to rely on telegraphic news "stories," prepared by the managing editor of Science Service, Mr. Watson Davis, and the members of his specialist staff, so that their reports of the proceedings of conferences and conventions shall be well-balanced and accurate, without losing their attractiveness as items of news.

In Great Britain there is, of course, fairly adequate publication and survey of the results of research, such publication being intended for the use of the scientific population itself, and being normally directed by members of that fraternity, but we seem to lack a widespread sense of the importance of an appeal to the non-specialist members of the community as part of their ordinary daily culture, an appeal which must, to be worth while, be sponsored by the most notable members of the professions, and to be effective by the more journalistically-minded among them. There is, after all, no valid reason why the dissemination of knowledge beyond the confines of schools and colleges, provided it is carried out with scrupulous honesty, dignity and restraint, should not be acknowledged to be as valuable a social service as the collection and arrangement of the knowledge itself. True, this view has been given practical effect in certain influential sections of the British lay press by acknowledged authorities in a number of the sciences, but apart from one or two publications of admitted standing, there is little organized continuous effort in this direction. An attempt was made a couple of years ago to secure the interest of scientific societies and institutions in Great Britain in the establishment of a science publicity service, but the response was so disappointing that the scheme was abandoned.

Dr. E. E. Slosson, in a recent address before the American Association for Adult Education, made the somewhat surprising statement that archeology and astronomy—essentially remote and unpractical—head the list of the sciences in order of popular interest, and that the essentially practical sciences are low in the list. He ascribes this, probably correctly, to the same cause as that operating in the selection of, say, "futuristic art" as a subject of study in a women's club rather than "domestic economy." He declares that scientific workers have been too humble and too modest in claiming credit for what they have done and what they can do in the control of human affairs, but have allowed statesmen, writers and financiers to take all the praise for the advance in civilization and the amelioration of living conditions that were really due to scientific research. If we look at the matter from the point of view of the wealth of nations, as Dr. G. E. Hale, the honorary chairman of the National Research Council, has recently done in *Harper's Magazine*, it is clear enough that the business of men of science is to help to guide mankind as well as to serve it. That is to say, if a scientific orientation can more universally be associated with moral and religious convictions in the equipment of the human mind, there will be less danger of the wicked and unscrupulous misuse of scientific power, less point in arguing the prohibition of poison gas, and an extension of that wider fraternal patriotism which distinguishes scientific international relations.—*Nature.*

SCIENTIFIC BOOKS

The Biology of Insects. By GEORGE H. CARPENTER, D.Sc. 473 pp., 16 pls., 88 text figs. London: Sidgwick & Jackson, Ltd., 1928, 16 s.

WHEN Professor J. Arthur Thomson, in the series of biological handbooks which he is editing, came to the insects, he chose a very good man to prepare this volume. Dr. Carpenter had shown, in his "Insect Transformation" (1921), done while he was professor of zoology in the Royal College of Science in Dublin and at the same time secretary of the Royal Irish Academy, and by his "Insects: Their Structure and Life" (1924), published after he became keeper of the Manchester Museum, that he had a grasp of the subject and a power of presentation in a very thoughtful and most interesting way that made him the man to do the insect volume in the biology series as it should be done.

It is very obvious that Mr. Savory, for example, who wrote "The Biology of the Spiders" in this same series, had a much simpler task than Dr. Carpenter's; and in fact the author of the present volume must have been put to it to decide just what to use in a book of this restricted size. The overwhelming number of insects, their extraordinary diversity in form, habit and function, and the great mass of accumulated and published knowledge would seem to necessitate the publication of several volumes on their biology instead of one. Dr. Carpenter, in his preface, acknowledges himself chargeable with the offense of omitting many subjects which might be expected to appear in such a book.

But to the person who examines the book with its wealth of interesting facts and its profusion of illustrations, the omissions will scarcely be noticed. The main topics considered in the fourteen chapters are, Feeding and Breathing; Movement; Sensation and Reaction; Behavior, Instinctive and Intelligent; Reproduction and Heredity; Growth and Transformation; Family Life; Social Life; Adaptations to Haunts and Seasons; Classification; Evolution; Insects and Other Organisms; Insects and Mankind. In all these topics Dr. Carpenter shows an extraordinary knowledge of the work done in many countries by many competent workers. He has hit upon

the significant things and has explained them in such a way that they are readily understood. And he has brought into logical form and in proper juxtaposition the work of isolated individuals so as to place before the busy worker in biology a comprehensive and readable whole.

