

CHEMISTRY

Super-Sensitivity of New Research Tool Is Confirmed

Illinois Investigators Devising Improvements to Make Magneto-Optic Method Dependable for Laboratory Routine

"A POWERFUL new tool for research, one thousand times more sensitive than the most delicate methods of analysis now used," is the report Dr. B. S. Hopkins and Dr. Gordon Hughes of the University of Illinois gave the American Chemical Society following a study of the magneto-optic method of analysis developed by Dr. Fred Allison of Alabama Polytechnic Institute, and used in the discovery of the last two chemical elements.

The Illinois scientists are devising improvements to Dr. Allison's method which they expect will make it a dependable tool for routine use in the laboratory—one with which the limits of human knowledge can be extended to present "unknowns" where infinitesimals of one-millionth of one per cent. are matters of importance.

Methods Compared

Dr. Hopkins and Dr. Hughes found that the magneto-optic method surpasses a thousand times analysis by arc spectra, its nearest rival in sensitivity. The limit of accuracy of the X-ray spectra method is one-tenth of one per cent., Dr. Hughes said; the arc spectra will analyze to one thousandth of one per cent., depending on the substance under examination, and the magneto-optic method easily extends this limit to one millionth of one per cent. This accuracy is achieved in analysis of rare earths, that part of the periodic table where analysis is most difficult because the elements are so closely "jammed together" there.

The Allison method uses simple apparatus, which costs much less than that required in other forms of analysis. Two hundred dollars would cover the cost of that employed in the University of Illinois investigations, it was stated.

Dr. Hopkins and Dr. Hughes also reported that the Allison analysis requires a much smaller "sample" than other methods and that the substance is not destroyed as is the case with the chief forms of analysis now used.

But their investigations have led them

to agree with other scientists who have found that the Allison method in its present form is not dependable.

"Results are obtained from the instrument by noting faint light flickers with the eyes," Dr. Hopkins told Science Service. "Dr. Allison and his workers have trained themselves to make these observations and they have become very efficient, but others have tried reading with the eye and they have found that they cannot depend on it.

"Our work has been directed at eliminating this fault," he continued. "Dr. Hughes has already improved the light source, a spark which has been unsteady. He is now developing a photographic method of reading the 'minima.' The faintly varying light makes a record on a very sensitive moving photograph plate and this is examined under a microphotometer, which is much more accurate than the eye in locating the spot of slight light variation."

"The next step will be the making of two photographic records," Dr. Hughes said, "one to picture light after it passes

through the liquid being analyzed and the other to show light made from the same source but which does not pass through the liquid. This refinement is expected to make it easier for us to pick out the 'minima' variations from other fluctuations such as those caused by the spark flicker and by photographic emulsion granulations."

The scientists then expect to apply the photoelectric cell to the apparatus so that readings can be taken automatically. Sufficiently sensitive cells are already available, Dr. Hopkins said.

One field of science which is expected to be benefited by use of the improved apparatus is the study of minute traces of minerals and metals in food.

Science News Letter, April 9, 1932

PHOTOGRAPHY

Camera Reveals Mountain Not Seen by Aviator

A NEW record in long-range photography was made about a month ago by Capt. Albert W. Stevens of the U. S. Army Air Corps from a plane flying near Salinas, Calif., 80 miles south of San Francisco. His picture shows Mt. Shasta, 331.2 miles distant.

The previous distance record was made by Capt. Stevens last year in South America with a 320-mile view of a peak in the Andes. Even from a height of 23,000 feet, Capt. Evans could not see Mt. Shasta; he pointed his camera by compass. Krypto- (*Please turn page*)



NEW LONGEST-RANGE PHOTOGRAPH

yanine film, developed in Eastman research laboratories, reproduced the picture from penetrating infra-red rays

that pierced the hundreds of miles of haze obscuring the view.

