

Book Reviews

Works intended for notice in this column should be sent direct to the Editor (A. J. C. Wilson, Department of Physics, University College, Cathays Park, Cardiff, Great Britain). As far as practicable books will be reviewed in a country different from that of publication.

Fifty years of X-ray diffraction. By P. P. EWALD.
Pp. x + 720. Utrecht: N. V. A. Oosthoek's Uitgevers
Mij. Price \$ 11.25.

No living branch of science is static. As it develops it may change its form, and such changes must be reflected in the way that the subject is presented to the newcomer to the field. Only by seeing the fundamentals presented unclouded by the errors and obscurities of the past will he be able to cope with the advances and complexities that he encounters.

But as he becomes more expert in the field, he will realize that something is missing from the textbooks; they necessarily omit the spirit and sense of adventure. At some stage he must fill this gap, for anyone who believes that science develops only by logical and predictable steps cannot make a good scientist. He may be able to carry out given routines to solve particular problems, but he will be unable to make the 'breakthrough' that exposes new fields and provides great opportunities.

This book, then, should be read by everyone who feels that he has attained a modest competence in the use of X-ray diffraction. It will show him how halting were the steps of the pioneers, and should reassure him if he feels that he can never be as logical and precise as the textbooks pretend that these pioneers were. It shows them as people with personal difficulties and scientific doubts that seem extraordinary today but which were not extraordinary at the time.

The production of the book coincided with the fiftieth anniversary of the discovery of the diffraction of X-rays by crystals. The story of the events leading up to this discovery is fully recounted by Ewald, who unwittingly planted the idea in Laue's mind and did not see the outcome until it was published. The reader will see that one of the most brilliant episodes in physics was not the result of careful planning but occurred because of the chance that the right men, the right ideas, and the right apparatus happened to be together. All that was needed was the catalytic action of an apparently unrelated problem!

Again, it is obvious to us now how the discovery should have been used: a new radiation was available and could be used for studying matter on the atomic scale; the optical principles were known and could have been used immediately. But the type of mind necessary for the discovery was not the type of mind necessary to exploit it. The subject moved from Germany to England, where the results, under the direction of W. H. and W. L. Bragg, flowed thick and fast.

And so the pattern of research changed, although never again so fast as at the beginning. There were waves of progress and then apparent quietude — not the steady

development described in the textbooks. Different people came into the subject for different reasons — not the least important being a personal liking for a great man. The subject spread rapidly throughout the world and is now perhaps one of the best organized subjects in the whole of science.

We are indeed fortunate to have a man like Professor Ewald who, himself a pioneer, had the enthusiasm and energy to carry through the project of publishing this book. He is able to give first-hand accounts of the beginning of the subject; he is able to see the impact which the discovery made upon physics as a whole; and he has the authority to persuade his colleagues and his friends to contribute their own personal views and impressions. We should be grateful to him for producing this most important book.

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X-ray optics. The diffraction of X-rays by finite and imperfect crystals. By A. J. C. WILSON. Pp. 147 + 34 figs. London: Methuen. 2nd edition. Price 21s.

The second edition (first edition 1949; cf. Acta Cryst. 2, 340) of Wilson's *X-ray Optics* has not altered in general plan, but has been considerably enlarged. The most important addition is the introduction of the mean square breadth of diffraction lines, which is a useful tool for measuring line profiles in powder photographs. The bibliography has been expanded (full titles of the papers cited are now given) and some remarks are added occasionally. The author is primarily concerned with the influence of crystal disorder on the X-ray diffraction patterns of single crystals and on the line profiles of powder photographs. The physical background of disorder processes and their theoretical interpretation lies beyond the scope of this booklet. Fortunately the mathematical presentation is very simple. In spite of this for some problems a fairly high standard is reached. It should therefore be recommended to all advanced students as a very useful guide for the formal interpretation of diffuse X-ray diffraction photographs.

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