BOOK REVIEWS

IRON ORE BENEFICIATION, by LAWRENCE A. ROE. ix+305 pages, Minerals Publishing Company Lake Bluff Illinois 1957. Price $5.00.

This book is a discussion of the iron ore minerals and of the techniques and equipment peculiar to iron ore beneficiation. It is assumed that the reader will be familiar with subjects common to the general field of minerals beneficiation, such as crushing, grinding, and sizing.

There are many handbooks and textbooks covering the general field of minerals beneficiation, but very few have attempted to put together the details for specialized branches such as beneficiation of the ores of a single element.

The volume under review has as its principal object the gathering in one place of the many scattered bits of information relating to iron ore beneficiation, but it is in no sense a handbook or textbook. Its broad coverage, as well as the numerous footnote references and lengthy lists of additional references at the end of each chapter, should make the book very useful to the increasing numbers of minerals beneficiation engineers who are primarily concerned with the processing of iron ore minerals, as well as to those in related fields who would like a general and readable summary of the subject.

The volume is a clearly reproduced and easily readable offset printing from type-script. There are more typographical errors than would be expected from this method. It is a little surprising to find the lists of additional references arranged neither alphabetically nor chronologically.

With the increasing importance that the taconites are assuming in the domestic production of iron ore minerals it is logical that the three longest chapters in a work of this kind, other than the one on descriptions of the minerals themselves, should be those on techniques involved in processing these ores—Pyrometallurgical Processing, Magnetic Separation and Aglomeration.

The concluding chapter on Research is unexpectedly short—a little over three pages of text and four pages of Additional References. It is more a concentrated outline of the history of such research and its cost rather than an attempt to assess current research and to point out future needs and possible trends.

The Index is also quite inadequate, attempting to cover 300 pages of text with only five lightly filled pages of index.

EARL INGERSON

TABLES PERMETTANT LE DÉPOUILLEMENT DES DIAGRAMMES DE RAYONS X ET ABAQUES DE RÉGLAGE DES MONOCHROMATEURS À LAME COURBE, by A. J. ROSE, 141 pages, 21×27 cm. Centre National de la Recherche Scientifique (C.N.R.S.), 13 Quai Anatole-France, Paris 7^e, 1957. Price (bound): $4.50.

The author is both a mineralogist at the Sorbonne and a research director at the C.N.R.S. He is famous for the x-ray photographs he takes. Whoever has seen his exhibit at the Montreal Congress will tell you he is a perfectionist.

The main table (Table I) gives the function $\lambda/2 \sin x$ to 5 significant figures for six different wavelengths[1] ($K\alpha_1$ of Cu, Ni, Co, Fe, Cr, and Mo) and for all values of x in steps of 0.01° from 0.01° to 89.99°. In view of the analogy between the two formulae

$$a_{uvw}/2n = \lambda/2 \sin \phi_n \quad \text{and} \quad d_{hkl} = \lambda/2 \sin \theta,$$

the table can be used to obtain the period a_{uvw} of the rotation axis $[uvw]$ from a rotating-crystal pattern ($x=\phi_n$) or the interplanar distance d_{hkl} from a powder pattern ($x=\theta$). It

[1] *Erratum:* p. 7, line 1, instead of $K\alpha$ read $K\alpha_1$.

is not necessary, however, to calculate the value of x, as two additional columns list the quantities[2]

$$\delta = 2R \tan \phi_n \quad \text{and} \quad \Delta = 4R\theta,$$

each for two camera radii, $R=180/2\pi$ and $R=240/2\pi$ mm. These arguments are simple functions of the measured distance between two symmetrical lines on the film; in the case of the usual rotation pattern, $\delta=2h_n$ is the distance between the two n^{th}-layer lines; in the Mauguin rotation method (film perpendicular to rotation axis), $\delta=2RH/h_n'$, where H is the crystal-to-film distance and h_n' the radius of the (circular) layer line; in the Debye-Scherrer powder pattern $\Delta=2l$ or $2\pi R-2l$, according as $2l$ is the distance between two corresponding forward-reflection lines or back-reflection lines; in the Seeman-Bohlin patterns, $\Delta=l$ (transmission) or $2\pi R-l$ (back reflection). For a camera with radius 2R, use $\Delta=l$ instead of $\Delta=2l$.

The numerical values of the wavelengths are those of Cauchois and Hulubei, multiplied by 1.00202 so as to be expressed in Å units. They differ, only in the fifth place, from the ones commonly used (*Acta Cryst.* **1**, p. 46, 1948). Table II*a* gives atomic weights and mass absorption coefficients for the $K\alpha$ of Mo, Zn, Cu, Ni, Co, Fe, Mn, and Cr. Table II*b* lists e^{-x} to 4 decimals for $x=0(0.01)5.50$ and $5.50(0.10)9.90$.

Curved quartz crystal monochromators of two types (Johann, 1931; Johansson, 1933) are used almost routinely in French laboratories. This fact explains why Table I refers to $K\alpha_1$ wavelengths only; it also accounts for the nomographs included in the volume. Let the quartz plate of such a monochromator be cut at an angle σ to the reflecting planes $(10\bar{1}1)$, let r be the radius of curvature of the net planes $(10\bar{1}1)$, SC the distance from the x-ray source S to the plate center C, and CF the distance from C to the focalisation line F. Each nomograph corresponds to a certain wavelength ($K\alpha$ of Mo, Cu, Ni, Co, and Fe) and gives SC and CF (mm.) in terms of r (mm.) for several values of σ. The nomographs solve two problems: (1) Find the focal distances SC and CF of an available monochromator used with a given x-ray wavelength. (2) Select a monochromator that possesses desirable values of SC and CF, imposed, say, by space available.

The presentation is clear. The tables were first printed by I.B.M. machines, then reproduced by photo offset with a 2 to 1 reduction, which does not impair their legibility.

DONNAY AND DONNAY

REFERENCES

JOHANN, H. H. (1931), *Z. Phys.*, **69**, 185.
JOHANSSON, T. (1933), *Z. Phys.*, **12**, 507.

[2] *Erratum:* in column 3, instead of $4r\theta$ read $4R\theta$.