

fessor J. M. Bijvoet, University of Utrecht, President of the International Union of Crystallography, and Professor Max von Laue, Kaiser-Wilhelm Institute, who suggested the experiments which produced the first x-ray diffraction pattern, that of a crystal of copper sulfate, in Munich in 1912.

The first paper, "Historical Survey", was presented by Professor Sir W. L. Bragg, Cavendish Laboratory, Cambridge University. Professor Bragg noted that the title of his paper was really a misnomer, as he intended to discuss only the first years of x-ray crystallography and not the relatively recent work which would have been familiar to the "second generation" crystallographers present. He then described the experiments by Laue and his co-workers in which the first x-ray diffraction photographs were obtained, and the excitement which the publication of the results produced in various laboratories in Britain, particularly at Leeds, where Professor Bragg's father, W. H. Bragg, was then engaged in research on x-rays. Their working out of the first structures to be established, those of sodium chloride, potassium chloride, and diamond, and the difficulties with their apparatus were described with interesting detail.

Professor Laue then spoke briefly in German. He explained that in his opinion, although the initial work was done in Germany, the reason why so little work was done there on crystal structures was that the Germans were interested only in principles. The English, he pointed out, were interested in models and the use of the principles. He expressed the hope that Germans would adopt this attitude, not only in science, but also in the fields of culture and politics, so that there might be more harmonious relations between the two countries.

In the second paper, "Growth and Scope of X-ray Crystal Analysis", Professor J. D. Bernal, Birbeck College, London, recalled his early work in crystal structure analysis, and also attempted to predict what the field might be like in the future. He noted that, in as much as some previous predictions he made six years ago had not yet come to pass, he might just as well still make use of them. Professor Bernal foresaw great strides in methods, largely because of the rather high proportion of papers on methods which appear in *Acta Crystallographica*. He looked for great improvements in x-ray tubes and in methods for recording diffraction patterns; on the other hand, methods for the solving of structures will also be extended, including extension of the so-called "direct methods", and perhaps the day will arrive when every worker in the field will have his own handy X-RAC on his desk. The importance of crystal structures to the chemist was emphasized, especially in the fields of stereochemistry and proteins.

Dr. Dorothy Hodgkin, University Museum, Oxford, then discussed, in the third paper, "Chemical Problems", some of the difficulties which crystallography had presented to the chemist. When she first started in structure work, there was the widespread opinion that x-ray analysis' main role would be merely to verify established principles; this has since been found to be

quite wrong, she said, as more problems were being posed than were being settled. Among these are the invariant spatial configuration of the tartrate ion, for which there is at present no theoretical stereochemical explanation, the comparison of the structures of the oxalate ion and oxalic acid, the unexpected structure of arsenobenzene, which was found to contain a six-membered ion of arsenic atoms, and the still unconventional boron hydride structures. Dr. Hodgkin also described briefly the progress on the structure of vitamin B12, which is far more complex than any solved structure. Certain details of it have been established, but considerably more work remains to be done before the desired degree of clarification can be effected.

"X-Ray Analysis and the Metallic State", by Professor G. V. Raynor, University of Birmingham, was the fourth paper. Professor Raynor traced the importance of x-ray diffraction in the study of metals and alloys. He covered in some detail the history of the studies of the metallic state, and how some theories, such as that of the Brillouin zone, which were originally based on results of work with simple alloys, have withstood tests on more complicated systems recently examined. Professor Raynor called attention to recent studies designed to settle the question of valency in metals, and remarked that an additional increase in accuracy of measurements of electron density would doubtless lead to a much fuller understanding of this interesting question.

The final paper of the conference, "The Application of X-Ray Analysis to Protein Structure", was presented by Professor Bragg. This paper, as Professor Bragg pointed out, represented quite a change in scope compared with the first four, as he intended to discuss only one projection of one crystal. He then described the work which has been done so far on the structure of hemoglobin. It might seem that the location of thousands of atoms was beyond the reach of x-ray analysis, but the crystals fortunately have properties which enable the direct evaluation of part of the molecular transform, and hence the electron density. These properties, viz., the stepwise changes in the lattice constants with water content and pH, and the inclusion of salts in the crystals, are being studied in great detail, and have so far enabled the determination of the dimensions of the molecule and, moreover, have given strong indications of exact shape of the transform in one zone. Much additional work remains to be done, but as Professor Bragg remarked at the beginning of his talk, this work may be likened to the voyage of Jason to obtain the Golden Fleece: the difficulties are tremendous, but the prize is rich.

