D. H. Niblett das sog. Bordoni-Maximum der inneren Reibung in k.f.z. Kristallen, das durch Elementarschritte der Versetzung im Kristallpotential hervorgerufen wird,

R. H. Chambers die besonders ausgeprägten Effekte dieser Art in k.r.z. Kristallen.

R. Truell, C. Elbaum und A. Hikata beschreiben innere Reibungseffekte während der Verformung von Al und NaCl.

W. J. Bratina diskutiert solche Effekte in kubisch raumzentrierten Metallen, insbesondere Eisen und bei grossen Schwingungsamplituden.

Eine besondere Anwendung haben anelastische Messungen beim Studium bestrahlungsinduzierter Defekte gefunden, die D. O. Thomson und V. K. Pare beschreiben.

Der längste und theoretisch tiefstschürfende Artikel des Bandes von A. Seeger und P. Schiller beschreibt schliesslich die dynamischen Eigenschaften des elementaren Vehikels der Kristallversetzungen, der 'Kinke' (altdeutsche Übersetzung des engl. Wortes kink).

Der Kristallograph wird sich in diesen Artikeln nur insofern angesprochen fühlen, als er an der Struktur und Dynamik von Kristallbaufehlern interessiert ist. Manchmal kommt die Kristallographie in diesen Artikeln neben der Physik sogar etwas zu kurz. So hätte man sich im 1. Abschnitt eine gruppentheoretische Behandlung der Punktfehler-Relaxation gewünscht. Im ganzen aber ein ausgezeichnetes Handbuch, zu dem man dem Herausgeber gratulieren kann.

P. HAASEN

Institut für Metallphysik der Universität
34 *Göttingen*
Hospitalstr. 12
Deutschland

The physics of semiconductors. The proceedings of the eighth international conference on semiconductors, Kyoto 1966. Pp. x+xiii+780. The Physical Society of Japan.

The Eighth International Conference on the Physics of Semiconductors was held in Kyoto, Japan, in September 1966. The proceedings have now appeared as a single formidable volume of some seven hundred and eighty pages containing about 150 papers. Naturally there is a very wide range of topic and the papers are divided into eighteen sessions: Band theory, Optical properties – lattice, Optical properties – electronic, Excitons, Magneto-optics, Impurity states, Recombination, Transport phenomena, Quantum transport, Hot electrons, Electron–phonon interactions, Current instabilities, Impurity conduction, Tunnelling, Magnetic semiconductors, Superconductivity, Semi-metals, Plasma instabilities, Magneto-plasma and Magneto-acoustic phenomena. These section headings are sufficient to show the scope of the Conference.

The way in which each of these subjects has developed over the last few years in breadth, depth and sophistication is remarkable. Thus in the first topic, that of Band theory, the advances since the Second Conference in 1954 are such that we now have fair descriptions of the electronic band structure of the 3–5 and 2–6 compounds as well as for silicon and germanium. These are based principally on pseudo-potential and perturbation calculations with comparisons with experimental results, usually those obtained from optical reflexion experiments. Already these techniques are being applied to other more complex materials.

Optical methods for studying semiconductors have always been important and have figured in each successive conference. They have been notable for their elegance of technique. Amongst the new work reported at this conference, that concerned with the interpretation of two-phonon Raman scattering is noteworthy, as is the use of lasers to provide the primary beam in such experiments. The use of strong magnetic fields in experiments aimed at studying transport phenomena as well as in optical experiments has increased noticeably. There is also an increased interest in the highly anisotropic layer compounds such as CdI_2 and GaSe, as is evinced by several contributions in the sessions on optical properties.

Impurities continue to be studied extensively and the recent work is covered in the three sessions on Impurity state, recombination and impurity transport. This is an area in which it is better to report 'steady progress' generally rather than to pick out a particular paper or technique.

From an application point of view, the papers in the Current Instability section are important, for they are mostly related to the Gunn effect, the general principles of which are now understood. There are, however, significant 'filling-in operations' still to be done, as this set of papers shows. The most striking feature in this field is the swiftness of the development of theory and experiment once an effect had been observed, to give the first manufactured devices (three years).

The more exotic materials are represented in the sections on magnetic and superconducting semiconductors, although both are small.

The impression given by this volume is one of extremely high activity in numerous laboratories. Once again one is struck by the way in which semiconductors are such excellent vehicles for solid state research of a most general kind. The volume itself is well produced; items of discussion are given after each paper. That there are misprints is inevitable in such a large volume of this nature. Fortunately, they do not mar its contents. These proceedings are a very valuable summary of recent knowledge and must be freely available in all laboratories with pretensions to solid-state research.

D. H. PARKINSON

Royal Radar Establishment
St. Andrews Road
Great Malvern
Worcs.
England

World literature in physics as seen through *Physics Abstracts*–1964 issues. Two vols., duplicated, pp. 1–258, 259–531. 1967. Price U.S.$ 15.00.

