CHEMISTRY

Sulfur Fumes Liquefied Give Chemists Useful New Solvent

Because it Works in Way Different From Water or Alcohol, it May Make Possible Entirely New Compounds

THE CHOKING fumes that pour out of factory chimneys or arise when sulfur is burned become, when liquefied, a water-like solvent that makes possible new compounds and a whole new field of chemical research.

The fumes are sulfur dioxide gas, SO_2, widely used in the preparation of sulfuric acid and other chemicals. But the liquid state and its possibilities have been largely overlooked, said Dr. J. Russell Bright of Wayne University in a recent address to the American Chemical Society.

There is plenty of sulfur in this country. There is enough in Texas mines alone to supply the whole world's present needs. Sulfur fumes escape from almost every chimney. In Detroit alone, Dr. Bright states, 120,000 tons of sulfur dioxide escape each year from the chimneys of coal-burning factories and buildings. Extended use of the substance would not make any fresh demands on critical war materials.

The gas is very easily liquefied. It is only necessary to cool it to 14 degrees Fahrenheit, which could be done in an ice cream freezer, or, without reducing its temperature, to compress it to one-third or one-half its volume. For this reason it was the refrigerant used in the early household refrigerators, and this was its first extensive commercial use.

Liquid carbon dioxide is an even better solvent for organic substances than water or liquid ammonia. It is not so good for inorganic substances and dissolves few metals.

Chemists need solvents in which to carry out chemical reactions. Dry chemicals do not in general react on one another. They must be dissolved in a liquid that will divide and disperse their molecules and give them mobility so that they may choose new partners and form new compounds. Water, ammonia, alcohol, ether, benzine and many less well known liquids serve this purpose.

Chemists need many solvents for many different purposes. What the solvent does not dissolve is just as important as what it does dissolve. The universal solvent, sought by alchemists, the solvent that was to dissolve everything, would have been utterly useless if found, with nothing to keep it in. If you wish to remove a grease spot from your clothing, you want a solvent that will dissolve grease. If it dissolved the cloth as well, it would be effective but utterly useless as a spot remover.

The discovery of a new solvent having a new set of properties thus opens a new field of chemical possibilities. New reactions and new compounds become possible. There are certain compounds of sulfur and cyanogen that can be produced in no other way, Dr. Bright points out, than by the use of sulfur dioxide as the solvent. Some of these compounds may become useful in the preparation of insecticides and other poisons.

Science News Letter, February 28, 1942

PUBLIC HEALTH

Air Corps Is "Safest," At Least In Peacetime

IN PEACETIME at least, the air corps appears one of the safest places in the Army—even the Quartermaster Corps is more dangerous, according to the annual report of the U. S. Army Surgeon General for the fiscal year July 1, 1940, to June 30, 1941.

A table listing the incidence of broken bones, for example, shows the greatest number in the Cavalry, with the Artillery, Quartermaster Corps, Engineer Corps, Infantry and Air Corps following in that order.

For all of Uncle Sam's soldiers during the fiscal year, the doctor's bill was $73,138,251.85, a medical bill which held the Army death rate to only 2.8 per 1,000 strength, the lowest in history, excluding battle casualties.

Soldiers treated in hospitals by military medical personnel, however, increased from an average daily low of 4,753, in 1939 to 8,300 in 1940, an increase of 75%. Despite two influenza epidemics, incidence of pneumonia among 19,609 'flu cases was only 0.3%.

One result of the shift from a peace to wartime basis was the organization of a subdivision of Medical Intelligence and Tropical Medicine in the U. S. Army.

This unit is prepared for protection of soldiers' health at stations outside the United States. Surveys of such territory, the report states, have been made or are being made and the data filed for future use. The report praises the Medical Corps Reserve, "without which medical service rendered during the year would have been impossible."

In 1940 the Medical Department initiated a concentrated program of venereal disease control which has produced favorable results.

As in the past, automobile accidents continued to be the prime cause of death in the Army during the period, with air transport accidents second. Railroad accidents accounted for the fewest fatalities and tuberculosis, a minor factor now, was next to last on the list.

The report showed alcoholism to be a relatively minor health factor with fewer cases admitted during 1940 for treatment than at any time since 1916. About that time the report shows that alcohol addiction increased from practically non-existence to a fairly high rate in 1923 and remained rather constant during the next 10 years. In 1933, a decline set in and continued to the 1940 low of approximately 2.7 per 1,000 strength.

Medical Department problems of mobilization were emphasized by a statement in the report of the large numbers of enlisted men who must be trained as technicians.

For an Army of 1,800,000, the report said, approximately 23,000 qualified dental, veterinary, sanitary, medical, surgical, pharmacy, laboratory and X-ray technicians are required. In addition, some 35,000 administrative specialists are necessary. Facilities existing at the time the report was prepared were sufficient to train 18,000 enlisted technicians in three-month courses.

Science News Letter, February 28, 1942

FISHERIES

Oysters, Like Cattle, Grow Fat in Rainy Years

OYSTERS, like cattle, depend on rain. They grow sleek and fat in rainy seasons, are lean and make poor eating in drought years, states the new annual report of the New Jersey Agricultural Experiment Station.

The reason is that oysters, like cattle, are animals and depend on plants for their food. The "pastures" on which oysters feed are minute one-celled plants that swarm in uncountable millions in the sea, as grass-blades pack meadows on the land. As pastures of the land depend on soil fertility, this microscopic "grass of the sea" depends on mineral nutrients in solution in the water. Most of these mineral salts are washed down from the land. When rains are copious and rivers are full, the inshore waters where oysters live are well fertilized; in droughty years they receive little of these necessary washings from the land, the micro-plants dwindle accordingly and the oysters go hungry.

The parallel breaks down, however, when it comes to seasons of destructive floods, when dams burst and valuable topsoil is washed away from the land. That is hard on agriculture ashore, but fine for aquiculture offshore. Some of the best oyster years on record have followed summers of notable floods.

There is a notable and obvious difference, too, between the grazing of livestock and the feeding of oysters. Cattle move about, feeding on stationary plants, but in the sea it is the animal oysters that stay put and the plants that swim or drift about until they are caught in the in-sucked current of water that each oyster keeps pumping through its shell.

The parallel picks up again when it comes to the variety of plants eaten respectively by cattle and oysters. Cattle eat almost anything green, but depend mainly on two large plant groups: grasses and legumes. Oysters feed on practically any microorganism they capture, but their mainstays are two large groups of microscopic plants, which have no common names but are known to scientists as diatoms and dinoflagellates.

A "fat" oyster deos not contain actual fat, as a fat steer does. Its reserve food is stored in the form of glycogen, or animan sugar—the same stuff that is stored in our own livers and the readiest reserve food that can be drawn upon in our own physiological emergencies. This liver-sugar in oysters is one of the things that makes them especially desirable in the human diet.

Science News Letter, February 28, 1942

It is possible to obtain *fat* in a crystalline form.