

mately associated with all that pertains to organic life on this old round world of ours.

The immortal Darwin gave it a mighty impetus when he presented to the world his doctrine of natural selection, and the researches of Brooks in our own country place us on a high plane in this beautiful study. Some day the world will be startled by the results of biological research.

Perhaps the most remarkable discovery recently made in embryology, a branch of biology, is that we can trace the evolution of a species through its development in the embryo, that is to say, the very beginning of the embryo is identical with the most ancient form; throughout its development we see its evolution to its present condition. Koch's discovery of the bacillus of tuberculosis made another epoch in the science of biology.

Brooks has said: "It may be some day we shall be able to construct a living organism by the combination of the proper elements." Atwater has trodden upon almost forbidden ground in his remarkable investigations of the calorific value of foods in the human subject—indeed, has gone so far in this splendid research that we may dare hope some day to measure the food value of a thought.

I am aware, as already remarked, this is treacherous ground upon which to build a solid foundation, but the better day has come when the earnest seeker for truth is no longer hindered in his onward course by that ancient barrier 'hitherto shalt thou come and no further.'

In the broad light of the twentieth century the investigator, the university man, untrammelled by fear, save the fear of error, will rise to heights of knowledge never dreamed of in our philosophy.

I verily believe that the storehouse of God's truth is like unto the 'widow's

cruse,' take from it as we may, it will never be emptied of its rich, its priceless treasures.

To-day we are but learning single notes. Tomorrow we shall blend them into chords. The hour will chime when all humanity shall know the law of harmony—when every note in every chord shall find its part in the sublime oratorio of universal life.

JOHN A. BRASHEAR.

#### SCIENTIFIC BOOKS.

*Outline of the Evolution of Weights and Measures and the Metric System.* By WILLIAM HALLOCK and HERBERT T. WADE. The Macmillan Company. Price, \$2.25.

THE science of metrology in its evolution has been regarded by many as furnishing the best means of tracing the history of the exact sciences. If this be true, we should welcome this carefully prepared treatise by Hallock and Wade—men fitted by taste, training and experience to write upon this topic.

We have here presented a systematic general history of weights and measures, the scientific methods by which units and standards have been determined, the correct standards by which the units are represented, and the present aspect of modern systems of weights and measures together with the difficulties and advantages involved in any proposed change.

A work of this sort is especially opportune just now when a determined effort is being made to introduce the metric system in this country. It will give much useful information to help those in doubt to decide whether a change in our metrology is advisable or not. Whatever the personal views of the authors are on this subject, they have wisely refrained from giving them undue prominence.

The work contains chapters on the beginnings and development of the science of metrology, origin and development of the metric system, extension of the metric system throughout Europe and elsewhere, weights and measures in the United States, the metric system in the various arts and trades, electrical units, standards and tables of useful constants and equivalents.

Extensive foot-notes point the reader to further sources of information and a full index adds to the value of the book as a work of reference.

This book can well be declared the most complete and most authentic work extant on this important subject and it should be read by the student of physics to whom a knowledge of units and standards is most necessary, as well as by all who wish to be well informed in regard to this interesting topic.

A thorough test has proved that every recognized authority has been consulted and more than one forgotten pioneer in metrology has been given due credit for his contribution to the science. On the whole the book can be commended without reservation and the authors are entitled to our best thanks for placing in compact readable form facts that are accessible to the few and obtained by them after long and tedious research.

J. H. GORE.

*Notes on Electrochemistry.* By F. G. WIECHMANN, Ph.D. 5 x 9 in., pp. vi + 144. Price, \$2.00. New York, McGraw Publishing Company. 1906.

The aim of the author, as expressed in the preface, has been to give 'a clear and concise presentation of the general principles which underlie electrochemical science,' 'to offer a general survey of the subject, to serve as an introduction to its study and to aid in the securing of a proper understanding and appreciation of the work along individual lines.'

In pursuing this aim, the author has devoted seven pages to general principles of science, fourteen to general principles of electrical energy, nineteen to electrochemistry proper, fifteen to electrolytic dissociation, seventeen to electrochemical analysis, forty-six to electrotechnology, and ended up with a name and subject index. Each chapter is prefaced by a list of the most important literature on its particular subject.

We differ in opinion from the author concerning the classification of electrotechnical processes; his division into direct-action and indirect-action processes seems to us to be illogically worked out, at least as far as re-

gards placing 'electrodeposition from fused electrolytes' among the 'indirect action' processes. On page 125, line 6, the accidental omission of 'not' makes the sentence express the reverse of the facts concerning the first news of the manufacture of calcium carbide. There are a few other shortcomings really not worthy of mention, in view of the high standard of excellence and accuracy prevalent in the book.

The plan of the work is admirable, it is carried out in a masterly manner, and the author has produced an introduction to electrochemistry which most satisfactorily fulfills his objects, as quoted above. The style is clear and crisp, the information of a high standard of reliability and surprisingly up-to-date. The balance is excellent. For student, technologist, general scientist or man of affairs, it can be highly commended as a trustworthy, satisfactory and inspiring guide into electrochemistry.

JOSEPH W. RICHARDS.

#### SCIENTIFIC JOURNALS AND ARTICLES.

*The Journal of Experimental Zoology*, Vol. III., No. 3 (September 1906), contains the following articles: 'Locomotion of Amœbæ and Allied Forms,' by Oris P. Dellinger.

Amœbæ and Diffugias are studied from side view as they creep along the polished edge of a glass slide. From such a view the points of attachment and support which furnish the key to their locomotion are easily seen. All forms studied alternate the points of attachment and pull and squeeze themselves along. 'Light Reactions in Lower Organisms. I. *Stentor Coeruleus*,' by S. O. Mast. 'The Influence of Light and Heat on the Movement of the Melanophore Pigment, especially in Lizards,' by G. H. Parker. A study of the color changes in the skin of the horned toad shows that the so-called reversed color changes of certain lizards, *Stellio*, *Uromastix*, etc., are probably temperature reactions and not light reactions, and leads to the conclusion that in all melanophores and other like pigment cells, whether they are in the skin or the eyes of the vertebrates or