Important papers on important biological investigations have a way of accumulating so rapidly that the average worker is confused or badly informed, until such a book as this appears in which a thoroughly competent man has digested them all into an understandable whole.

Thus, the topics just mentioned have been given a just and philosophical treatment, sufficiently condensed to be plain reading and yet sufficiently detailed to be convincing—a difficult task done in a masterly way. The fifty-page chapter on evolution, for example, will be a delight to many workers who have not followed the recent contributions of entomology to different aspects of this engrossing subject.

The plates are done from admirable photographs, and, like the text figures, are admirably chosen.

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Colorado Plant Life. By FRANCIS RAMALEY. Published by the University of Colorado, Boulder, Colorado, 1927.

THIS book of 299 octavo pages and illustrated with 133 figures and three colored plates of Colorado wild flowers has been issued as Volume II of the Semicentennial Publications of the University of Colorado. As the work is dedicated to the citizens of Colorado with presumably only a modicum of botanical knowledge, it is written in a simple style without sacrificing essential scientific accuracy. In this especially well-illustrated and printed book the author, who is professor of biology in the state university, describes in successive chapters plant sociology, life zones and altitude, the botany from a railway train or automobile, color in plants, plants of stream-sides and ditch-banks, mountain-parks, mountain-lakes, the life of a plant, the plains in springtime and autumn, mesas and foothills, plants of the true mountains, grasses and grass-like plants, forests and forest trees, the architecture of plants, flowers, fruits and seeds, and the flora of Colorado in which chapter the characteristics of the principal plant groups are emphasized. Keys are added, so that the trees of Colorado may be identified readily. A list of the early spring flowers of Boulder and vicinity, comprising 102 species, is given with a bibliography of publications dealing with Colorado vegetation. Appendix IV comprises a list of books on botany suitable for high-school and public libraries in Colorado. The author has included in the chapter dealing with the flora of Colorado a short history of the study of Colorado botany, which began with the collection of plants by Edwin James, who was historian and naturalist of Major Long's Expedition (1819–20). He has furnished a sample, which might be followed profitably by other states of the Union.

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SPECIAL ARTICLES

MULTIPLE POSITIVELY CHARGED RADIOACTIVE IONS

IN a recent paper[1] the writer discusses the question of the existence of doubly charged positive ions in gases for intervals of time usually involved in gas ion mobility measurements. It is there shown that previous experiments supposed to be conclusive on this point are not so and that there is practically no evidence for the existence of such ions under the conditions above. There remains unexplained a very definite observation by Erikson[2] on the mobility of recoil atoms from active deposits of Ra, Th, and Act which if correct can not be passed over summarily. The results were not checked in recent experiments of Dee[3] in which however the data were too meager to constitute a real contradiction. Erikson observes positive ions of mobility 1.56 for these recoil atoms, which are doubtless the normal singly charged positive ions in air. He also observes in high fields with shorter time intervals simultaneously with the slower ions, ions of mobility of 4.35 cm/sec per volt cm. in each case. These apparently do not show the aging effects usually found for positive ions in other gases. This mobility is nearly three times the mobility of the normal ion. He ascribes it to a doubly charged[2] ion in air. This it can not possibly be, as doubling the charge can not more than double the mobility. Furthermore on the basis of ion theories it is doubtful if the mobility is directly proportional to the charge. It is probable that the mobility of a doubly charged ion would be between twice the mobility of a singly charged ion and the mobility of that ion. A mobility of 4.35 cm/sec might mean a triply charged positive ion. It is more likely that it would correspond to an ion with at least four positive charges. It is the purpose of this article to give reasons for believing that we may

[1] Loeb, L. B., Proc. Nat. Acad., SCI., 13, 703, 1927.

[2] Erikson, H. A., *Phys. Rev.*, 24, 622, 1924, and 26, 629, 1925.

[3] Dee, P. I., Proc. Roy. Soc., A 116, 664, 1927.