Jerry Donohue  
Cavendish Laboratory  
Cambridge, England

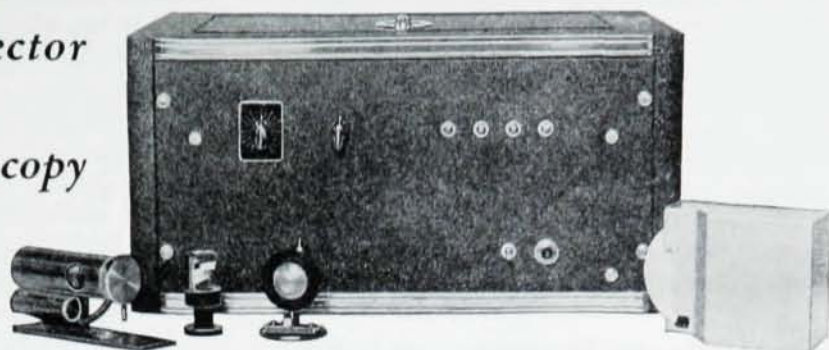
## Calorimetry

### 7th Annual Conference at NBS

Recent developments and modifications in precision calorimetric equipment and techniques were discussed at the Seventh Annual Calorimetry Conference, held at

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the National Bureau of Standards last September 19-20. More than one hundred calorimetrists attended the meeting, which was under the chairmanship of D. R. Stull of the Dow Chemical Company. The program, arranged by Guy Waddington of the Bureau of Mines, included a number of individual reports as well as four round-table discussions. The latter were concerned respectively with presenting calorimetric data in journals, adiabatic and high-temperature drop calorimetry, new and useful commercial products for low-temperature calorimetry, and electronic thermoregulators.

## Book and Sound Records

### Scientific Meetings Transcribed

The advent of tape recording has made possible a new way to extend the benefits to be derived from scientific meetings. This was demonstrated at the meetings of the Colloquium of College Physicists and American Association of Physics Teachers at Iowa City, Iowa, June 11-14, 1952.

A tape record was made of nearly every report given at the meetings. To accomplish this the microphone was tied around the speaker's neck, and a connector plug of the microphone circuit placed in his pocket. Thus the speaker's hands were free and the cord was dragged by the pocket as the speaker moved about.

The recording machine served as a public address system while making the record and this assured that the people in the audience had no difficulty in hearing.

After the conclusion of the meetings a typewritten transcript of every report was prepared and sent to the speaker. Every speaker was invited to edit his transcript, supply diagrams and prepare 250 copies for assembly into a book record of the meetings. This was done with the understanding that such a book record should not be considered as publication and should not prevent the article from being published elsewhere.

It proved to be a shock to some speakers to learn what they had actually said. They all recovered, however, and supplied 250 copies of their reviewed transcript. These articles have been assembled, bound, and one copy sent to each person registered at the meetings.

It is expected that this book will serve as a reference volume in the library of those who received it. The book should permit a detailed study of the verbatim record of any report of particular interest and permit a continuation of discussion of reports by mail by parties interested. It should result in the preparation of a better article for final publication in a scientific journal.

The tape records of the reports have been placed on file and are available for duplication for anyone wishing to have any of the reports as they were actually made. The tape record is available for nearly every report listed on the program of the meetings as published in the *American Journal of Physics* 20,464, October 1952. The cost for duplicate reels is \$2.00 (paper) or \$3.00 (plastic) per 15 minutes. Arrangements for duplicates may be made through Dr. Thomas Osgood, Editor,

*American Journal of Physics*, Michigan State College, East Lansing, Michigan, or by writing to J. G. Winans, Sterling Hall, University of Wisconsin, Madison, Wisconsin.

J. G. Winans  
*University of Wisconsin*

## Optics Congress in Spain

### International Commission Meets in April

The International Commission of Optics will hold its third regular congress in Madrid, Spain, during April 1953, in connection with the activities in celebration of the 50th anniversary of the Spanish Society of Chemistry and Physics. The business sessions of the congress will be restricted to official delegates from the several participating countries. However, there will also be an open symposium on Optical Problems of Vision, organized by the Spanish society, with Professor J. A. Artigas as chairman and Professor J. M. Otero as secretary. This meeting will extend over the three-day period 15 to 17 April, and will be featured by invited papers presented by Messrs. Stiles of England, Granit of Sweden, Le Grand of France, and Wald of the United States. Persons wishing to receive further information about the symposium should contact the chairman of the U.S.A. National Committee of the International Commission of Optics, Professor Stanley S. Ballard, Tufts College, Medford 55, Massachusetts.

## Electroacoustics

### International Congress in Holland

The International Commission on Acoustics, a special commission of the International Union of Pure and Applied Physics, is sponsoring an international congress on electroacoustics in the Netherlands from June 16th through June 24th. The congress will include seven major sections, of which one will be a symposium on the sound insulation of light-weight structures under the leadership of C. W. Kosten of the Netherlands. The subjects and general reviewers for the other sections are as follows: Sound Recording, R. Vermeulen (Netherlands); Public Address Systems, E. Meyer (Germany); Acoustic Measurements, L. L. Beranek (U.S.A.); Hearing Aids and Audiometers, P. Chavasse (France); Electroacoustics in Ultrasonics, G. Bradfield (Great Britain); and Electroacoustics Applied to Musical Instruments, E. G. Richardson (Great Britain). The opening session will be held in The Hague and the technical sessions will take place in the Institutes of the Technological University of Delft, in Eindhoven (Philips' Industries), and Hilversum (Netherlands Broadcasting Center). The opening session of the congress on June 16th will include a lecture by the president of the International Commission, R. H. Bolt. Correspondence relating to the meeting should be addressed to the organizing secretary of the International Electroacoustics Congress, Mr. P. A. Lange, Mijnbouwplein 11, Delft, Netherlands.