

imperfectly acquainted with the writings of that distinguished antiquary. For instance, the name of the fifth day in the Maya calendar is *chicchan*, which in one of his articles, published in 1888, Dr. Seler derives from *can*, serpent, and *chi*, to bite; but in a later paper, published in 1891, he retracts this etymology, and says, "Jetzt ist es mir zweifellos, dass es *chic-chaan*, d. h., 'tomado señal,' 'tomado aguero,' bedeuten soll." Dr. Thomas, unacquainted with the latter article, asserts that my quotations were not correct, and questions the translation. It is good for reviewers, as well as writers, to keep themselves acquainted with the current literature of their own special branches.

Dr. Thomas also objects to my interpretations of the Maya month names from religious ceremonies held at certain seasons, stating that it is "totally different from the method by which the names of the months of other calendars were obtained";—entirely overlooking the fact (for I cannot suppose he is ignorant of it) that the Nahuatl month-names are recognized by all to have been derived just in this way.

In his letter to *Science*, Dr. Thomas fails to grasp Mrs. Nuttall's theory. There is no fixed relation of the ceremonial year of 260 days to each civil solar year of 365 days; but in a cycle of exactly 37 solar years, 13,515 days, the two calendars coincide; and there is certainly some evidence that this cycle was noted and celebrated by both Mayas and Mexicans. We may well leave, however, further discussion of this intricate subject till the appearance of Mrs. Nuttall's work, now in course of publication by the Peabody Museum of Archæology.

The analogies which Dr. Thomas endeavors to point out in favor of a Polynesian origin of the calendar are not impressive. For instance, 8 months, 232 days, surely does not "correspond somewhat closely with the sacred period of the Mexican calendar," which was 260 days. Nor is it easy to see why it is such a "singular fact," that the Javanese, like the Mexicans, had a five days' week, since both employed the quinary method of enumeration. As to the Hawaiian system, Dr. Thomas is quite right in speaking of the accounts of it as "in evident confusion"; therefore the less we base analogies upon it, the more creditable will be our caution.

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#### Mining Exhibits at Chicago.

THE anonymous writer of the article entitled, "The Columbian and the Centennial Expositions," in *Science* of Feb. 2, we think unjustly criticizes the exhibits of the Mining Building. It is evident that the writer, in common with probably nine-tenths of the visitors, has passed judgment on the exhibit as a whole by examining merely those parts of it which were displayed on the ground floor. To a lover of educational features in the exhibit nothing could arouse greater regret than that so vast an amount of space on the ground floor was devoted to "great piles of rocks and ores utterly without system" and to the veritable storage of practically worthless, unlabeled material in expensive showcases, as for example in the wretched Mexican display. Your correspondent most justly condemns such waste of space, but when he attempts to score "the rest" of the exhibits, it is very easy to see that he overlooks the gallery exhibits, which in educational value far exceeded any at the Centennial. In Philadelphia exhibits of considerable interest, but of no scientific value, were scattered through several buildings; and the "Mining Annex," itself an afterthought, and added to the main building merely to supply the demand for space, contained little that was comparable even to the exhibits on the ground floor of the Chicago Mining

Building. The elaborate, and on a whole excellent, metallurgical display in the west gallery, though defective, had no competitor at the Centennial; the most instructive Coke-exhibit, the admirable abrasive exhibit, the large floor-chart of the coal fields of the United States, and the collections of building stones all in the east gallery and the grand display of oils in the north gallery, the mere decoration of which we understand cost \$65,000, are not even mentioned by your correspondent, and probably he never ascended the tiresome stairways which led up to the real mecca of the few who desired to study the educational exhibits in the Mining Building. Nor is mention made of the great systematic collections of minerals and rocks displayed respectively in the east and west galleries. It is worth noting that every specimen in two of these collections was labeled with its species, crystallographic form, chemical formula and locality, and so mounted as to clearly display the label, which in one collection was invariably a printed one. These systematic collections were unquestionably the best labeled, most complete and scientific, ever shown at any World's Fair. Two fine displays of gems in the rough and cut, in the west gallery, are also overlooked. It is easy to find fault, but far better, in our judgment, to discern merits, and as a mineralogist who visited the Centennial more than a score of times and spent six months at the Columbian Exposition, the opinion here expressed that the mining exhibit at Chicago far exceeded that at Philadelphia may coincide within the unwritten opinion of many a mineralogist.

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New York.

#### BOOK REVIEWS.

*Histories of American Schools for the Deaf, 1817-1893.*

Edited by EDWARD A. FAY. 3 vols., octavo. Washington, D. C., The Volta Bureau.

THE historical sketches contained in these goodly volumes were prepared for the Columbian anniversary, the enterprise having been first suggested in December, 1892. They give accounts of all the schools for the deaf that have been established in the United States, Canada and Mexico, most of the histories having been prepared by the heads of the various schools or by persons designated by them, several of the writers being deaf themselves. The different articles of which the work consists are printed and pagged separately, the printing in many cases having been done by pupils or graduates of the schools, and the volumes are profusely illustrated with portraits and other pictures. Most of the schools are public, and supported in whole or in part by the state; but private and denominational institutions are also included, the whole number of schools dealt with being seventy-nine in the United States, seven in Canada and one in Mexico. Besides the histories of the various schools, these volumes contain an introduction by the editor, an account of several conferences of the instructors and also of the American Association to Promote the Teaching of Speech to the Deaf, together with many statistical and personal items pertaining to the general subject.

Of the schools whose origin and history are here recounted, the greatest interest naturally attaches to the earliest ones and to those which at a later time introduced the system of oral teaching. The editor in his introductory note alludes to the first establishment of the European schools for the deaf, which were the models of our own; and the opening chapters of the first volume describe the founding of the first two American schools, the American Asylum at Hartford, which was opened in 1817, and the New York Institution, which originated independently the following year. The remainder of the

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