INTERNATIONAL CONFERENCE ON CRYSTAL LATTICE DEFECTS

by Henry M. Otte

A review of the International Conference on Crystal Lattice Defects which was held in Japan in September 1962.

Photo courtesy Shimizu Photo Studio, Kyoto, Japan.

Dr. S. Yoshida, Laboratory of Crystal Physics, Hiroshima University and Prof. R. M. Thomson, Dept. of Metallurgy, University of Illinois.

The beginning of September saw some 130 scientists from 13 foreign countries converge on metropolitan Tokyo to join about 300 of their Japanese colleagues at the International Conference on Crystal Lattice Defects. This conference, which was held under the auspices of the International Union of Pure and Applied Physics from September 3-12, was organized by the Physical Society of Japan. A large number of the participants were, however, not physicists, but metallurgists, and possibly even some who would consider themselves, in line with current trends in the United States, material scientists.

Prior to the main part of the conference, held in Kyoto, September 7-12, a two-day symposium on the Mechanical Aspects of Lattice Defects was arranged in Tokyo. The publication (within four to six months) of the proceedings of both the Tokyo symposium and the Kyoto conference are planned by the Physical Society of Japan which hopes to make the bound volume(s) available for about \$15.00, as a supplement to the Journal of the Physical Society of Japan.

The Tokyo symposium consisted of some two dozen papers by about 48 contributors, an average of two authors per paper. This average also held for the approximately 140 papers presented at the Kyoto conference. Not unnaturally, almost half of the papers were by authors from

the host country, but those by Americans were about equal in number, and together they formed the majority of the contributions. As the Russian participants arrived too late to present their papers at the Tokyo symposium, arrangements were made to accommodate some of them at the Kyoto conference. Consequently, the discussion time available at the conference was, in general, less than that at the symposium. Only the discussions actually presented will be published, and in many cases, this will unfortunately not indicate the number of views that had to go unheard.

All authors had been requested to provide fairly extensive abstracts (in English) ahead of time, and these were available at the conference. The usefulness of the abstracts was enhanced by the inclusion, in many cases, of diagrams and figures.

An address by Takeo Fujiwara, professor emeritus of physics at Hiroshima University and chairman of the organizing committee, opened the sessions in Tokyo and in Kyoto. He spoke in English, and this was the language used throughout the conference. Admiration for the hosts in the way many of them coped with the difficulties that the use of this language created for them was unanimous, and a tribute was paid by J. J. Gilman when he introduced the session, of which he was chairman, in Japanese. This was greeted by an appreciative round of applause from those who understood what he said as well as those who did not.

The highlight of the conference was as expected, the pair of evening lectures. E. W. Müller, professor at

Pennsylvania State University, and inventor of the ion microscope, gave a brief description of the instrument followed by numerous beautiful photographs illustrating its capability of resolving the location of individual atoms on the surface of a metal. At the end of his lecture, Prof. Müller showed a brief ciné film of "atoms in action".

Prof. K. Mendelssohn, from the Clarendon Laboratory, Oxford, presented a fascinating talk in which he demonstrated the wealth of information that can, under suitable conditions, be obtained about point defects and extended imperfections from low-temperature measurements of both electric and thermal conductivities on the same material. He concluded his presentation by illustrating the capability of the method in studying neutron irradiation problems where the effects are difficult to interpret by other methods.

In view of the large number of papers presented and also their expected rapid publication, it is hardly practical or even worthwhile to present a summary of the individual contributions here. An outline of the topics will serve to give the reader a general impression of the nature of the conference.

Tokyo symposium

The Tokyo symposium was divided into four topics: I motion of dislocations in crystals; II work hardening; III internal friction: interaction between dislocations, and point defects; IV discussions of the problems relating to the Bordoni peak.

(Continued on page 165)

HENRY M. OTTE, member of AIME, is with RIAS, (Research Inst. for Advanced Study), div. of Martin Marietta, Baltimore, Md.

Crystal Lattice . . .

(Continued from page 157)

In session I papers were presented by F. W. Young, Jr. (ORNL), W. G. Johnston (G.E.), J. J. Gilman (Brown University), R. Thomson (University of Illinois), R. W. Cahn (University of Birmingham, now at University College of North Wales), J. Takamura (Kyoto University), K. Yazu (Gakushuin University), J. Washburn (University of California, Berkeley), and K. Matsuura (Tohoku University). Three of the papers were theoretical and the others described experimental observations made on semiconductors, alkali halides, alloys, and pure copper.

Session II consisted of four speakers: A. Seeger (Max-Planck-Institut für Metallforschung), D. Kuhlmann-Wilsdorf (University of Pennsylvania), K. Sumino (Tohoku University), and R. Maddin (University of Pennsylvania). Of these, only one dealt with bcc metals, and the others were all concerned with fcc metals and alloys.

The longest session was III, in which the following gave talks: R. Truell (Brown University), K. Lücke (Technische Hochschule Aachen), D. O. Thompson (ORNL), R. R. Hasiguti (University of Tokyo), J. M. Roberts (William Marsh Rice University), M. Sakamoto (Tokyo College of Science), T. Okada (Osaka University), C. Wert (University of Illinois), G. Schoeck (S.C. de Bariloche), and T. Sugeno (University of Tokyo). Four of these papers were theoretical and provoked an exceptional amount of discussion; the others presented experimental results on the bcc metals iron, tantalum, and sodium, on copper, and on alkali halides.

