here and abroad to explore ways to lasting peace, American intellectuals and their government come off quite well. In no other land is an equivalent effort being made to explore the psychological, technical, and political methods by which we can reduce the possibility of thermonuclear war. In fact, the literature has grown so extensive and sophisticated that few but full-time professionals can keep abreast of it. Furthermore, many natural scientists and strategic specialists in the Pentagon, RAND-type organizations, the Arms Control Agency, and the White House are drawing upon this literature in the formulation of national policy. The movement toward an invulnerable deterrent, the attempt to achieve a nuclear test ban, and the announced decision to spare Soviet cities in the event thermonuclear war should occur are in large part attributable to the energies of these experts. Along with Osgood and Lapp, they too have been seeking alternatives to war or surrender.

Yet from the perspective of the continued precarious nature of the world situation, this effort is rightly judged inadequate. We have only begun to comprehend and meet the challenge posed by the continued advance of science and technology. And when we truly grasp the implications for international society, of the 20th-century scientific revolution, even the prescriptions of Osgood and Lapp may appear mild when set alongside the magnitude of the problem.

X-ray Diffraction

Diffuse X-ray Reflections from Crystals. W. A. Wooster. Oxford University Press, New York, 1962. xi + 200 pp. Illus. $5.60.

The diffraction of x-rays from lattices has been under ever greater study during the past 50 years. The first years were concerned with the deduction of repeating atomic arrangements in, hopefully, nearly perfect crystalline materials. Occasional early notice was made of unusual diffuse effects on films and other detecting devices, and these observations have lead to extensive studies of the diffuse scattering associated with the following effects: temperature motion of atoms, including the rotation, translation, and dilation of molecules; the disturbance of lattice perfection by substituting different atomic species (or order-disorder phenomena); the distortion of the lattice caused by atom substitution, vacancies, dislocations, and other imperfections; stacking faults and layering phenomena; precipitation phenomena; and large scale distortion of the lattice (like that associated with cold-working).

A book that covered this area would be of great value to students of the field and to many research workers who are interested in details of the phenomena which give rise to diffuse x-ray scattering.

Wooster has attempted in this book to remove the difficult-appearing relationship between a diffuse scattering effect and the lattice disturbance that causes it by utilizing the optical diffractometer and by a minimal use of mathematics. The optical diffractometer presents a simulated image of the expected diffuse scattering from two-dimensional arrays of holes which represent scattering centers and which have the desired type of imperfections or periodic distortions. The major portion of the book then gives, in complete experimental detail, the interpretation of thermal diffuse scattering, mostly as it is observed by film techniques. Examples of the determination of elastic constants and the spectra of elastic vibrations are given. The rest of the text consists of review chapters on diffuse effects from several structural imperfections—layer types, the effects of twinning in diamond, age-hardening, and order-disorder—and from molecular crystals.

To limit the subject matter, Wooster omitted consideration of diffuse scattering from gases, liquids, and amorphous solids and by the techniques of electron and neutron diffraction.

The many tables, charts, and corrective techniques for thermal, diffuse, scattering studies as well as the optical simulation of diffuse effects will be useful to young research students, the book's intended audience. The review chapters will aid those interested in further investigation of these interesting phenomena. But the content does not appear to have a sufficiently detailed theoretical basis nor to provide sufficient analysis of many of the phenomena to satisfy the advanced research worker or the technologist.

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Sarton's Essays

Sarton on the History of Science. Dorothy Stimson, Ed. Harvard University Press, Cambridge, Mass., 1962. xvi + 383 pp. $10.

"The history of science should not be a refugium peccatorum; it is on the contrary a discipline which should attract the attention and the devotion of bold and adventurous spirits, hard workers and courageous pioneers" (p. 49). So spoke the late George Sarton in one of the most attractive essays in this selective reprinting of his multifarious writings. It reminds us, however inadequately—for Sarton was truly humble—of his own courageousness in the face of very real difficulties and deficiencies. It also serves to recall a memorable sentence written by his wise and perceptive daughter, in a recent article about George Sarton. May Sarton observed that her father was, "A man who moved with extraordinary freedom over the ages and the continents within a daily orbit as undeviating as that of any planet" [*The Texas Quarterly*, Autumn (1962)]. The singular truth of this statement will be apparent to the readers of these essays which range from Avicenna and Maimonides to Leonardo da Vinci and on to Sarton's (now quite famous) "Notes on the reviewing of learned books." How better could one describe this humane scholar whose principal mission was and always remained the demonstration of the unity of knowledge?

It is entirely fitting that Dorothy Stimson should select and edit this all too brief collection of essays. The selecting must necessarily have been most difficult. Although we are informed that most of the essays were chosen from a list of those that Sarton himself considered suitable for republication, the fact remains that his writings were so diverse in subject matter, so specialized at one moment and at the very next so universally applicable to scholarship in general, at once erudite (but not pedantic), yet at the next turn almost sentimental, that any brief selection inevitably fails to portray the full man and his accomplishments.

At the same time this selection (which has been skillfully handled) may serve to effect the most desirable end: to wit, the publication of Sarton's *Opera Omnia*. Nothing short of such a project can ever do justice to his immense scholarship.