writer has been able to determine, pasteurella equiseptica-like strains have not heretofore been isolated from the brains of horses suffering from so-called cornstalk disease.

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A FRESH WATER SPONGE FROM SOUTHERN CALIFORNIA

FRESH-WATER sponges are rare in California, largely because of the scarcity of permanent streams. This is especially true of so-called Southern California, south of the San Gabriel or Sierra Madre mountains. It appears, in fact, that hitherto no fresh-water sponge has ever been reported in this part of the state. On October 13, 1934, a student, Mr. Donald Nelson, found and a few days later brought to my attention such a sponge, *Asteromeyenia plumosa* (Weltner) Annandale. This is a rare species, originally described from Kinney County, Texas, and having as its only other reported locality Shreveport, Louisiana. The two Southern California specimens were each about the size of the palm of a man's hand, growing in a cement weir box which is part of an irrigation system, near Fullerton (just southeast of Los Angeles). The source of water is the Santa Ana River, which runs deep in winter, but is often dry in the summer. The specimen collected was well provided with gemmules and is typical to the most minute degree of the species as previously described.

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SCIENTIFIC BOOKS

ELECTROLYTES

Electrolytes. By HANS FALKENHAGEN, professor in the University of Köln. Translated by R. P. Bell, fellow of Balliol College, Oxford. Royal 8vo, pp. 346. $9.50. Oxford University Press.

THE motif of this comprehensive monograph is "not only to give the most important theoretical principles in the domain of electrolytes, but also to give the reader some idea of methods of experimental investigation and the reliable experimental results obtained." This statement obviously implies the notable advances made by Debye and his followers, but readers interested in topics closely allied to electrolytes will find the English translation extremely valuable.

Although the present book is for the greater part simply a translation of the 1932 German edition, it has been revised in consultation with the author to bring it into line with the experimental and theoretical advances of the past two years. The added topics embrace: theoretical and experimental work on transport numbers, Onsager's treatment of the dissociation field effect, the extension by Fuoss and Kraus of Bjerrum's theory of ion-association and finally an appendix by R. H. Fowler illuminating R. H. Gurney's application of quantum mechanics to electrode processes.

The author does not assume that, since the basic subject-matter is a time-honored one, all readers will be prepared to comprehend the intricacies of such specialized topics as those just enumerated. To this end, he devotes the first six chapters to an elementary and well-organized presentation of the problems of the equilibrium state and the irreversible process of conductance in a way which should prove helpful to one who is approaching the subject for the first time.

The thermodynamic treatment follows closely the classical methods of Planck, modified, of course, to embrace the activity concept of G. N. Lewis. Although disciples of the American and Danish schools of physical chemistry would doubtless prefer a more concise and less labored development, nevertheless the thermodynamics is eminently sound and consistent. In chapters 7 to 10, the principles of the Debye-Milner theory are developed pictorially, then mathematically and finally tested in their limiting forms as explanations of the solubility influences of ions upon ions, the salting-out effect of ions upon neutral molecules, heats of dilution and dependence of conductance upon concentration (Onsager's theory), viscosity, frequency and field strength (Wien effect).

The author has made notable contributions, in collaboration with Debye, on the intricate problem of the frequency and field strength effects, and hence is well qualified to present the subject. Although there is now available a wealth of experimental data supporting the theory in its numerous aspects, the author selects examples which not only substantiate his case, but give appropriate credit to pioneer workers in the field.

The title of Chapter 11, "More Concentrated Solutions," may prove somewhat disappointing in that one who has not been dealing with the subject might expect that the concentrated solutions of industrial importance are to be discussed. As a matter of fact, the term refers primarily to that all too dilute range of concentrations for which it is necessary to consider the ion-size parameter "a" as a correction to the limiting laws—to account for the specific effects of individual electrolytes. The Hückel formula which is based upon the assumption of specific linear decrease of dielectric constant with concentration and which reproduces the experimental results of really concentrated solutions (0.1 to 4 M) is dismissed as little

more than "a convenient empirical formula for interpolation" (p. 273). This summary dismissal may eventually prove to be unnecessarily severe; nevertheless, it should operate as a warning for those writers who have been using the formula indiscriminately without cautioning their readers that the dielectric parameter has at present little or no physical significance.

