—as the Cetaceans, Edentates and their allies, and others. While it has been deemed useful, especially in an American review, to point out the most conspicuous errors in the treatment of the American members of the perplexing order Rodentia, it must not be supposed that other parts of the book are equally open to criticism. In reviews it is both proper and desirable to point out erroneous statements, while, from the nature of the case, like detailed comment respecting the good qualities is well nigh impossible. Hence notices of very good books often seem to consist mainly of adverse criticism. I fear this is true in the present instance.

The bird part of the Royal Natural History will be reviewed separately.

C. H. M.

Lehrbuch der Biologie der Pflanzen. FRIEDRICH LUDWIG. Stuttgart, Verlag von Ferdinand Enke. 1895. 8°, pp. vi + 604, with 28 figures in the text.

The Germans are quite persistent in refusing to recognize as biology the mixture of botany and zoölogy, which is rather unfortunately called biology by the English and Americans, and as a general thing they designate by the latter name the relations of plants to their surroundings, a subject that the Madison Congress of American botanists agreed to call ecology. It is, therefore, to this subject that Professor Ludwig's latest book refers, and it includes chapters on the adaptations of land and water plants to their surroundings, adaptations to a parasitic habit of life, the part played by fungi in the nutrition of higher plants, carnivorous plants, commensalism and symbiosis, adaptations of plants to the physical and chemical character of the soil, climbing plants, phenology, the various protective devices met with in plants, the many interesting arrangements concerned with pollination and dissemination, and the influence of man on the forms of plants, with which is connected a general discussion of heredity and the causes of variation from hereditary types.

Dr. Ludwig is an earnest student of the relations of plants to their surroundings, especially of their adaptations to pollination by insect agency, and his book appears to be not only pleasantly written, but accurate in its statement of fact.

WM. TRELEASE.

A Monograph of the North American species of the genus polygonum: By JOHN KUNKEL SMALL. Memoirs from the Department of Botany of Columbia College, Vol. I. Issued April 23, 1895. 4°. pp. 183, Pl. A. and 84. Price $6.00.

While it is generally believed that the classification and naming of plants is a less advanced branch of botanical investigation than the study of their morphology, development and physiology, botany would be a very crude science, indeed, without such work, and one of the duties that fall to the possessors of every large herbarium is that of monographing difficult groups—a duty all the more imperative because of the undeniable fact that such work can only be done where good library and herbarium facilities are at hand.

The botanical department of Columbia College, with one of the finest herbaria and systematic libraries in the country, is apparently fully aware of this fact, and at frequent intervals Dr. Britton and his assistants and special students publish revisions that are helpful to all systematic students of the North American Flora. The last of these publications inaugurates a series of Memoirs which promise to reflect much credit on the institution under the auspices of which they are published.

No collection in the world contains more valuable material for a study of the North American Knotweeds than is to be found at

Columbia, which possesses the herbarium of Meisner, the last general monographer of the genus, and to this has been added the choicest of the other collections of the country. While Mr. Small has done no small amount of field work on some of the forms, the result appears to be worthy of the facilities he has enjoyed, though, like all monographic essays, its strength or weakness must be tested by practical use. Keys to the sub-genera and to the species under each of these, and plates representing the habit and the more essential details of each species, render the work easy to use, and the anatomy of representatives of the several groups has been comparatively studied and largely illustrated. In appearance the monograph is good, and the plates are clearly drawn and well printed, though a little flat and harsh—a defect that the artist will doubtless overcome in future work.

Wm. Trelease.

The Geological and Natural History Survey of Minnesota. The Twenty-third Annual Report, for the year 1894. N. H. Winchell, State Geologist. Minneapolis, Harrison & Smith, State Printers. 1895. 8vo. 255pp.

This survey has kept steadily on its way for many years, under the able direction of Professor Winchell, who gives us annually a volume in which matters of practical importance to the people of Minnesota and questions of general scientific interest alike find efficient treatment.

In the present volume, after a summary statement of the year's work of the Survey, Professor Winchell, in Part II., discusses the Origin of the Archæan Greenstones of Minnesota. This paper is of the nature of a review of Bulletin No. 62 of the U. S. Geological Survey on the Greenstone Schist areas of the Menomee and Marquette Regions of Michigan, by Dr. George H. Williams, in which the tendency of the conclusions reached by Dr Williams is to refer the greenstones as a body to dynamic metamorphism of massive eruptive rocks, while a sedimentary origin is not denied to a part of them. Professor Winchell skilfully arrays the facts, both megascopic and microscopic, in support of his own view of the origin of these greenstones, and would reverse the main conclusion of Dr. Williams as to the comparative amounts of the two sorts, massive and sedimentary. His conclusions are given in the following words: "We look upon the greenstones in Minnesota as an oceanic terrane having a definite stratigraphic position (the uppermost part of the Keewatin), although probably involving some truly irruptive masses. Its materials, both basic and acid, are interbedded by sedimentation the one with the other, and are sometimes mingled. The decayed condition of these materials is due to the natural action of the Keewatin ocean prior to consolidation, and the crystalline condition of the lower beds is due to later metamorphism which, having its active forces and seat at greater depths, did not permeate the whole formation. It is not attributable so much to dynamic movements as to internal heat. Wherever such movements operated with much violence, the lower Keewatin sediments were fused, producing irruptive felsytes and granite. Such granite is bordered usually by belts of crystalline schist, evidently formed at the time of such fusion."

Part III. is devoted to a preliminary report on the Rainy Lake Gold Region, by H. V. Winchell and U. S. Grant, in which, after an introductory part on the occurrence and associations of gold ores, and a historical sketch of the gold discoveries of this region, the body of the report is devoted to the general features and geology of the area and a more detailed account of individual properties. Most of the gold-bearing rocks of this district belong to the *Keewatin* di-