to specialized aspects of the technique. Consequently, there is a need among crystallographers for a book that covers both theoretical and practical features of direct methods in an integrated and up-to-date way.

This book does not quite achieve this. It contains ten chapters that discuss various aspects of direct methods, each chapter having a separate author. The editorial hand could have been firmer. Apart from the inevitable problems of duplication and overlap, each contributor has been allowed to use his own nomenclature which is consequently different in every section. This will confuse the non-expert and so limit the overall usefulness of the book. The index, too, is rather poor.

There are, however, some excellent individual contributions. Rogers has written a thorough chapter on origin and enantiomorph definition, looking at what can be a difficult subject in a fresh and interesting way. Hauptman, who was one

of the pioneers of direct methods, has contributed a clear and elegant summary of some recent theoretical developments including potentially important work on seminvariant theory. Another pioneer, Sayre, gives an account of phase expansion and refinement methods in his typically concise and illuminating style. There is also an interesting chapter by Argos and Rossmann on the molecular replacement method although its inclusion somewhat extends the customary boundaries of direct methods.

Whether these chapters justify buying the whole volume is of course a personal decision. In any case, the price is not unreasonable for a book of this length. However, the field is still open for a definitive book on direct methods in X-ray crystallography. □

C. J. Gilmore is a Lecturer in Chemistry at the University of Glasgow, UK.

A wealth of virus lore

D.H. Watson

Introduction to Virology. By K. M. Smith and D. A. Ritchie. Pp.212. (Chapman and Hall: London and New York, 1980.) Hardback £12, \$29.95; paperback £5.95, \$14.95.

THE STRENGTH of this book lies in its wide-ranging selection of examples from the world of plant and invertebrate as well as of vertebrate and bacterial viruses. Fungal, protozoal, mycoplasma and spiroplasma viruses are also mentioned. The reader will also benefit from K. M. Smith's wide knowledge of the natural history of plant and insect viruses in particular, as well as from the beautiful electron micrographs (more profuse than is usual in a book of this size) which reach the excellent standard one would expect from this author. Many of these micrographs are of viruses not often represented in illustrations of more comprehensive texts.

The order of presentation is a little unconventional and in some respects illogical; an elementary introduction to the general characteristics of viruses and a survey of the morphology of some representative viruses are followed by chapters on purification, classification and nomenclature, virus diseases of a wide-ranging selection of organisms, spread of viruses and latency, satellite viruses and viroids.

At this stage are interpolated two basic chapters by Professor D.A. Ritchie on virus replication and virus genetics. The chapter on replication in particular is a masterly summary of replication of the various groups of viruses. However, many

teachers of virology would, I think, agree that this core topic should have been brought forward since an understanding of the basic principles of replication is a necessary preliminary to the study of many of the topics discussed in earlier chapters, for example latency.

There follows a rather dated discussion of tumour viruses which only mentions virus isolation and electron microscopy as methods for establishing virus aetiology. Late in the book come tissue and cell culture of viruses and virus assay which are surely basic to much of the earlier chapters.

The book concludes with a chapter on control of virus disease. This is sketchy in the extreme and also somewhat dated. The student reading the paragraphs on interferon will surely contrast the low-key treatment of interferon with what he picks up from the media. The selection of thiosemicarbazone as the only chemotherapeutic agent discussed for animal viruses is also likely to give a somewhat distorted view.

The student requiring an introduction to the subject, either from the standpoint of another discipline or as background reading for an elementary course, would perhaps be better served by one of the other paperback volumes — say Primrose's *Introduction to Modern Virology* (Blackwell Scientific: Oxford) now appearing in a second edition, although Ritchie's chapter on replication would be very usefully read by him. Paradoxically, the book should perhaps be read by more advanced students because of the wealth of lore on viruses often perfunctorily treated in the more standard texts, and also for the wide selection of micrographs. □

D. H. Watson is Professor of General Microbiology and Head of the Department of Microbiology in the University of Leeds, UK.

Mathematical plasma physics

R.J. Bickerton

Plasma Physics for Nuclear Fusion. By K. Miyamoto. Pp.610. (MIT Press: Cambridge, Massachusetts, 1979.) \$50, £31.

PROFESSOR Miyamoto's book is aimed at postgraduate or advanced undergraduate students but it will be equally useful as a reference volume for research physicists in the field. The book was first published in Japanese in 1976 and has now just appeared in English. It appears to date effectively from about 1974 and is consequently dated in the more rapidly moving parts of the subject.

The book opens with arguments in favour of nuclear fusion based on apparently unsubstantiated figures for future energy requirements and for reserves of fossil fuels and uranium. There are then four sections in the book covering fundamentals, magnetohydrodynamics, kinetic description and finally heating diagnostics and confinement. Under fundamentals we have particle orbits, field configurations, Coulomb collisions and the Vlasov equation. The magnetohydrodynamic section includes toroidal equilibria of various kinds, plasma diffusion and a full range of instabilities. Topics considered under kinetic description are waves in cold and hot plasma, Landau damping and microinstabilities due to inhomogeneities in real or velocity space. The final section covers heating by a variety of methods, plasma diagnostic techniques and a survey of confinement experiments.

Professor Miyamoto's view of the world is clearly mathematical rather than physical. The treatment is comprehensive but monochrome with no attempt made to highlight important concepts and no concessions are made or detail sacrificed in the interests of clarity. In many cases the mathematical working is fully displayed so that derivations can be followed step by step. One result is that the book is a heavy read and less than gripping. The main body of the book is very weak and largely silent on the extent to which the theory being presented has been tested by experiment. Although it can be justified by the title it is nevertheless sad that that reader is given no impression of the relevance of the main body of plasma physics to non-fusion fields, in particular to astrophysics.

The chief merit of the book is its completeness and in the detail of the presentation. As such it will be a useful reference book, although somewhat marred by a crop of misprints. □

R.J. Bickerton is Associate Director (Science) at the JET Joint Undertaking, Abingdon, UK.