The Gronwall-La Mer solution of the Poisson-Boltzmann equation, which disposes of the absurd result of "negative ion diameters"—frequently encountered in applying the original theory to high valence ions or low dielectric solvents—is presented in detail for practical application. The close relationship between the Gronwall-La Mer treatment and the Bjerrum hypothesis of ion-association is set forth rather more clearly than has been customary at the hands of some of the recent converts to the modern theory of electrolytes. The problem of "true" degree of dissociation for high concentrations is discussed in this chapter in the light of refractometric and Raman effect data, while Bronsted's "Principle of Specific Interaction" is accorded a highly appropriate presentation.

A conspicuous feature is the judicial attitude which the author assumes in presenting the work of other workers, even when they differ radically from his own views; also the complete nature of the literature references to date of publication (May, 1932). For example, the several possible interpretations of the existing e.m.f. and calorimetric data on the heats of dilution and heat capacities are presented in the light of their obedience to the limiting law and incomplete dissociation. Considering the difficulties inherent in so comprehensive an undertaking, the translator has succeeded in most instances in incorporating the more significant additions to the close of 1933.

At that time only Onsager's masterly criticism of the statistical foundations of the theory ("Symposium on Electrolytes," *Chemical Reviews,* August, 1933) was available. Since then conflicting papers by Halpern, by Kirkwood and by Fuoss dealing with the question of integrability conditions, fluctuation terms, etc., have appeared in the *Journal of Chemical Physics.* The theory is certainly not unassailable from a critical statistical view-point, yet the general excellent agreement with experiment makes it appear highly probable that these statistical weaknesses may not prove serious, after all. Under the circumstances, the author and translator undoubtedly acted wisely by deleting R. H. Fowler's earlier critique and reserving judgment on these vexing questions, even though it is done at the expense of disappointing the expert.

The reviewer has found no serious errors or misprints. The printing and format conform to the high standards of the Oxford Press. However, it is a pity that the editors of the Physics Series do not insist that their authors include an adequate subject and author index. The abridgement from the 7-page author and 4-page subject index of the German edition to the inadequate single page subject index will seriously interfere with the full use of this well-documented book as a convenient source of reference.

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REPORTS

THE ELIHU ROOT LECTURES OF THE CARNEGIE INSTITUTION OF WASHINGTON

THE establishment of the Elihu Root Lectures by the Carnegie Institution of Washington provides an opportunity for a broad outlook on science. Dedicated to a distinguished statesman well known for his appreciation of scientific research, these lectures focus attention on the influence of science upon human thought and upon our attitude toward life. For these lectures speakers will be selected from those who are eminent in their respective fields and have themselves contributed to the development of scientific thought.

The first lecture was delivered by Dr. James R. Angell, president of Yale University, on December 4. The subject was "Popular and Unpopular Science." The speaker presented an analysis of the reasons why the modern social order so readily accepts the superficial and the incorrect, and fails to appreciate or utilize the truly significant advances of science. In discussing the connection between science and the dominant forces of society Dr. Angell stated:

> . . . If science in any important sense is to affect the intellectual fabric of civilization, then through education it must be woven into the essential fabric of our culture. To do this will require at best several generations and not a few profound changes in educational method and objectives.
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> Among other things, it will certainly mean a wide-ranging program of continuing adult education, for science grows so rapidly and its changes are so kaleidoscopic, that in no other way can adult intelligence keep abreast of its discoveries. To be sure, many individuals have intellectual limitations which will leave them inevitably strangers to the intrinsic implications of science. But limitations of this kind face all educational systems and at every level. In any case, what is really important is not so much the prevalence of accurate, up-to-date scientific knowledge as it is the ingraining, deep in the habits of thought of the people, of a careful, critical—even skeptical—scrutiny and analysis of every situation,