

work tells what progress has been made since, both in the establishment of schools and in improving the methods of teaching. The difficulty of teaching language to the deaf has made it necessary to confine the instruction for the most part to the elementary branches; but the higher education has been given to many pupils, and as the time for instruction has been lately increased by admitting the pupils at an earlier age, the opportunities for higher education are now much improved. Special care is taken in many of the schools to train the pupils in some mechanical art, so that they may become self-supporting; and these measures have been attended with gratifying results.

The system of oral teaching and lip-reading, though long practised in Germany, was not introduced into this country until 1867, when the first school to employ it, the Clark Institution at Northampton, Mass., was opened under the presidency of Mr. Gardiner G. Hubbard. A few years later Mr. Bell adapted his father's system of visible speech to the instruction of the deaf, and under his enthusiastic advocacy oral teaching has rapidly grown in favor, and is now employed in a large percentage of cases. At first, indeed, it was opposed even by some of the ablest teachers, who believed it would be detrimental to the pupils themselves; but experience has so shown that for many pupils it is really the best method. Besides oral teaching, many other improvements have been introduced from time to time, until now the American schools for the deaf are equal to any in the world.

Of the Canadian schools described in the third of these volumes, several are private Catholic institutions, and their history is written in French; but the Canadian governments have not neglected their duty in the matter, and the deaf children of the provinces are now as well cared for as our own. Mexico is far more backward, only one school having yet been established; and much remains to be done to bring that country up to the level of her northern neighbors. For further details of the work described in these volumes we must refer the reader to the books themselves, and we are sure that he will rise from the perusal with a fuller appreciation of the good which the schools for the deaf are doing, and with the best wishes for both teachers and pupils.

*Die Ruinenstätte von Tiahuanaco.* By A. STÜBEL and M. UHLE. With one chart and forty-two plates. Breslau, C. T. Wiskott, 1892.

In the present work the learned authors have given the results of Dr. Stübel's investigations at Tiahuanaco, together with an exhaustive presentation of what is known about the history and traditions connected with the ruins which have attracted so much attention since the earliest times. The amount of information collected by Dr. Stübel during a stay of a little more than a week is really astounding. His measurements give us for the first time an adequate idea of the curious stone carvings and architectural pieces which have been described by D'Orbigny, von Tschudi and Squier. We also find here for the first time accurate reproductions of the interesting reliefs which are found on the façade of the large monolithic gateway. Besides these figures illustrating the ruins which were investigated by Dr. Stübel, the book contains a large map and a panorama illustrating the situation and the scenery in which the ruins are found. It was an exceedingly difficult task to interpret the meaning of the curious stone carvings which showed plainly that they were intended for architectural purposes, but which were scattered about on the site of the ruins. The authors have succeeded in showing clearly which way the stones were intended to be joined together, and have succeeded in constructing by means of models of these stones a façade figured on Page 38 of the work, which has certain analoga among the known remains of ancient Peruvian civilization.

In the discussion of the probable origin of the ruins the authors have reached the conclusion that the ancestors of the Aymara were probably their builders. The large and interesting figure over the gateway of Tiahuanaco is interpreted as the Deity of Light.

It must be added that the printing and the plates of the work are beautifully executed. The work ranks in importance with the former contributions from Dr. Stübel on the ancient civilization of South America.

*Science and Education.* By THOMAS H. HUXLEY. New York, D. Appleton & Co. \$1.25.

