tion as to the Laramie or Upper Cretaceous age of the typical Judith River Beds.'

4. Since Hayden's stratigraphical observations near the mouth of Little Rocky Mountain Creek do not harmonize with the paleontological correlations of Drs. White and Stanton at the mouth of the Judith River, and since no one has ever revisited the first locality and reversed Hayden's determinations by a reexamination of the stratigraphy, I believe the exact stratigraphic position of the Judith River beds remains unsettled and that it is premature to assert that 'the true Judith River beds certainly overlie the Ft. Pierre and are of more recent age,' although this is now very generally believed and may eventually prove to be the case.

J. B. Hatcher.

BOTANICAL NOTES.

VEGETABLE GALLS.

These curious growths, which result from the action of two organisms, have not received the attention of botanists which they deserve. That they develop because of the presence of some insect, or as a consequence of the sting or puncture of another insect, does not make them less vegetable in nature. A prickly gall on a rose leaf is a rose structure as truly as the rose fruit is, and its growth and development are as properly the objects of study by the botanist as are the growth and development of any other plant structures.

Mr. Edward Connold, an English botanist, has recently brought out a most interesting book on 'Vegetable Galls,' which must help to direct the attention of botanists to this neglected field. By means of fine half-tone reproductions of photographs he shows more than one hundred galls and their variations, and to these he has added descriptions which bring out quite methodically their structural characteristics, and their relation to the causal parasites. In treating the subject the author groups galls into: (1) Root galls, (2) stem galls, (3) leaf galls and (4) flower and fruit galls. Of the first he illustrates six kinds by as many plates. Among the thirty-one plates of stem galls perhaps the most suggestive are numbers 23 and 24, which show galls on the twigs and stems of *Salix cinerea* caused by the larvæ of *Agromyza schineri*, and which so closely resemble the early stages of the 'diamonds' on the 'diamond willow' of the Great Plains as to suggest similarity of origin. Of leaf galls there are no less than sixty-three plates, representing a great number of different forms much like those found on leaves in this country. Twelve plates are given to the illustration of the galls on flowers and fruits, including two in which the galls are the familiar 'plum pockets' due to the presence of the minute fungus *Exoascus insititiæ*.

A similar work should be undertaken in this country. Mr. Connold has set a good example, showing us how to illustrate as well as how to treat the subject. No doubt the text is capable of improvement, and yet we should not object to a work in which the text was patterned directly after that found in the English book. Here is an open field for some of our active young botanists to enter.

POPULARIZING THE STUDY OF FUNGI.

Any book which increases popular interest in any department of botany should be welcomed by scientific men, even though the treatment may not be quite like that in works designed to be used by students and professors in the colleges and universities. No doubt those of us who belong to the latter class are quite too much inclined to measure the value of every book by our own needs and standards. We commend the book which meets our wants and which is so written that it seems to be addressed to us or our students, and too often we deem of little value the book in which we find nothing new for ourselves, although it may appeal directly to many other people who know less about the subject. That there are some popular books which are simply atrocious is true, and the present writer has been obliged to denounce them in strong terms, and yet it is an open question whether even the worst of these are wholly bad. With their crude drawings and barbaric coloring, they may appeal to certain classes of untrained minds much more than the ele-

gantly drawn figures to be found in some of our best works. We must not forget that wood-cuts precede steel plates, that 'chromos' are antecedent to the appreciation of good oils and water colors, and that gaudy adornment is the forerunner of that finer and nicer ornamentation that prefers quietness of form and color.

All this is apropos of a book on the fungi —really on the toadstools and mushrooms— prepared by an enthusiastic amateur fungologist, Captain Charles McIlvaine, with the title 'One Thousand American Fungi.' We are told that a score of years ago, while the author was living in the mountains of West Virginia, he became interested in the luxuriant growths of fungi which he saw in his rides through the dense forests. Beginning with a gastronomic interest (which in fact still dominates his work), he has widened his field of interest so as to take in much of what we are pleased to regard as scientific. Gradually the idea of preparing a book took form, and the result is a large octavo volume of more than seven hundred pages, and including a couple of hundred illustrations, many being colored plates or half-tone reproductions of excellent photographs. In order to secure the information he desired in regard to the edible qualities of fungi, he had personally to test "hundreds of species about which mycologists have either written nothing or have followed one another in giving erroneous information." He naïvely refers to the frequent 'unpleasant results' following such personal tests, but in the end he felt repaid by "the discovery of many delicacies among the more than seven hundred edible varieties" which he found. Such work constitutes real investigation. It is laboratory work of a special kind, but while its purpose is the discovery of gastronomic facts, they must be included in the mass of knowledge and experience which we call science. While appealing primarily to the mycophagist, this book will be found useful to the mycologist also.

MARINE LABORATORY BOTANY FOR 1903.

THE annual announcements for the season of 1903 of three water-side laboratories are at hand. The first of these is that of the Marine Biological Laboratory at Woods Holl, Mass. Here, as in former years, the botanical work will be under the general direction of Professor Bradley Moore Davis, of the University of Chicago. The work may be under supervision or without supervision. Under the former, courses are offered in morphology, physiology, cytology, ecology, and the morphology and taxonomy of the thallophytes. For these the usual fees are charged. Investigators who wish to take up lines of work without supervision may be accorded the privilege free of expense by making application to Dr. Davis and complying with certain requirements. The session begins July 1 and ends August 12.

The Minnesota Seaside Station, at Port Renfrew, on Vancouver's Island, will open about the middle of July and close about the first of September. As in former years, the station is to be under the direction of Professor Conway MacMillan, of the University of Minnesota, Minneapolis. The party is to leave Minneapolis *viâ* the Canadian Pacific Railway 'about July 15,' and return to Minneapolis 'about September 1, making two stops, one at Glacier, the other at Laggan.' "Classes in elementary and advanced botany will be formed for high-school teachers and undergraduate college students." Advanced workers will find many problems awaiting their independent investigation.

The Ohio State University Lake Laboratory will be open again at Sandusky, and, as heretofore, will include work in several lines of botany. This year there are offered general botany (the study of type forms, from the lowest to the highest orders), ecology, systematic botany, and the morphology and taxonomy of algæ and fungi. As the work is all under Professor Kellerman, this is a sufficient guarantee of its high quality. Instruction begins June 29 and closes August 7, but the laboratory does not close until somewhat later in the summer.

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