson, then only 27 years old, discovered the positron or positive electron in 1932, and thus wrote his name into the history of science as the first to recognize one of the fundamental particles out of which the universe is built. This discovery of the positron came while cosmic rays were being investigated.

Balloon ascensions made by Dr. Hess in 1911 showed that the mysterious and penetrating radiations that other scientists attributed to radioactive substances in rocks must originate outside the planet earth. Dr. Hess, who is still active in physics research, was thus a pioneer balloonist in quest of cosmic ray data. At first Dr. Hess suspected that the radiation originated in the sun, but that was later disproved.

Study of the powerful radiations was undertaken by many scientists in subsequent years. Among the leaders was Dr. Robert A. Millikan, whose researches brought them into prominence. Dr. Anderson collaborated with Dr. Millikan upon his researches and while watching tracks of radiation made in water vapor subjected to intense magnetic fields found the positron or positive electron which previous theory postulated must exist.

Chemistry Prize

The Nobel Prize in Chemistry for 1936 has been awarded to Prof. Peter Debye, director of the Kaiser Wilhelm Institute of Physics in Berlin and professor of physics at the University of Leipzig. Prof. Debye, who recently was in this country as a guest speaker at the Harvard Tercentenary celebration, is a co-founder of the famous Debye-Huckle theory in physical chemistry, which made it possible to calculate exactly the electrical conductivity of a strong electrolytic solution.

One of the most interesting applications of this theory to everyday things is the concept that the invisible inner structure of water resembles that of a solid like a diamond much more closely than it does a vapor like steam, in which molecules are all tumbled about without any right-side-up or upside-down.

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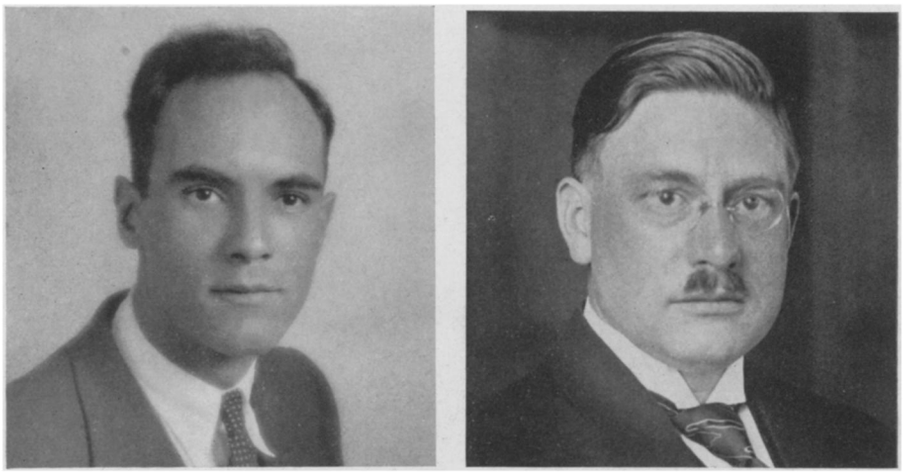
PHYSICAL CHEMISTRY

Prize Theory Concerns Electricity in Solutions

THE FIELD of molecular physics, of equal interest to chemists and physicists, has benefited from Professor Peter Debye's work. He is responsible for developments of extreme importance in the study of solutions, the electrical properties of insulators, the heat capacity of solids, and the structure of individual molecules. His work has provided the foundation for the methods which today are used to obtain as near as possible a "photograph" of an individual molecule. Of course, the "photograph" is not directly a picture of the inconceivably small molecule but rather a pattern from which a picture can be deduced by mathematical methods. Similarly, his mathematical deductions have led to a much clearer insight into the processes by which salt solutions conduct electricity—important to chemistry.

Electrical engineering as well as pure science has been benefited by his theories of electrical insulators, which are based on the idea that most molecules, although they contain equal quantities of positive and negative electricity, are electrically unbalanced inasmuch as one end of the molecule is positively charged while the other end is negatively charged. When a liquid containing such molecules is subjected to an electrical field, the molecules have a tendency to turn into line with the direction of the electric force. This very markedly affects the electrical properties of the liquid. Engineers are interested in these electrical properties while pure scientists are greatly interested in the information regarding molecular structure which Debye's theory yields.

Another very important application of mathematics was his treatment of the heat capacity of solids. The heat capacity of a substance is the quantity of heat which must be transferred to the substance in order to raise its temperature one degree. At very low temperatures, hundreds of degrees colder than room temperature, the heat capacity of all solids gets very small. Einstein gave the first explanation of this, and thus



PRIZE WINNERS

Dr. Carl D. Anderson, California Institute of Technology (left), is one of the winners of the Nobel Prize in Physics. Prof. V. F. Hess, University of Innsbruck, Austria, was honored jointly with Dr. Anderson. Prof. Peter Debye, Kaiser Wilhelm Institute of Physics (right), received the Nobel Prize in Chemistry.

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