World literature in physics as seen through *Bulletin Signalétique*–1964 issues. Two vols. duplicated, pp. 1–220, 221–326. Paris: Conseil International des Unions Scientifiques, Bureau des Résumés Analytiques, 1967. Price U.S. $ 15.00.

These two works are the first part of a study being made by the ICSU Abstracting Board of the production of abstracting journals within the field of physics. There are four physics member journals of the ICSU AB, the two here studied, the *Physikalische Berichte*, and *Referativnij Žurnal*. A similar study is in progress for *Physikalische Berichte*,

and a fourth study will consist of a comparison of the first three; it is unfortunate that there are no present plans for a study of the *Referativnij Žurnal*. In each case the study was made by punching cards, one for each citation, containing information on the journal, the country of publication, the language of the paper (when this was easily ascertained – for the *Bulletin Signalétique* this was not always the case), the time lag of the entry, whether an abstract (as distinct from merely a title citation) was included, if so whether it was signed, and the subject classification of the paper. These cards were then processed by computer and the results analysed in various graphs and tables, so that one can see, for example, what fraction of the total literature, or the literature from any one main subdivision of physics, is contained within what fraction of the total number of journals. Many of the results are of interest primarily as a study of the abstracting journals, but some reveal important facts about the literature of physics, such as the predominance of the English language, and the predominance of the major journals (five per cent of the journals produce fifty per cent of the citations). Each study has a list of all the journals that appeared in the entries for 1964 in order of the number of entries; *Acta Crystallographica* is in thirtieth and twenty-eighth place in the two lists.

J. W. GLEN

Physics Department
The University of Birmingham
Birmingham 15
England

_F_-centers in alkali halides. Solid state physics, supplement 8. BY JORDAN J. MARKHAM. Pp. x + 400. New York and London: Academic Press, 1966. Price $ 16.

First impressions carry considerable weight, and in this case I was struck by the time gap between the literature covered and the present day. The author in his preface, dated July 1966, 'believes most of the experimental aspects of the *F*-center are covered until about the middle of 1963', though in fact several 1964 papers are quoted. The book has an old-fashioned air due to the approach adopted by the author. He does not arrive, in any detail, at the de Boer model for the *F*-centre till page 292. In this model, now universally accepted, an *F*-centre consists of an electron bound to a negative ion vacancy.

The book contains ten chapters which fall naturally into three sections. The first five chapters review the optical properties of the *F*-centre, and related topics such as photoconductivity and the production of *F*-centres. This is followed by three chapters on electron paramagnetic resonance in theory and practice, including the ENDOR measurements which were decisively in favour of the de Boer model. In the last two chapters the author describes the theory of *F*-centre wave functions and of strong electron–phonon interactions. He is especially well fitted for this section in view of his well-known review article in this field. The author quotes his own work in the text, but over-modestly excludes his own name from the author index. It is not clear that very much is gained by having these three sections bound together, especially if doing so has resulted in delayed publication.

The author is aware that the 'major problem related to the de Boer model is the production of negative ion vacancies' (p. 293). This problem has been further emphasized by the experimental discovery of ultraviolet coloration of alkali halides published in 1964. The proposals of Pooley and Hersh suggest that non-radiative transitions play a key role. Unfortunately non-radiative transitions are given scant treatment.

This work is well written and well produced with few errors. Some of the figure captions are too brief; in particular that for Fig. 3.4 does not list the temperatures for the curves shown. There is some confusion on page 57 where in a summary it is stated that 'some alkali halides color more easily at low temperatures than at high', though the reverse statement occurred in the preceding section. Possibly this arose since both statements are true, some alkali halides showing a maximum in the curve of coloration efficiency *versus* temperature. This is true for ultraviolet coloration, which is one of the sections of the book which has been overtaken by recent experiments. On the theoretical side there is now more understanding of the anomalously long lifetime of *F*-centre fluorescence. With regard to the study of aggregates of *F*-centres whole new fields of study have emerged, including the effect of uniaxial stress on the optical and fluorescence spectra. This clarifies the symmetry and degeneracy of these centres in much the same way that this was accomplished for *F*-centres by electron paramagnetic resonance. A full treatment of these more complex centres falls outside the scope of the book under review, but I feel that the relative neglect of the *M*-centre is hard to justify. No reference is made to the van Doorn and Haven model suggested in 1956, and further supported by Pick in 1960, in which the *M*-centre simply consists of a close pair of *F*-centres.

I feel it is unlikely that this book will fulfil its avowed aim of assisting the beginner in this field. A beginner would be well advised to consult the simpler and more extensive book by Schulman and Compton, *Color Centers in Solids*. However the specialist will find much useful material in this scholarly work.

W. A. RUNCIMAN

Solid State Physics Division
Atomic Energy Research Establishment
Harwell
Didcot
Berks.
England