Hydrogen Shown to Have Twin

Chemistry

The whirling heart of an atom was displayed to the members of the American Chemical Society by a youthful German physicist, Dr. K. F. Bonhoeffer. The revelation of the state of affairs in the inmost core of the microcosm of matter was more than a stunt of delicately manipulated physical apparatus, too: it was a revolutionary demonstration that the hydrogen atom, the basic unit with which chemists reckon as mathematicians begin with the figure 1, is not one, but two. There are two kinds of hydrogen. The second kind, whose existence was unsuspected until Dr. Bonhoeffer proved it, is called para-hydrogen.

There is not much difference between the two types of hydrogen atom. They are both built up of the same thing: one electron, or particle of negative electricity, revolving around a central particle or nucleus as the moon goes round the earth. The hitherto unsuspected secret lies in the nucleus. The hydrogen nucleus is made up of two parts, which are in constant rotation. In the atom of ordinary, "plain" hydrogen these two parts spin in the same direction, just as the two ends of a doorknob turn in the same direction. But in para-hydrogen they spin in opposite directions, like the front wheels of a wagon slewed around on a sharp turn.

There is no immediate commercial importance to Dr. Bonhoeffer's discovery. It is absolutely "pure science." But when it is remembered that we now float dirigibles bigger than battleships with helium, which fifty years ago was "pure science"—and 90 million miles away on the sun at that—it is rash to predict what its significance may or may not be.

The contributions of chemists to the growth of American industry were not forgotten in the excitement over the discovery that we have been starting our chemical reckoning with a 2 instead of a 1. Much money can be saved, and gases valuable for heating houses or use in chemical industries can be obtained, by salvaging by-products now allowed to go to waste in "cracking" petroleum to make gasoline, according to Gustav Egloff, Chicago oil chemist. These gases could be used for enriching the water-gas now almost universally the basis of domestic fuel.

Iodine, which has figured largely in public discussion because of its importance in the prevention of goiter, is a gift of the rocks and not of the air, as has often been supposed. The idea that it floats inland from the sea as a gas in the atmosphere was dispelled by Prof. J. F. McClendon of the Unviersity of Minnesota. Careful analysis of air fails to show a trace of the gas. Iodine is carried by the air, it is true, but only locked up in dust particles; and dust is minutely fragmented rock. Rocks put iodine into the soil, plants take it up from the soil, and man and the animals get their iodine from the plants. Much iodine is carried to the sea in run-off water, and this iodine is lost to human use, except for such small fractions as are recovered in sea foods.

Science News-Letter, September 21, 1929

Cornstalks to Furnish Light and Power

Chemistry

Gas for heating, lighting and power, carbon dioxide to put the "fizz" in soda-water and pop, and fibrous pulp for high-grade paper, will all come out of the same tankful of cornstalks when the process described before the meeting of the American Chemical Society by Prof. C. M. Buswell of the University of Illinois is worked out on a commercial basis.

A circle of cornfields within an eight-mile radius will yield enough stalks to keep a city of 80,000 supplied with gas, Prof. Buswell estimated. An individual plant small enough for the needs of the separate farmstead can be run by the farmer; or a huge plant of city size can be developed.

The process depends upon bacteria —germs of fermentation and decay, here recruited to the assistance of man rather than to his annoyance and damage. Turned loose in a tight tank with a lot of chopped-up cornstalks in water, plus some form of nitrogenous fertilizer, the bacteria convert a large part of the stalk material into methane and carbon dioxide. Methane is the same gas as the "fire-damp" that miners dread, but properly piped it becomes a tame and tractable heat and light producer.

The carbon dioxide has no value as fuel, but can be compressed into cylinders for soda-fountain use or frozen into "dry ice" for refrigeration. The left-over pulp in the fermentation tank is made up largely of the longer, tougher fibers of the stalk, the most valuable part from the point of the paper maker. Finally, Prof. Buswell pointed out, making cornstalks commercially valuable will result in the destruction of the European corn borer, which hides over winter in cornstalks and field stubble.

Science News-Letter, September 21, 1929

Golf Ball Murders Fish

Ichthyology

Golf is charged with the murder of 74,000 fish at Glacier National Park fish hatchery. A player sliced badly, the ball entered and clogged the intake water line, and the thousands of little fish had nothing to swim in.

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Kansan Makes Diamonds

Chemistry

Artificial diamonds were promised the world by Prof. J. Willard Hershey of McPherson College, Kansas, who spoke before the American Chemical Society.

The most promising modern attempts at achieving this much-sought-for end, Prof. Hershey said, were made about thirty years ago by a French scientist named Moissan. Taking up the work where Moissan left off, the Kansas chemist has made some improvements in his technique and is hopeful of eventually producing good diamonds in the laboratory. His process consists of melting pure carbon with filings of various metals in an electric furnace, and then plunging the white-hot mass into an ice-cold saturated salt solution. The cooled mass is subjected to further chemical treatment, and then tested for diamond particles.

"I have not yet succeeded in all that I hope to accomplish," said Prof. Hershey, "but the largest diamonds produced at McPherson College are the largest genuine synthetic diamonds on record."

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