Big Molecules from Little Ones

The synthetic chemist's task of making big molecules out of little ones, which was the aspect of chemistry that held Father Nieuwland's own professional attention for many years, was discussed by Prof. Hugh S. Taylor of Princeton University. In building up these giant molecules, to make such things as artificial rubber, the proportion of the elements in the compounds may not change during the process, but the arrangement of their atoms does change radically, and this rearrangement of the building-blocks largely determines the properties the new substance will have, Prof. Taylor said.

Father Nieuwland's Work

Father Nieuwland's important work in chemistry, culminating in the discoveries that made the production of artificial rubber practicable, occupied a relatively short part of his life, William Stansfield Calcott, director of the Jackson Laboratories of the E. I. duPont de Nemours Company, pointed out. For a good many years he was so busy with his duties as professor of botany at Notre Dame that he gave little time to chemistry. But when he did return to his test-tubes he produced results rapidly.

He was always more interested in the processes, the reactions, involved in his experiments than he was in the final products, Mr. Calcott said. And he would never report on a piece of work until he had all the facts nailed down. Once, making up a compound of acetylene, Father Nieuwland noticed that the resulting gas did not smell exactly "right." He held up publication on this research for several years, until he was sure what the strange-smelling stuff was. It proved to be divinyl acetate —now the basis of a major industry in synthetics.

Botany, the second career of the noted scientist, remained his avocation after he had abandoned it as a profession in favor of chemistry. Dr. Marcus Ward Lyon, formerly of the U.S. National Museum, discussed this aspect of Father Nieuwland's work. He spent long days afield, collecting, and was equally industrious in the study of botanical history. He built up an exceptionally fine library of rare botanical works for his university. His own personal bookplate, Dr. Lyon disclosed, bore the design of a flower, with the Latin inscription for "Consider the lilies of the field."

Science News Letter, January 23, 1937

PUBLIC HEALTH

Scientists Risk Lives in Carbon Monoxide Research

RISKING their lives for the past six months in an effort to learn more about the effects on the human body of carbon monoxide gas, one of man's deadliest enemies, six "human guinea pigs" of the Harvard Fatigue Laboratory have found that the average man can stand the gas only until his blood is one-third saturated with it.

At the same time they confirmed previous findings that very tiny concentrations of the gas can bring man to this breaking point. Only one part of the gas in a thousand parts of air, for example, breathed for half an hour or so, can render a healthy man unconscious. That is, if he is not active—if he is driving a car, for example. If he is exercising vigorously, he will succumb even sooner.

They also added significant biological proof of a familiar lesson, a lesson emphasized by the mounting toll of deaths from carbon monoxide poisoning throughout the nation. It is the fact that the insidious poison gives absolutely no warning of its presence or even that it is stalking its prey.

Not only is the gas colorless and odorless, as has been known for some time, but in addition, it has been found, a man breathing it feels no ill effects, not even drowsiness. He just collapses without warning. If he is driving his car, if he is alone in a garage, he may well be doomed.

Dramatic Proof

Most dramatic proof of this was brought to the Harvard experimenters when Dr. W. H. Forbes of the Fatigue Laboratory suddenly fainted after he had just completed tests requiring a high degree of skill. Other workers had to carry him from the gas-filled chamber and revive him. His blood proved to be almost one-half saturated with carbon monoxide.

The experiments, conducted cooperatively with the Harvard Bureau for Street Traffic Research, were directed by Dr. David B. Dill, assistant director of the Fatigue Laboratory, Dr. Harry de Silva of the Bureau, Dr. Forbes and F. M. Van Deventer of the Cities Service Refining Company whose survey to the effect that about five per cent of automobiles and closed trucks examined on highways have dangerous concentrations of carbon monoxide led to the research. These men and two students volunteered for the tests.

The plan of the experiments was to admit the deadly gas in known concentrations and amounts into a closed room in which the "human guinea pigs" were being tested at regular intervals for their reaction time, judgment, perception, and other automobile driving skills. Blood samples were also drawn at intervals to determine the percentage of saturation with the gas. In all experiments the subjects showed no decrease in skill even when their blood was about one-third saturated and they were practically ready to collapse.

Tests were limited to these simulated driving conditions although it is hoped ultimately to extend the investigation to include tests directly concerned with the operation of automobiles.

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PHYSICS

Gravity Value Determined At Bureau of Standards

USING special pendulums of fused silica, the most precise measurements on the absolute determination of gravity ever made have just been announced by the National Bureau of Standards. Dr. Paul R. Heyl and Guy S. Cook performed the measurements which fix the acceleration of gravity at Washington to be 980.08 centimeters per second per second.

For years the measurements made at Potsdam, Germany, in 1906 have been the international base determination by mutual consent of scientists. Although the Washington scientists made fewer observations than did the German investigators, the accuracy of individual readings is higher, so that the average value obtained is comparable in accuracy.

The new Washington value differs from the value at Potsdam by 2 parts in 100,000. Whether the new value will be widely accepted, as was the 1906 in Germany, can only be determined by the future.

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