

Chemists Accurately Analyze Specks

Chemistry

Spectroscope Begins to Show Quantitative Make-up

THE classical picture of a chemist as a man peering at a test-tube or anxiously watching a precipitate form in a beaker must now be varied to show him in the role of a wielder of invisible radiations or a watcher of artificial rainbows.

The newer methods of analysis, including X-ray analysis, spectrum analysis, micro-analysis and many other modern refinements and innovations, are such as to leave the man who "took chemistry" a few years ago but who has not paid much attention to it since, floundering and gasping. These new methods were described at the recent meeting of the American Chemical Society in Atlanta.

Where the older chemist needed whole ounces of material before he could make an analysis, his modern descendant can often get even more accurate results with a speck of stuff no bigger than a pinhead. He puts the material to be analyzed under a microscope instead of a test-tube, and through the magic eye of that instrument sees the effects of the reagents he applies multiplied a thousand-fold.

Watching rainbows used to be the most visionary of occupations, but the modern chemist, watching through his spectroscope the glowing streaks given off by an ignited "unknown," can dissect its chemical makeup as accurately as the anatomist with his scalpel can take apart a fish or frog. Beginnings in spectrum analysis were made long ago, but these were only qualitative: they told what was in a given sample of material, but did not answer the question, "how much?" which is basic to all industrial processes as well as to a great deal of "pure" chemistry. Now the magic rainbow-tube of the chemist is beginning to be able to weigh the parts of the things it is called upon to analyze.

XYLOSE, a sugar made from woody stuff, may come to figure as largely in American industry as its chemical cousin cellulose now does. A commercially practicable means of manufacturing it out of cottonseed hull bran, now a very low-value by-product of the cottonseed industries, has been worked out at the U. S. Bureau of Standards. It was discussed by one of the group of scientists who developed it, Dr. W. T. Schreiber.

Although xylose has almost the same chemical makeup as glucose, lactose and other food sugars, it is not expected to play its most important role as a food. It can be fermented into a variety of materials useful in industry, especially alcohol and such solvents as acetone, lactic acid and acetic acid. By other manipulations it can be turned into a basis for dye-stuffs and food colors.

Transformed into an allied substance, xylite, it may be treated as cellulose is treated to make guncotton, resulting in a new explosive which might be called nitroxylite.

Although the possible use for xylose as food is not large in bulk, it may be important nevertheless. It is not as sweet as common cane or beet sugar, but it has a definitely sweetish taste, and it may therefore turn out to be useful in the diet of diabetics, who cannot tolerate ordinary forms of sugar. Xylose appears to be harmless to diabetics.

Xylose has been an expensive laboratory possibility for a long time, but its preparation from agricultural waste on a large scale makes it an important industrial novelty. The Bureau of Standards group that developed it includes S. F. Acree, who originated the present process for its manufacture, W. L. Hall, Max Bradshaw, Fred Acree, W. T. Schreiber, Klare Mackley, R. C. Geib, W. Eckhardt, Baker Wingfield, C. S. Slater and G. M. Kline.

ANEW gas for the cells of electric refrigerators was demonstrated at the opening sessions of the Chemical Society meeting. It is non-poisonous and non-inflammable, and it very closely approaches the refrigerating engineer's notion of an ideal substance for the purpose.

The new gas is a compound of carbon, chloride and fluorine, and is a chemical cousin to carbon tetrachloride, widely sold under a variety of trade names and used for such diverse purposes as grease-spot remover, fire extinguisher and insect exterminator. As a matter of fact, carbon tetrachloride is one of the two ingredients that are used in making it, the other being a less-known compound, antimony fluoride.

The new refrigerant is the inven-

tion of Thomas Midgley, Jr., famous as the developer of ethyl gasoline, and a Belgian chemist, Dr. A. L. Henne.

It is as completely non-toxic as carbon dioxide, which we have in our lungs all the time as the result of our breathing and which we swallow whenever we drink any kind of carbonated beverage. It is also completely non-inflammable; even with the addition of 30 per cent. of butane, an exceedingly explosive gas, the mixture refused to ignite.

WHERE does iodine in Kentucky rainwater come from? Dr. J. S. McHargue and Dr. W. R. Roy of the Kentucky agricultural experiment station asked their fellow-chemists this question at the Chemical Society meeting, but did not offer to answer it.

Iodine in natural waters of inland regions has figured importantly in public-health work since the discovery of its importance in preventing goiter. In regions near the sea, it is assumed that the iodine in natural waters comes from sea-water spray flung into the air and evaporated into clouds. But Kentucky, Dr. McHargue pointed out, is 500 miles from the nearest point on the sea.