The final session wound up with presentations by A. Ikushima (University of Tokyo), J. J. Gilman, H. Suzuki (J.A.E.R.I.), S. Okuda (Rice University), A. Seeger, and S. Koda (Tohoku University). Outstanding in this session was the debate concerning the size of the debris dipoles, and their ability to explain the low temperature Bordoni internal friction peak in strained crystals.

Kyoto conference

The Kyoto conference sessions were divided into three main groups: I fundamental properties of lattice defects (divided further into eight subject matters); II interaction between lattice defects; and III production and annealing of lattice defects.

The topics of Session I (70 papers) were quite diverse, and included papers on magnetic resonance, optical studies, and observations of lattice defects; electrons and phonons and their scattering by lattice defects; color centers and lumines-

Notice to Members

In a move to improve the addressing and data processing functions of its business office, AIME has decided to have the Data Processing Center, located in the United Engineering Center, perform these services. Prior to the change-over, all address labels for the February and March issues of JOURNAL OF METALS were prepared and stored.

During this period, changes of address that are reported **cannot** be made on the mailing labels. This **does not** mean the notification has been ignored; the changes will be picked up for the April issue.

Name Changes Made For ISD Committees

Changes in the names of several of its committees were approved by the Iron and Steel Division of The Metallurgical Society during a meeting of the ISD executive committee in Cincinnati, Ohio on December 4.

The National Open Hearth Steel Committee and the Acid Converter and Basic Oxygen Steel Committee were merged into one committee, to be known as the *National Open Hearth and Basic Oxygen Steel Committee*. This change was deemed advisable because of changes in technology and the fact that the same personnel involved in open hearth steelmaking are very often also identified with the basic oxygen steelmaking process.

The name of ISD's Mechanical Working Committee has been changed to *Mechanical Working and Steel Processing Committee* to recognize the increased scope of the work being done by this group.

Also, the name of the Blast Furnace, Coke Oven, and Raw Materials Committee was shortened to *Iron-making Committee*.

cence; formation and migration of point defects and the equilibrium among defects in compounds; and impurity conduction and energy levels of defects in semiconductors. Both sessions II (25 papers) and III (45 papers) were concerned with metals as well as non-metals. The central theme of Session III was radiation damage and its effects.

The whole conference was run with extraordinary efficiency and credit for this must go to the Organizing Committee, chaired by Prof. T. Fujiwara, to the Executive Committee chaired by Prof. R. R. Hasiguti, to the Scientific Program Committee, chaired by Prof. T. Suzuki, and to the local sub-committees chaired by Dr. E. Matsuura (Tokyo) and Prof. J. Takamura (Kyoto).

Pacific N.W. Conf. Set April 25-27 In Portland, Ore.

The 16th Annual Pacific Northwest Metals and Minerals Conference which will be held in Portland, Ore., will feature an all-day Electric Furnace Session on Thursday, April 25. The conference will be held at the Multnomah Hotel, April 25-27.

Tentative plans call for a morning session beginning with opening remarks by R. W. Shearman, secretary of the Electric Furnace Committee, and secretary of The Metallurgical Society; and G. C. Olson, works manager of Atlas Steel Ltd., and past chairman of the Electric Furnace Committee.

Papers will be presented on *Arc Melting of Stainless Steel for Castings* by Jack Belmont, Esco Corp.; *Vacuum Melting in the Albany, Ore. Area*, by Robert A. Beall of the U.S. Bureau of Mines' Albany Metallurgy Research Center; and *H-Iron Through Steelmaking*, by Russel J. MacMullan and Harold M. Stotler, Hydrocarbon Research Inc.

The afternoon session will have papers on *Improving Load Power Factor in the Operation of Arc Furnaces* by Carroll E. Hermanson, Oregon Steel Mills; *Effective Utilization of Power in Submerged Arc Furnaces*, by Lawrence R. O'Brien, Union Carbide Metals Co.; *Basic Refractories for Electric Furnace Practice* by Ray A. Witchey, A. P. Green Co.; and a paper by W. E. Schwabe, National Carbon Co.

Other technical sessions will be presented, but details have not yet been announced.

The Pacific Northwest Metals and Minerals Conference is sponsored by AIME, American Welding Society, American Society for Metals, and the National Association of Corrosion Engineers.

Metallurgical Society Will Participate in Western Metal Congress

The Metallurgical Society will be one of the five societies participating in the American Society For Metals' Western Metal Congress and Exposition which will be held March 18-21 in Los Angeles.

Technical sessions will be held in the Ambassador Hotel while the Metal Exposition will be held in the Pan-Pacific Auditorium and an adjoining pavilion. Attendance is expected to exceed 25,000.

Under the chairmanship of Walter M. Pollit, the local section of AIME has organized four technical sessions; they are on the following topics: fundamental concepts of formability, theory of deformation, diffusion bonding, and advanced methods of metals joining.