THIS, the third volume of Professor Huxley's "Collected Essays," consists of a number of papers and addresses, most, if not all, of which have been published in some form before. The first one, on Joseph Priestley, is commemorative of a prominent worker in science and other departments, and will interest those who like to trace the history of knowledge and opinion. The remaining essays deal with various aspects of the educational problem, especially in its relations to pure and applied science. Some of them are devoted to general education, both elementary and higher, while others discuss the more special topics of medical and technical education. On the last-named subject Mr. Huxley speaks with some hesitation, and, while insisting on the importance of scientific training as a preparation for the higher kinds of technical work, maintains that handicrafts can only be learned in the workshop. Medical education, he thinks, needs to be improved in two ways, by excluding some subjects that are commonly included in it and by making the study of the remaining subjects more thorough and profound; and it is somewhat remarkable that one of the studies that he would exclude from the medical curriculum is his own favorite science of comparative anatomy. In treating the subject of education in general, Mr. Huxley, as our readers know, has always been a strong advocate of a more thorough and extensive study of physical science, and his influence in promoting that study has doubtless been considerable; yet he is by no means unmindful of the just claims of other studies. Metaphysics and theology are of course excluded from his curriculum; but he lays stress on the need of logic and psychology as well as of ethics and the social sciences, and he shows a keen appreciation of the "pleasure without alloy" to be derived from the arts of beauty. Several points in his discussion of university education might give occasion for criticism if we had space and time for the purpose, yet with the greater part of his views we cordially agree, and, even where we are obliged to dissent, we generally find his remarks suggestive. Consisting, as the book does, of separate essays prepared at various times during a period of forty years, it lacks the systematic character of a regular treatise; yet it is well worth the attention of all professional educators, and especially of the teachers of physical and medical science.

*The Dawn of Astronomy; A Study of the Temple-worship and Mythology of the Ancient Egyptians.* By J. NORMAN LOCKYER, F.R.S. New York and London, Macmillan and Co., 1894, 432 p.

THIS handsome volume, presented on excellent paper, in clear type, and with abundant illustrations, will be considered a valuable addition to the early history and archæology of Egypt and Babylonia, even by those who are unable to accept the author's deductions in many of their details.

He certainly shows by a variety of evidence that most of the earliest architectural monuments were constructed with reference to the positions of heavenly bodies at certain seasons; and therefore that the close observation

and the religious respect of such bodies formed two leading features in ancient science and mythology. In some of the earlier chapters he very properly gives the elements of astronomical knowledge requisite to calculating the position of the stars at fixed periods, and also the methods for determining with accuracy the "orientation" of buildings. This is by no means the same everywhere, and he justly observes that where we find such a contrast as in the temples of Thebes and Memphis, in one of which we find "solstitial" and in the other "equinoctial" orientation, it demands almost a difference of race to explain it.

Professor Lockyer, availing himself of the French and German surveys of the temples of Egypt, aided by studies of his own made on the spot, finds that one of the main objects of the temple of Karnak, for instance, was for the purpose of obtaining an exact observation of the precise time of the solstice; that many of the temples were not intended for solar but for stellar observations; and as these, owing to the change of place of the stars, would not have remained true for more than three hundred years, they furnish us a means of approximating the date of their construction. On this theory, the author calculates one of the temples at Edfu to have been constructed for the observation of the star Canopus, and to have been built about 6400 B. C. This extends the epoch of culture in Egypt far beyond the time usually fixed by modern archæologists, and illustrates the great value of the author's methods, if they should prove acceptable to the scientific world.

Several chapters of the volume are occupied with the astronomy of the early Babylonians. It would seem this was based on independent observations not less ancient than those of Egypt, but at first exerting no influence upon them. Later, at an undetermined but a very remote period, the astronomical science of northern (lower) Egypt was deeply tinged with the stellar and solar doctrines and myths of Mesopotamia.

The volume is full of suggestions for future research, and there is no question but that it puts in the hands of investigators new methods of throwing unexpected light on the origins of civilization. We earnestly hope that not in the Old World only, but in the great ruins of Mexico, Central America and Peru, they will be applied.

*Inorganic Chemistry for Beginners.* By SIR HENRY ROSCOE, F.R.S., D.C.L., LL.D., M.P. Assisted by JOSEPH LUNT, B.Sc. (Vict.), F.C.S. New York and London, Macmillan and Co., 1893, 245 p.

