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.