CHEMISTRY

Chemistry Nobelist

The 1945 award goes to Prof. Artturi Virtanen of Finland who has done practical work in cattle nutrition as well as research on capture of nitrogen by plants.

➤ PRACTICAL barnyard science and highly important basic investigations on how plants turn air into food have been combined in the research career of Prof. Artturi I. Virtanen, director of the Biochemical Institute at Helsinki, Finland, to whom the Nobel Prize in Chemistry for 1945 has been awarded.

Probably more people in the highly cow-conscious lands around the Baltic would recognize his name as the originator of the A. I. V. method of making silage than would know him as the discoverer of several important steps in the nitrogen synthesis by legumes. Yet the two are linked together, just as some of Pasteur's fundamental researches had practical tie-ups with such practical matters as brewing and silkworm culture.

Being interested in how proteins were made out of nitrogen captured from the air by bacteria on pea and clover roots, Prof. Virtanen was also interested in how the same proteins were broken down and destroyed by other bacteria. This led to a study of how silage spoiled when it was permitted to become alkaline, with the eventual loss of protein in the form of ammonia. He stopped such spoilage by wetting down the fresh fodder, as it was packed into the silo, with a weak solution of hydrochloric acid. Silage thus treated kept very well, and the physiological effects of the residual acid were offset by adding a little ground limestone and soda at feeding time. This is the foundation of the A. I. V. method. It is widely used in the dairy regions of Europe, though it has not been adopted to any great extent in the United States.

Prof. Virtanen's researches on the capture and utilization of nitrogen from the air in food formation in plants have led to some interesting discoveries. He found that the root-nodule bacteria sheltered by legumes do not necessarily feed their captured nitrogen directly to their hosts, but excrete into the soil considerable quantities of one of the essential building-blocks of the proteins, aspartic acid, which the host-plant is able to use. He found also that the bacteria could live without the support of a higher plant, but that they throve better and captured more nitrogen if they had it. He also uncovered evidence that higher plants can capture nitrogen directly themselves, without the aid of root bacteria.

In other researches Prof. Virtanen proved that higher plants could take up and utilize relatively complex organic compounds from solution in the soil. This ran counter to the doctrine, quite generally accepted for a hundred years or more, that such organic compounds have to be decomposed by soil microorganisms into simpler substances, which are then taken up by the plants and rebuilt into complex compounds.

In experiments with Dr. Synnove von Hausen, Prof. Virtanen found that plants' growth could be greatly stimulated, and their flowering and fruiting made earlier and more abundant, by feeding their roots with a yeast extract.

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PHYSICS—CHEMISTRY

Atom Bomb Nobelists

The 1944 chemistry award goes to Prof. Otto Hahn of Berlin; Prof. Wolfgang Pauli gets 1945 physics award for theoretical studies on atomic structure.

➤ AWARD of Nobel prizes to two European atomic scientists, one of them a German, emphasizes the importance to scientific progress of free interchange and publication of scientific information.

Prof. Otto Hahn of Berlin, who has been given the 1944 chemistry Nobel prize, may be, as rumored, in the United States among the German scientists brought to this country in the custody of the U. S. Army.

His researches reported in January, 1939, on the fission of the uranium atom with energy release, were actually the beginnings of the gigantic research project that resulted in the atomic bomb. His scientific reports, along with those of Dr. F. Strassmann, co-author with Prof. Hahn of the famous Die Naturwissenchaften paper, and observations of Dr. O. R. Frisch and Dr. Liese Meitner, both then refugees from Germany, caused the nuclear physicists of the world to start striving for the practical release of atomic energy.

Prof. Hahn's researches were published in the leading scientific journal of Germany, despite the fact that Nazi Germany was then only a few months away from war.

Prof. Wolfgang Pauli, now visiting professor at the Institute of Advanced Studies at Princeton, N. J., who has been awarded the 1945 physics Nobel prize, was born in Vienna, studied at Munich and until 1940 was at the Technical College in Zurich, Switzerland. His theoretical studies on atomic structure have contributed to advances in physics, among them the release of atomic energy.

He is best known for the exclusive principle that bears his name. In a story issued in 1933, Science Service explained this principle as "rugged individuality of electrons."

This article said:

Smith, Jones, Brown, White: these are the Anglo-Saxon world's commonest names. They all contain five letters.

The five letters in the name are not sufficient to classify them, but physicists can distinguish between the 92 identical electrons in the uranium atom family by having five labels for each little mite of electricity, and no two of these little fellows have the same five letters attached to them.

These tiny particles of electricity or matter, the electrons, are very standard uniform fellows and always have the same weight and quantity of electricity when they are alone, but if they are attached together to make up an atom they begin to exhibit individuality. The tags placed on any one of them by the scientist give his address within the atom and tell how far he lives from the center of the community.

The name given to the statement of this individuality is the Pauli exclusion or equivalence principle, which was formulated by the eminent physicist, Prof. W. Pauli, early in the development of the new wave mechanics. This states that there are never two or more equivalent electrons in the same atom, such that the values of all five of their quantum