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Opiates Found Related to Essential Elements of Diet

Research Shows Substance Giving Benefits of Vitamin C Can Be Prepared from Derivative of Harmful Drug

CHEMISTS are building a bridge over the seemingly impassable gap between destructive, habit-forming drugs and essential, building elements of diet, it appears from a report made to the closing session of the American Chemical Society. From an alkaloid derived from the age-old drug, opium, there may come after a series of chemical changes a substance bringing the benefits of the anti-scurvy vitamin C, possibly the vitamin itself.

Spurred by the recent discoveries which indicate that the effects of vitamin C can be gotten from a substance easily made from narcotine, a by-product in the manufacture of morphine from opium and which is now of little value, chemists throughout the world are racing to learn more about narcotine and its compounds. Progress of an American laboratory was described by Dr. Carl R. Addinall, research chemist of Rahway, N. J. He told how he has made from narcotine, by methods simpler and more general than those used in the past, a number of compounds, the proportions and transformations of which may become valuable allies in the investigation of citrus fruit juices and other foods well supplied with vitamin C.

Dr. Otto Rygh, Norwegian chemist, announced at the first of the year that by heating narcotine with hydrochloric acid he had obtained a substance very much like vitamin C, possibly the vitamin itself. He admitted, however, that it is likely to be a mixture of the potent substance with impurities. When he fed it to guinea pigs suffering from scurvy, the pigs were cured of the vitamin C deficiency disease.

The claims of Dr. Rygh are contested by a prominent English biochemist, Dr. Silva, who reports that the substance he prepared from narcotine by the method adopted by Dr. Rygh did not cure guinea pigs of scurvy. The work of the Norwegian chemist is now being ex-

amined in other laboratories throughout the world.

Science News Letter, April 9, 1932

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New Method May Result In Cheap Supply of Ramie

A NEW cellulose industry for America seems to be a step nearer reality following the development in laboratories at Louisiana State University of a method of treating ramie to obtain from it longer and stronger fibers than are now available from cotton, flax or hemp. The work is being carried on by Dr. P. M. Horton of Louisiana State University, and G. L. Carter of the University of Virginia, and was reported to the American Chemical Society by Mr. Carter.

The unusual durability and strength of ramie have been known to the world since ancient Egyptians used it for wrapping those mummies which have been

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Castor Oil Yields Drug That "Unpoisons" Cobra Venom

THERE IS MORE to castor oil than the rebellious small boy or even his insistent parents ever imagined. For from it a drug has been made that takes the poison out of poisons. It renders harmless the quick death-dealing venom of the cobra and rattlesnake, as well as those sluggish, ill-defined toxins in the bowels of man which are responsible for the condition commonly known as auto-intoxication.

Sodium ricinoleate, better known as soricin, is the name of this castor oil

best preserved for modern examination. But the only processes that have ever been available for separating the useful fiber from the worthless parts of the stalk are slow and expensive and are carried out entirely by hand labor.

By chemical means of digestion and bleaching Dr. Horton and Mr. Carter report that they have separated the fiber from its closely clinging bark and have given it a clean white color with practically no loss of strength.

There remains, it was pointed out, the separation of the fiber and bark from the interior pulp and woody tissue. In the laboratory this was easily accomplished by hand. The development of a machine for this simplified operation is not expected to be difficult. The many machines of the past, all of which have been failures, have attempted to separate the fiber from both the outer bark and the inner wood and pulp.

If the laboratory method of separating the fiber from the bark, which has been developed at Louisiana State University, can be applied commercially, chemists agree that one of the greatest difficulties preventing the extensive use of ramie in industry will be overcome.

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Sulfur Dioxide Harmless As Food Preservative

DRIED FRUITS preserved by treating with sulfur dioxide, the pungent gas obtained by burning sulfur, are not actually harmful, Dr. P. F. Nichols and Prof. W. V. Cruess of the

derivative. The intricate process leading to its isolation is described by Dr. Theodore H. Rider.

The action of soricin merely removes the toxic properties of the bacterial toxins and other poisons and leaves their other properties intact, according to Dr. Rider. Thus a toxin such as that of tetanus or diphtheria, when detoxified by soricin, is said still to retain the power of producing immunity even though it is no longer a dangerous poison.

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