WE are always glad to welcome a text-book such as the above, and to mark its improvement over the vast number of elementary text-books in chemistry which have become so common of late. The book is arranged with a proper understanding of a beginner's necessities, and instead of a few paragraphs on chemical theory followed by a dictionary-like description of the chemical elements, we have a proper discussion of the principles, the study of the elements being introduced by a careful analysis of these principles as applied to a few, well chosen, typical examples. It is ridiculous to expect a beginner in any science to grapple at once with its particular symbols and to memorize details which are of no moment. We say of no moment, for without proper introduction these details are meaningless. The laboratory manual has too often been mistaken for a text-book of the science.

We note particularly in the above work the chapters on elements and compounds, combination in definite and multiple proportions, calculations, physical measurements, and the properties of gases. In Part II. the following non-metallic elements are studied with their more important compounds: Oxygen, hydrogen, nitrogen, chlorine, sulphur and carbon.

*Principles and Practice of Agricultural Analysis.* A manual for the Examination of Soils, Fertilizers and Agricultural Products. By HARVEY W. WILEY, Chemist of the United States Department of Agriculture. Easton, Pa., The Chemical Publishing Company. Vol. I., No. 1, 1894.

THE first number of this work has been received, and while it may yet be too early to judge of the character of the book as a whole, our expectations are raised, and we shall look for an epoch-making work on agricultural chemistry. Professor Wiley is of all men in this country the most competent to write upon the subject, his long connection as Chief of the Chemical Department of the United States Department of Agriculture and his many writings in scientific journals being sufficient evidence of this. Part first includes an introduction, in which the elements of the earth's "crust" are discussed, particularly in their relation to agriculture, together with the rock-forming minerals and finally the subject of rocks and rock decay. The typographic work is excellent, and the number is well illustrated with sketches and with reproductions of photographs illustrating microscopic rock structure and the physical changes in rocks. It is proposed to issue this work in twenty to twenty-four monthly parts of forty-eight pages each, selling at twenty-five cents a number.

#### NOTES AND NEWS.

MACMILLAN & Co.'s announcements of forthcoming books include "The Study of the Biology of Ferns by the Collodion Method," for advanced and collegiate students, by George F. Atkinson, associate professor of cryptogamic botany in Cornell University; "Mental Development in the Child and the Race," by James Mark Baldwin, Stuart professor of experimental psychology in the College of New Jersey, author of "Handbook of Psychology," etc.; "Materials for the Study of Variation in Animals," part i., "Discontinuous Variation," by William Bateson, M.A., Balfour student and fellow of St. John's College, Cambridge, illustrated; "A Three Months' Course of Practical Instruction in Botany," by F. O. Bower, D.Sc., regius professor of botany in the University of Glasgow; abridged edition of "A Course of Practical Instruction in Botany," by the same author; "A History of Mathematics," by Florian Cajori, professor in Colorado College; "A Course in Experimental Psychology," by James McKeen Cattell, A.M., Ph.D., professor of experimental psychology in Columbia College; "The Gypsy Road, a Journey from Krakow to Coblenz," by Professor G. A. J. Cole, M.R.I.A., F.G.S., illustrated; "Elements of Metaphysics," by Professor Karl Deussen, of Kiel, authorized translation; "Life in Ancient Egypt," described by Adolf Erman, translated by H. M. Tirard, with numerous illustrations and maps; "Physiology for Beginners," by Michael Foster, M.A., M.D., LL.D., F.R.S., and L. E. Shore, M.A., M.D., B.C.; "Western Europe in the Fifth Century," lectures delivered at Oxford, by E. A. Freeman, D.C.L., late regius professor of modern history in the University of Oxford; "Western Europe in the Eighth Century," lectures delivered at Oxford by E. A. Freeman, D.C.L.; "The Life of Sir A. C. Ramsay," by Sir Archibald Geikie, F.R.S.; "A Short Manual of Philology for Classical Students," by P. Giles, M.A., fellow of Gonville and Caius College, reader in philology in the University, Cambridge, uniform with Dr. Gow's "Companion to School Classics"; "Town Life in the Fifteenth Century," by Alice Stopford Green, in two volumes, 8vo; "Hydrostatics," by A. G. Greenhill, F.R.S., professor of mathematics to the senior class of artillery officers,