### $Th_2Zn$

This compound is isomorphous with $Th_2Cu$ (see above). with tetragonal lattice constants: $a = 7{\cdot}60$, $c = 5{\cdot}64$ Å, Again, calculated and observed intensities confirm the Type $C16$ structure, with an ideal parameter of $\frac{1}{8}$. (Intensities were also calculated for $x = 0{\cdot}159$ with no improvement.)

Nowotny (1946) has examined the zinc-rich side of the system, reporting crystallographic data for $ThZn_9$, and he has discovered another compound richer in thorium, but presumably not $Th_2Zn$.

### $ThHg_3$

At approximately the composition $ThHg_3$ a hexagonal phase, $a = 3{\cdot}38$, $c = 4{\cdot}72$ Å, occurs with $z = \frac{1}{2}$. Intensity data are compatible with a disordered hexagonal closest-packed structure, but probably do not exclude ordering. The lattice constants vary somewhat from sample to sample and presumably the composition is variable over a range, but the solubility limits have not been established. The compound resembles $UHg_3$ (Rundle & Wilson, 1949).

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## Notes and News

*Announcements and other items of crystallographic interest will be published under this heading at the discretion of the Editorial Board. Copy should be sent direct to the British Co-editor (R. C. Evans, Crystallographic Laboratory, Cavendish Laboratory, Cambridge, England).*

### *Acta Crystallographica:* important notice

In order to reduce the pressure of work on the Editorial Board, the Commission on *Acta Crystallographica* has co-opted two additional members. As from 1 January 1956, Prof. E. W. HUGHES (Gates and Crellin Laboratories, California Institute of Technology, Pasadena, California, U.S.A.) will act as an additional American Co-editor and Prof. H. LIPSON (Physics Department, College of Technology, Manchester 1, England) as an additional British Co-editor. Articles in English should, therefore, be submitted to R. C. Evans, I. Fankuchen, E. W. Hughes, H. Lipson or I. Nitta.

## Book Reviews

*Works intended for notice in this column should be sent direct to the Editor (P. P. Ewald, Polytechnic Institute of Brooklyn, 99 Livingston Street, Brooklyn 2, N.Y., U.S.A.). As far as practicable books will be reviewed in a country different from that of publication.*

**Untersuchungen über die Elektronentheorie der Kristalle.** By S. I. PEKAR. (Translated from the Russian by H. Vogel.) Pp. viii+184. Berlin: Akademie-Verlag. 1954. Price DM. 13; $5·85.

The Russian version of this book appeared in 1951 and deals mainly with the theory of polarons as developed by the author and his Russian co-workers from 1944 onwards. A polaron is a particular excited state of an ionic semiconducting crystal in which a free electron, taken from the conduction band, is captured in a potential trough produced by the surrounding ionic charges. Under these circumstances the electron will produce a (radially directed) polarization of the nearby ions and this polarization diminishes the total energy of the state and so helps to keep the electron trapped. Because of its low energy this state in turn diffuses with comparative ease through the crystal. A non-trapped, quickly moving conduction electron cannot produce such polarization because of the inertia of the ions.

The wave-mechanical theory of this complicated state naturally requires many approximations, and there is considerable difference of opinion as to the validity of Pekar's approach in which it is assumed that the potential trough in which the electron is trapped offers energy levels in much smaller steps than those of the normal ions, but that these steps are large compared to those in the infra-red absorption region of the lattice. Thus the trapped electron absorbs photons in a spectral region of transparency of the normal crystal, and the polaron offers a model explanation of $F$-centers. The discussion of $F$-centers is the main object of the second half of the book.

Supplemented by the study of some more recent papers (e.g. H. Fröhlich, *Advances in Phys.* (1954), **3**, 325, R. P. Feynman, *Phys. Rev.* (1955), **97**, 660) this translation gives a good survey of the work done on the polaron. Translator, editor and publisher are to be congratulated on having done a very competent job.

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