must, so far as I am concerned, be given to B. G. Wybourne for his article "Compact Groups in Atomic Physics": doubtless the expert in group theory will learn much, but insufficient introduction is given for the uninitiated even to grasp the main points. Marcos Moshinsky's article on "Application of Group Theory to Problems of Atomic Physics" is much more down to earth, while Eugene Merzbacher gives a most illuminating account of "Second Quantization and Relativistic Effects". Mayers has a second contribution which discusses computational methods in the differential equations of atomic physics, while the techniques of computing are described by Charlotte Froese-Fischer.

Volume 2 contains eight papers on experimental atomic physics, of which four are by Alfred Kastler on various aspects of the spectroscopy of excited states. It is revealing to have the insights of the man who has contributed so much to modern atomic physics, and these four articles are full of good things. It would have been worthwhile to take more trouble with the diagrams, some of which are freehand sketches and many of which have the original lettering in French. The reference lists are so short that they give no adequate coverage of the literature, especially of material published in the last five years. Two of the remaining papers—those by Adman Şaplakoğlu and Richard Marrus—are on atomic and molecular beam experiments. Apart from a "private communication" and a single reference to the abstracts of a conference programme, the most recent reference to original work in Saplakoğlu's paper is dated 1951, and half of the references are to pre-war work; so that "new directions" is not an accurate description of the contents of this article. Marrus's contribution, on the other hand, is far more interesting and up-to-date, and gives among other things an account of the attempt at Yale to measure a charge difference between the proton and the electron. R. H. Garstang provides a workmanlike paper on "Atomic Physics in Astrophysics" which deals most competently with coronal excitation of atoms, with negative ions, and with forbidden atomic transitions. Lastly, C. Nicolaides and O. Sinanoğlu write on "Atomic Transition Probabilities: New Experimental and Theoretical Results and Their Comparison", and give a useful summary of the position concerning allowed transitions.

There is no doubt that some of these articles would have gained substantially had they been submitted to a review journal and hence subjected to assessment by referees; and this is, in my view, a better method of publishing such material.

W. R. HINDMARSH

Critical Points

Introduction to Phase Transitions and Critical Phenomena. By H. E. Stanley. Pp. xx+308. (Clarendon: Oxford; Oxford University: London, July 1971.) £5.

CRITICAL points associated with phase transitions have been familiar features of physics since Andrew's experiments on carbon dioxide in 1869 and Curie's investigations of ferromagnetism at the beginning of this century. Associated with them are singularities in such thermodynamic quantities as compressibility or susceptibility, critical opalescence (or its analogue for neutron scattering), and the anomalous behaviour of such transport coefficients as thermal conductivity, which becomes infinitely large.

The older thermodynamic theories of the critical region, dating back to van der Waals and now called classical, have long been known to be at variance with experimental evidence (qualitatively as well as quantitatively). Their ultimate rejection came surprisingly late, with Onsager's solution of the two-dimensional Ising model problem in 1944. This mathematical *tour de force* paved the way for a picture of the critical region much richer, as well as more complex, than had hitherto been imagined.

Since 1944 there has been tremendous activity over the whole field of critical phenomena, both theoretical and experimental. Out of a rich conglomerate of mathematical work on simplified "models", semi-phenomenological theories rooted in thermodynamics and hydrodynamics, and experimental measurements often of astounding precision, has emerged a new description of the critical region epitomized in the twin phrases "static scaling laws" and "dynamic scaling laws". We still know neither whether these laws are fully warranted experimentally nor, if they are, wherein lies their ultimate theoretical justification; but they certainly provide an effective focus for an immense diversity of current work.

This book is eminently suitable for new workers in this field, whether mathematicians, physical chemists, or physicists. Assuming only minimal acquaintance with thermodynamics and statistical mechanics, it presents a colourful and kaleidoscopic picture sufficiently well organized to allow them to see the wood for the trees. Better introductions exist to sections of this work, but no other book, or major review, has made so ambitious an attempt to cover both equilibrium and the dynamical aspects of it.

It is by no means flawless, and should be approached as a stimulating introduction rather than a definitive Handbuch article. For instance (p. 173), the "astute reader" confronted with thermodynamically inconsistent formulae ought not, as suggested, to dismiss the results as "inadmissible", but should note where the author erred in deriving them. Its historical asides are episodic rather than well-proportioned (the 1957 paper of Domb and Sykes, the first successfully to extract critical indices from power-series expansions, should certainly have been mentioned). And by restricting attention to systems having only two independent thermodynamic variables the author has excluded some topics (such as "exponent renormalization" due to impurities and "smoothless" postulates) with which even new workers should nowadays be familiar. But these are defects which can be removed from the inevitable second edition (by when, too, there may well be need for revision of some of the experimental data here quoted).

Meanwhile the author's enthusiasm, generosity of outlook, and industry have produced a most worthwhile addition to the literature. And it may appropriately be added that over half of the three hundred and fifty references in this book are to papers published in the last five years.

G. S. RUSHBROOKE

Agronomy

Crop Production: Cereal and Legumes. By Brian F. Bland. Pp. xii+466. (Academic: London and New York, June 1971.) £5; $14.50.

THIS book provides the reader with a general survey of crop production practices in Great Britain. The first four chapters on wheat, barley, oats, rye and maize would be of principal interest to professional workers and farmers in Great Britain. Later sections on beans, peas and sainfoin provide information that is not readily available from other sources. Each chapter includes a well documented summary of the botanical classification, quality, utilization, field management and pest control for each crop.

Because the chief emphasis is on field management of the crop, the book would be of value as a text for first-year students in agriculture or in a course specifically devoted to agronomy and crop production. Extension workers and farmers would be interested in the detailed information on seed-bed preparation, seed dressing, time of sowing, seed rate, weed and pest control, harvest and economics of production. The reference lists are comprehensive; the writing is clear and concise; the quality of print and illustrations are excellent.

F. W. SOSULSKI