in full, and there are brief summaries of some of the reports from the Working Parties of the Board of Trade in so far as they touch research.

Generally the book shows evidence of balance and of planning which were sadly lacking in the earlier edition. If the editor would direct a little more attention to the last section, "Who's Who in Industrial Research", and include in that a reasonable proportion of the men responsible for the management and the actual conduct of industrial research, instead of the overwhelming preponderance of academic, consultant or government entries which at present characterizes it, he would come well within sight of the goal of a reference book which everyone concerned with the conduct or direction of research would wish to have on his desk, both for ready reference and as a convenient guide to sources of authoritative information in regular demand.

R. BRIGHTMAN

Smoke

The Problem of Coal and the Atmosphere. By Arnold Marsh. Pp. 306+21 plates. (London: Faber and Faber, Ltd., 1947.) 21*s*. net.

THE author of this book is a red-hot zealot; his cause is certainly a good one. Briefly, his thesis amounts to this—the smoke nuisance *can* be abolished, and it *must* be abolished. The question before us at the moment, however, is this. How far will this volume help to spread the gospel? It is difficult to be sure. If something, however rational and desirable in itself, is said too much, too often, and a little too loudly, a boomerang action sets in, and the reader's sympathy, if not lost, is perceptibly reduced. Maybe Mr. Marsh will see the yellow light; it is to be hoped that he will. Everybody will agree with him that drastic action is needed to deal with the ill-effects of atmospheric pollution upon works of art; but the efforts of the Ministry of Works and the National Gallery in 1937 receive no mention, though given considerable publicity at the time. However, smoke and toil seem synonymous—unluckily—in men's minds: witness those telling lines (my italics) originally composed for the Potteries:

> "Where the busy sounds of labour
> Rise, the best of human *incense*,
> To the Throne of the Creator".

F. L. G. RAWLINS

Radio Engineering

By Dr. E. K. Sandeman. Vol. 1. Pp. xxiv+775. (London: Chapman and Hall, Ltd., 1947.) 45*s*. net.

THOSE who have come into contact with the author would expect the fresh and 'breezy' treatment given to the practice of radio here presented. In attempting to bring the novice up to the standard of the expert (not defined), the author dashes through all the subtleties of the academic teacher, collects an immense amount of information from his colleagues in the British Broadcasting Corporation, fills in many gaps, contributes much original thought, bends charts and methods to his will, and leaves one rather breathless at the prospect of what one is supposed to know, in addition to a flair for designing and costing, in order to be a modern radio engineer. Even so, we are warned that all this is only an approach if one desires to attain to the higher flights of radar and television.

The method has a disadvantage in that the practical applications of radio theory are those which are designed to meet the problems of the B.B.C., weighted somewhat by the views of one who has done creative work in that organisation for many years. With these slight reservations, one concludes that this text (including Volume 2 to come), so clearly printed and illustrated, bears comparison very well with recent American texts, and from many points of view is superior, in its decimal lay-out, and as a reference book for many topics. L. E. C. HUGHES

Las heladas y la necrosis fria de las plantas

Por Plutarco Naranjo V. Pp. 126+14 plates. (Quito: Imp. de la Universidad, 1947.) n.p.

ALTHOUGH some attention is given to the physical aspects of frost occurrence, this welcome survey is chiefly concerned with the nature of the biological damage caused to plants by the occasional radiation frosts that occur at altitudes of 2,000 m. or more in Ecuador. A review of contemporary weather data confirms experience elsewhere that radiation frosts occur on nights of little or no cloud when the air and the surface soil are dry.

Freezing of the cell sap was not observed, and damage to the tissues by expansion of the sap is dismissed as a possible effect of frost. The damage is attributed to an increase in the acidity of the cellular protoplasm, a change in *p*H of about one unit taking place when the respiratory quotient is decreased at low temperatures. When plants were damaged, it was because this shift was sufficient to bring the protoplasm to its iso-electric point, and coagulation set in. A number of photomicrographs and photographs illustrate the effect of frost on the cells and on the plants.

Suggested preventive measures include: (i) formation of dense clouds of smoke over crops; (ii) watering seed beds on occasions when frost is forecast; (iii) initiation of research on the breeding of frost-resistant varieties of plants. H. L. P.

A Book of Spiders

By Dr. W. S. Bristowe. (King Penguin Books, K.35.) Pp. 34+24 plates. (Harmondsworth and New York: Penguin Books, Ltd., 1947.) 2*s*. net.

THIS very pleasant essay will reveal to many readers details of the spider's life with which they were previously unacquainted. After an introduction which deals with some medieval opinions about spiders, Dr. Bristowe describes many striking devices by which these animals feed and protect themselves, and some remarkable examples of their conjugal and parental habits. He writes chiefly of the spectacular and the quaint; but, avoiding mere 'wonder-mongering', succeeds in emphasizing the diversity of the ways in which spiders have chosen, or been driven, to live.

A point of some significance emerges from his discussion of the spider fauna of small islands. He tells us that in an islet with some half-dozen species, nearly every one belongs to a different family: in other words, there is one representative of each type of specialist—"the maximum number of species with the minimum amount of competition". It would be interesting to know whether students of other groups have recorded a similar phenomenon.

Dr. Bristowe has been able to use as coloured plates a most attractive set of water-colour drawings, made in 1867–70 by A. T. Hollick for a supplement, planned by Pickard-Cambridge, to Blackwall's great work on British spiders. In rescuing these from oblivion, the Penguin Books have performed a notable service to arachnology. T. H. S.