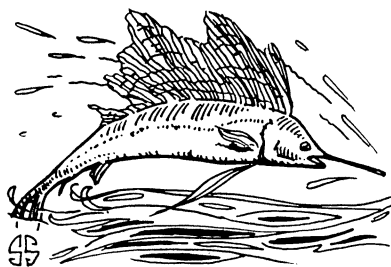
Iodine does not seem to be present as a gas in the air. Dr. McHargue made a critical chemical test of the air, bubbling it through a solution that should have detected the element if present even in minute quantities, and got no results. The source of iodine in Kentucky rainwater remains a mystery.

However, Dr. McHargue concluded, recent investigations indicate that forage crops and vegetables grown in his state contain appreciable amounts of iodine. There are no known areas in Kentucky where goiter is more prevalent than in other parts. Apparently the iodine content of natural waters and foods produced in Kentucky is adequate for the normal growth and metabolism of animals.

SCANDINAVIAN paper manufacturers can produce more cheaply than their American competitors. Each year they ship 6,000 tons of kraft wood pulp more than 4,000 miles to the southeastern states and sell it for less than the same kind of pulp made from the abound- (Turn to page 238)

NATURE RAMBLINGS

By Frank Thone



Sailfish

WHEN we have a President who is also an angler—which happens about once in a generation—he is apt to have a favorite brand of fish. Members of the portlier generation can remember Grover Cleveland's preference for trout. Calvin Coolidge caught trout also, but the fish he made famous was a perch. Now, with a second angler-President in immediate succession, we find Herbert Hoover going in for bigger game and having his luck with sailfish. Both on his pre-inauguration trip to South America and recently off the coast of Florida he brought to gaff first-class specimens of this strangely-shaped, hard-fighting fish.

Sailfishes (there are several species) are related to the swordfishes, as witness their long upper jaw, projecting into a formidable beak. Like the swordfishes, they are big fish. The kind President Hoover went after is the most northerly-ranging and the smallest, reaching a length of six feet and a weight of 150 pounds. There is one tropical species that gets to be more than half again as large.

The various species of sailfish are pretty strictly tropical or at most subtropical. The President's fishing waters, off Lower California and southern Florida, represent about as far north as they choose to run. Occasional specimens have been taken as far up the coast as Savannah and Norfolk.

Being large fish they require much food. Being swimmers in the open and not bottom feeders they require speed and agility in order to pursue the smaller fish on which they prey. Hence the flaring tail and the great sail-like dorsal fin. Hence also the long, almost wing-like pectorals.

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Chemistry—Continued

ing pine forests in this section. These economic facts were presented by Prof. Lauren B. Hitchcock, of the University of Virginia.

"New and economical methods of manufacturing wood pulp from southern pines must be perfected by American research chemists in order to meet foreign competition," Prof. Hitchcock declared. "It should be possible in the middle of a southern pine area, with as staple and satisfactory a labor supply as can be found in America, to profitably manufacture kraft pulp and deliver it a few miles away at some different amount, however small, below the price asked by foreign manufacturers after a 4,000 mile water shipment."

Kraft pulp is used in the manufacture of strong wrapping papers, and is the staple product of southern mills. Virginia, whose rate of industrial growth in recent years has exceeded that of other states, can fairly credit her success to wood pulp and cotton linters. A large portion of the state's industries, both old and new, involve chemical processes, and 65 per cent. of these are based on cellulose, said Prof. Hitchcock.

"Although Virginia's twelve mills are situated in a region generally regarded solely as a kraft district, the average value per ton of their product is exceeded by only two other states, Massachusetts and New Hampshire, large writing-paper producing districts," said Prof. Hitchcock.

Among Virginia's mills is the first ever built to manufacture a type of cardboard from chestnut chips.

Science News-Letter, April 12, 1930

New Names

To Cobh and Oslo add Istanbul, Gelibolu and Ankara. The Turkish Government has announced its official ways of spelling many names of cities and other geographic features, according to advices received here by the United States Geographic Board. And they add to the strangeness of the post-war map, agreeing not at all with the names that used to be in the geographies when we were children.

Constantinople, the Greek name chosen by the Roman emperor who built the city centuries ago, becomes Istanbul. Gallipoli, the scene of one of the most epic struggles in the history of warfare, is re-spelled Gelibolu. Angora, seat of the present Turkish Government, will henceforth be known as Ankara.

Geography

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STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912

Of SCIENCE NEWS-LETTER published weekly at Baltimore, Md., for April 1, 1930.

Washington
District of Columbia } ss.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared Watson Davis, who, having been duly sworn according to law, deposes and says that he is the Editor of the SCIENCE NEWS-LETTER and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Editor, Watson Davis, 21st and B Sts., N. W., Washington, D. C.

2. That the owner is:
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3. That the known bondholders, mortgagees, and other security holders owning or holding one per cent. or more of total amount of bonds, mortgages, or other securities are: None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appear upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

Watson Davis,
Editor.

Sworn to and subscribed before me this 1st day of April, 1930.

[SEAL]

Charles L. Wade.

(My commission expires April 6, 1933.)

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