

Minnesota Algæ. I. The Myxophyceæ of North America and Adjacent Regions, Including Central America, Greenland, Bermuda, the West Indies and Hawaii. By JOSEPHINE TILDEN. Pp. iv + 328, pl. 1-20. 1910.

This book, with the modest title of "Minnesota Algæ," treats of the blue-green algæ of North America and adjacent regions. It appears as a Report of the Survey, Botanical Series, No. 8. As the author states in the preface, it is largely compiled from numerous publications, though she has also drawn on her long experience in the study of the algæ. It has been published chiefly for the purpose of encouraging students in the collection and study of this group of algæ about which so little is at present known in this country, and to provide students, who do not have access to the numerous publications, with descriptions of all the species thus far accredited to the region. Illustrations of many of the species are also presented which should aid in the determination. These illustrations are largely copied (by means of photographs and tracings) from the classic monographs by Bornet & Flahault, Gomont, etc., though some of them are original. The illustrations, therefore, in general should be valuable for their accuracy, though they have suffered somewhat from an artistic point of view.

The descriptions are said to follow, in general, those of Gomont, Bornet, Thuret and Flahault. Keys to the genera and species will assist the student in the recognition of the species.

Four paragraphs are usually given to one species. The first one gives the name of the plant with a few references to works where it is described. The second paragraph is usually a long one giving references to articles (with full title of the article) or works in which the plant in question figures in a list or description. Some synonymy is also mixed in with this bibliography of the species. As the author suggests, there is a certain convenience in having these references under each species, but they thus occupy a large part of the book because of repetition, and the example could probably not be followed in many cases except

where funds for publication are freely available. The third paragraph gives a description of the species, while the fourth one gives the distribution by states or countries, including the particular local habitat, which in some instances is quite definitely indicated.

Since the use of double plates renders it impossible to have descriptions of figures on a page facing the plate, references to the figures would have been rendered much easier if names and corresponding figure numbers had been printed at the bottom of each plate.

It is to be inferred from the Introduction that the author contemplates another volume on the same group of algæ sometime in the future which is to be of a monographic nature. If the present work succeeds in interesting a sufficiently large number of persons in different parts of the country who have the time to collect, study and preserve the material in their region, and if the author can make a thorough and critical study of all this material, comparing it with type material or authenticated specimens in the herbaria of Europe, and bring it together with the accuracy, judgment and finish shown by some of her European predecessors, it will furnish us with an exceedingly valuable contribution to American algology. GEO. F. ATKINSON

A Study of the Absorption Spectra of Certain Salts of Potassium, Cobalt, Nickel, Copper, Chromium, Erbium, Praseodymium, Neodymium and Uranium as affected by Chemical Agents and by Temperature. By HARRY C. JONES and W. W. STRONG. Johns Hopkins University. Pp. 159, 98 plates. Publication No. 130, Carnegie Institution of Washington.

In this monograph the authors have recorded the results obtained from the study of about three thousand solutions of salts of potassium, with a colored anion, cobalt, nickel, copper, chromium, erbium, praseodymium, neodymium and uranyl and uranous uranium.

"The effect of the addition of free acids and foreign salts on the absorption spectra is studied at some length and in considerable detail and results have been obtained which

show that chemical reactions in general are probably much more complex than is represented by the equations which are usually employed to express such chemical changes." The effect of the nature of the solvents on the absorption spectra has been one of the chief points investigated in this work. It is shown that solvents which themselves do not absorb visible light may have a determining influence on the absorption of the dissolved substances. Well-defined "solvent-bands" have been discovered for water, the alcohols, acetone and glycerol. These bands are perfectly characteristic of each solvent, and their existence is regarded as strong evidence for the theory of solvation, upon which work has been in progress in the laboratory of the Johns Hopkins University for the past twelve years.

The experimental methods employed are essentially those used by Jones and his co-workers in previous investigations of absorption spectra. To the chemist probably the most interesting result obtained in this work is the evidence for the existence of a series of intermediate compounds in the course of a chemical reaction. When, for example, uranyl nitrate is transformed into uranyl sulphate by the addition of sulphuric acid the absorption bands of the former salt gradually shift over to the position occupied by the absorption bands of the latter. "In an example of this kind the bands can be made to occupy any position between the initial and final positions, and it seems probable that when a salt of one acid is transformed in this way into a salt of another acid, there is a whole series of intermediate systems or compounds formed."

At the present time no method is known for separating these unstable intermediate compounds, but the spectrographic evidence is such as to warrant the assumption of their existence and confirms the view that the ordinary chemical equation represents only the initial and final stages in a series of reactions.

The influence of the solvent on the absorption spectra of the different solvents examined is most interesting. The absorption spectra of the same salt in different solvents are fre-

quently very different and in a mixture of two solvents the bands characteristic of each appear, the intensity varying with the relative amounts of the two solvents present. The authors attribute the change in the absorption spectrum accompanying change of solvent to solvation rather than to differences in the dielectric constants of the solvents. The authors call attention to the fact that "probably no salts show more characteristic bands than some of the uranous salts in the various solvents: water, the alcohols, acetone and glycerol." The discovery of a strong "water-band," λ 4274, in the absorption spectra of the neodymium salts is likely to prove useful in future spectrographic investigations. This band is intense and is free from neighboring bands.

Cases have been found where it is possible to break up the absorption bands into finer bands by chemical methods. An example is afforded by solutions of uranyl salts in acetone. By the addition of hydrochloric acid the uranyl bands are broken up into fine components, several of the bands becoming triplets and some doublets.

The authors summarize this action of hydrochloric acid and other reagents in the following statement: "The presence of foreign reagents causes the uranyl bands to become more intense and, in most cases, narrower." It is further noticed that these bands are slightly shifted toward the red.

Spectrograms have been made at different temperatures varying from 5° to about 80°. As a result of this phase of the investigation the authors conclude that rise in temperature is accompanied by an increase and a broadening of the general absorption in aqueous solution, the bands at the same time becoming more intense. The ninety-eight plates of absorption spectra given at the end of the monograph are a credit to both the investigators and the printer. The data compiled within this and the preceding monographs by Jones and Uhler and Jones and Anderson will undoubtedly prove of much value to future investigators in the field of light absorption by solutions. FREDERICK H. GETMAN