innumerable circumferential striations – many more than in the unetched sample (fig. 3). An electron microscope study of these structures will be reported later.

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Figure 3 Two-stage etch (stage 2). Blastular SiC coat. Nomarski interference contrast. Deposition direction – see arrow. (×610 – enlarged from ×540 for reproduction)

Book Reviews

Strength of Materials

P. Black

Pp 454 (Pergamon Press, 1966) 45*s*

This is an excellent book, well-suited to the requirements of the students for whom it was written. A particularly valuable feature is the excellent coverage of first and second moments, a part of the syllabus which students often find difficult. The book may also prove useful to first-year undergraduates studying electricity or electronics as a main subject, who sometimes find "strength of materials" hard-going.

The chapter on beam deflections could be considerably shortened by introducing Macaulay's method almost at the beginning, since all the examples shown can be done by this means. There is no chapter on practical stress analysis; for the level at which the book is aimed, this is probably a wise omission.

G. C. SPENCER

Single Crystal Diffractometry

U. W. Arndt and B. T. M. Willis

Pp xv + 331 (Cambridge University Press, 1966) 84*s*

The first diffractometer for the measurement of the intensities of X-ray reflections from a single crystal was built by W. H. and W. L. Bragg about 1913, with an ionisation chamber as X-ray detector. However, as the subject of X-ray crystallography developed, there was a marked trend away from diffractometers in favour of photographic methods of recording. The pendulum has begun to swing in the other direction only since about 1950. Diffractometers on which the crystal and detector had to be set to their appropriate positions by hand, for each reflection, were built because of the inherently greater accuracy of quantum counters compared with photographic detectors, but these were tedious to use. Automatic diffractometers, including a few with on-line computer control, are now coming into use. They are both faster and more accurate than photographic methods; as yet they are more subject to breakdowns and will always be more costly, at least in initial outlay.

The authors of this book are the leading experts in this country in the field of instrumentation for X-ray and neutron crystallography. They discuss both thoroughly and clearly every aspect of single crystal diffractometers, including peripheral topics such as choice of size and shape of specimen, counting statistics, collimation of neutron beams, monochromatisation of incident radiation, etc. Comparisons of diffractometer and photographic methods are somewhat biased in favour of the former, but not unduly so. The book includes an interesting discussion of possible future developments such as the use of co-ordinate detectors, or of "white" as opposed to monochromatic radiation.

This is a book which everyone concerned with crystal structure analysis will want to read, and will profit from reading.

W. COCHRAN

X-ray Determination of Electron Distribution

Selected Topics in Solid State Physics, VI

R. J. Weiss

Pp xv + 196 (North-Holland Publishing Co, 1965) 65*s*

This is a book on a single, rather specialised topic. It contains a detailed and comprehensive account of the theory and practice underlying attempts to determine electron distributions in solids by measurement of the intensity of X-ray scattering.

The book is divided into four chapters. The first deals with the theoretical calculation of the scattering of X-rays by free atoms in the Born approximation and shows how this is related to the electron wave functions. In the second chapter, the scattering from crystalline solids is discussed and formulae relating the integrated intensities of the Bragg reflections to their structure factors are derived for both perfect and imperfect crystals in several sample geometries. A particularly detailed account is given of methods of recognising and correcting for lack of perfection in perfect crystals and extinction in imperfect ones. Chapter 3 is concerned with experimental methods of measuring the integrated intensities on an absolute scale; both powder and single-crystal methods are discussed in detail. The final chapter contains an account of those experimental determinations of X-ray scattering which are considered sufficiently accurate for the determination of electron charge density, or momentum distribution; this includes only those in which absolute intensities have been measured with about 1 % accuracy. This chapter emphasises how few such accurate measurements are.

Whilst this book should be required reading for all those who wish to attempt to measure charge densities or to assess critically the value of any such measurement, it cannot be recommended unreservedly to students or to other general readers. The basic ideas on which the determination of electron distribution from X-ray scattering measurements depend are covered adequately in many texts on crystallography which are not so limited in scope, and the price of this particular book is very high indeed for such a slim volume.

P. J. BROWN