Some information valuable for reference purposes is presented in tabular form. Neutron and X-ray scattering data for the elements and isotopes are compared in Table 2, while the relations between the absorption characteristics of neutrons and X-rays are listed in Table 6. An interesting table on pp. 160–161 compares the properties of X-rays and neutrons for diffraction studies.

There are very few misprints or errors in the text, and the book is well bound and of a convenient size. The subject is a rapidly advancing one, papers reporting new developments appearing regularly month by month. It is therefore valuable to have this authoritative survey of the achievements to date. It should make a wide appeal to all those interested in the furtherance of knowledge about the solid state.

H. P. Rooksby

NEW LIGHT ON AN OLD POLYMER

Cellulose Nitrate

The Physical Chemistry of Nitrocellulose, its Formation and Use. By Dr. Frank Douglas Miles. Pp. xiii + 422 + 4 plates. (Edinburgh and London: Oliver and Boyd, Ltd., 1955. Published for Imperial Chemical Industries, Limited.) 45*s*. net.

THE theoretical and experimental background necessary for the understanding of high polymers is almost contemporary; the treatise of Staudinger was only published just over twenty years ago, and the modern entropy theory of their solutions is more recent still. Yet many of these substances, including nitrocellulose, have been major industrial products for a century or more. Workers in this field have therefore long felt the need for a treatise discussing, criticizing and interpreting, from a modern point of view, the great mass of experimental data and practical experience which has been acquired.

The treatise of Dr. F. D. Miles fulfils this need. His first chapter presents the X-ray and optical data on cellulose itself, and his second discusses the reaction of cellulose with nitric acid. Chapters 3–6 discuss the properties and applications of solid nitrocellulose and its gels (celluloid, leathercloth, cordite, etc.), and, finally, the last four chapters discuss the reactions of solid nitrocellulose, its fractionation, the properties of dilute solutions and the problem of solubility. The plan of the work is logical and orderly: the only criticism that can be made is that the presentation of data on solvent absorption and gelatinization in the fourth chapter, while the dilute solutions and general solubility are kept to the end, tends to hide their essential continuity.

In detail this book succeeds very well in holding the delicate balance between the old school who regarded such solutions and gels as uninterpretable except by special 'colloid-chemical' concepts, and the modernists who might consider there was nothing left to explain; in particular, Dr. Miles makes clear the importance of specific interactions between nitrocellulose and solvent molecules, although the last chapter does not tackle the difficult problem of the thermodynamic consequences of such interactions. The literature is very well covered—the long series of papers from government research establishments in France are given their proper importance, and Dr. Miles makes public for the first time much interesting work done in the laboratories at Ardeer of Imperial Chemical Industries, Ltd. It would be impossible in any reasonably sized book to discuss all the literature on nitrocellulose: Dr. Miles has managed to include nearly all the important papers before 1954 and at the same time to exclude the enormous volume of unsound work which, before his treatise, had to be ploughed through by those new to the subject.

This book can therefore be recommended to all interested in work on high polymers, as well as to those who specialize on cellulose and its derivatives. The book is well printed, and, for what it contains, is very cheap.

FURTHER STUDIES OF LAVOISIER'S CHEMICAL DISCOVERIES

Lavoisier

Théoricien et Experimentateur. Par Maurice Daumas. (Bibliothèque de Philosophie Contemporaine, Logique et Philosophie des Sciences.) Pp. ii + 180 + 4 plates. (Paris: Presses Universitaires de France, 1955.) 700 francs.

LAVOISIER has been the subject of many studies, but some details of his life and works are still imperfectly known. M. Maurice Daumas, who has studied correspondence, notebooks and other unpublished manuscripts preserved by the Paris Academy of Sciences, has re-examined several aspects of Lavoisier's chemical works, and the present book will be of value to all who are interested in eighteenth-century chemistry.

A chronological account of Lavoisier's work bearing on the theory of combustion, which has been compiled from many sources, shows that important results were often read to the Academy long before they were printed. The controversies over oxygen and water are briefly discussed, and it is concluded that Lavoisier did not himself claim priority for either the isolation of oxygen or the combustion of hydrogen to form water, but that he did, with justice, claim priority for the correct interpretation of the experiments. Many readers will agree with M. Daumas that sentiment rather than impartial inquiry has led to some opinions previously expressed on these topics.

M. Daumas also examines the origins of Lavoisier's "Traité Élémentaire de Chimie" (1789), showing that it was first planned in 1780 or 1781, before the antiphlogistic theory was complete; and he gives an interesting account of Lavoisier's apparatus, much of which still exists. The accuracy attainable by a scientist is limited by the quality of his apparatus as well as by his personal skill, and it was fortunate that Lavoisier could employ such excellent instrument-makers as Mégnié and Fortin.

After discussing Lavoisier's views on the nature of matter and on chemical affinity, M. Daumas concludes that, despite his genius, he could "act and think only as a man of the eighteenth century". However, he also directs attention to Laviosier's ability to "understand what was the problem of the hour, and to pursue it to its resolution"; that is a rare quality which ensures greatness in any century.

W. A. Smeaton