

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.

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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

U. S. Army Air Corps