

## Crystal defects

*Computed Electron Micrographs and Defect Identification.* By A. K. Head, P. Humble, L. M. Clarebrough, A. J. Morton, and C. T. Forwood. Pp. x+400. Defects in Crystalline Solids, vol. 7. (North-Holland: Amsterdam and London; American Elsevier, New York, 1973.) Dfl 100; \$35.10.

THE interpretation of electron micrographs of thin foils of crystalline material involves two radically different aspects: first, the morphology and orientation relationships of features such as precipitates, transition phases (for example, Guinier-Preston zones) and twins; second, the geometrical characteristics of crystal defects such as dislocations, stacking faults and point-defect aggregates. The first task involves simple examination of micrographs and matching of the diffraction patterns of selected areas, and offers no particular challenges to the experienced microscopist; the second is far more difficult, since the image (for instance) of a dislocation is really the image of a local distortion in the crystal lattice, and to identify the geometrical characteristics of the defect (Burgers vector, stacking parameters, and so on) requires the investigator to deduce the details of the lattice distortion from the appearance of the image under different imaging conditions. In fact, several images of the same defect are needed to interpret it securely.

The established way of identifying the Burgers vector of a dislocation is to find an imaging mode which causes the dislocation to disappear, but this method has limitations, especially with elastically anisotropic materials. The other method involves generating a theoretical image, with the aid of a computer program and pictorial print-out, for a particular set of imaging conditions, and comparing the theoretical image critically with that photographed in the electron microscope.

This book is the first detailed presentation of this computer technique, by a team of Australian authors led by A. K. Head, who originated the technique seven years ago. The book includes an outline of the two-beam dynamical theory which is the theoretical basis of the method; a full account, with many examples, of the practical steps involved in orienting a crystal, identifying the diffraction vector, dislocation line direction, and so on; the principles and details of the several computer programs, for both cubic and non-cubic crystals; and the methods for matching experimental and theoretical images. Finally the uses and limitations of the method are outlined.

The book is very much a practical operator's handbook; while its main use of course is to show the reader how to compute images, it will also be useful for the

beginner who is learning how to orient foils and features in foils. Altogether, this is an impressive compilation by a group of pioneers who have stayed the course and finished the job.

R. W. CAHN

## Quaternary fossil plants

*Quaternary Plant Ecology.* Edited by B. J. B. Birks and R. G. West. (The 14th Symposium of The British Ecological Society, University of Cambridge, 28-30 March, 1972.) Pp. ix+326. (Blackwell Scientific: Oxford and London, 1973.) £13.

THE relation between the ecology of plants, as seen today, and the study of fossil assemblages of plant remains from the Quaternary period has always been an exchange of information and ideas in both directions. It is generally realised that any attempt to interpret what an assemblage of fossil remains really represents, must depend on a knowledge and understanding of modern vegetation and the ecology of the constituent species. In return, the study of fossil assemblages leads to a much better appreciation of the extent to which the composition of present day vegetation depends on its history, both directly and indirectly through concurrent changes in the soil. The papers presented at this symposium are primarily concerned with the first relationship, that is, the ecology of the past but quite clearly a better knowledge of the past helps understanding of the present.

The first four sections, containing eleven papers, are directly concerned with methodology and the process of matching assemblages of pollen, or in one paper, other fossilised parts of plants, with modern vegetation. It is at once clear that a technological revolution has taken place as a consequence of the use of the proportions of carbon isotopes to give an independent estimate of the absolute age of a deposit. This allows the rate of deposition of a sediment to be calculated and thus pollen contents can be measured in absolute, rather than relative terms. This has stimulated a much more fundamental approach to the problem of relating the quantity of pollen deposited on unit area in unit time to the actual representation of species in the surrounding vegetation. Studies of the production of pollen, its dispersal in the air, its redistribution in water and its preservation are all included. These sections provide a fund of information and ideas which should be read by all palynologists.

The fifth section contains four papers concerned with the evidence from quaternary studies of the rates of change in vegetation over long periods, including both natural processes and changes for which man is largely responsible. The

sixth section is devoted to limnological studies which demonstrate the value of interdisciplinary studies using palynology and stratigraphic analysis of a variety of aquatic organisms.

Symposia tend to be rather uneven in their coverage and often include papers of relatively light weight. The very opposite seems to be true in this case. Those who planned, organised and reported the meeting are to be congratulated on bringing together so many stars each of such magnitude into a single constellation and on producing an outstanding contribution to the literature of palaeoecology.

C. D. FIGOTT

## Eccentric extracts

*Strange Phenomena: A Sourcebook of Unusual Natural Phenomena*, Vol. G-1. Compiled by William R. Corliss. Pp. 277. (Corliss: Glen Arm, Md 21057, 1974.) \$6.95.

As the flow of letters we receive whenever *Nature* publishes anything about ball lightning testifies many of our readers are interested in bizarre phenomena at the fringe of scientific understanding. That is as it should be; only by such interest can any of these phenomena be brought within the fold of science proper, just as continental drift has gained respectability during this century. So the publication of this sourcebook is likely to meet with a warm response.

Corliss has collected what he calls "homeless facts" and given them a home, in the form of a collection of brief reports (some no more than 200 words) culled from the scientific, pseudo-scientific and unscientific literature. The task is far from complete, and we are promised further volumes as the work progresses; the present edition is in the form of a ring-binder, so that necessary additions or deletions can be made conveniently.

Some examples culled from a random search of the pages suffice to give an impression of the book's scope: ball lightning, flames from the sky, earthquakes and lightning, strange detonations (barisal guns and the like), sunspots and rainfall, and so on. The march of science is such that the last of these phenomena has already been received into the bosom of 'serious' science, and most of the oddities which are mentioned are far from the lunatic fringe of flying saucers and little green men.

The net cast by Corliss has gathered a harvest from many sources, and *Nature* is lavishly represented. But it is a curious feature of the extracts from this journal in particular that they are clustered distinctly in time about two peaks, the first about 100 years ago and