SCIENCE

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A KEY TO THE MYSTERY OF THE MAYA CODICES.

I WISH to announce through *Science* to those interested in the subject, that I have fortunately discovered, at last, the key which will unlock the mystery of the Maya Codices and, probably, of the Central American inscriptions. The progress of decipherment will be slow, but, the clue having been obtained, it will ultimately be accomplished. I have already determined the signification of some dozens of characters and in several instances ascertained the general sense of a group forming a sentence.

This discovery settles at the same time several other points. First, it shows that the direction in which the Codices are to be read is as assumed by me in the "Study of the Manuscript Troano," pp. 136–141. Second, that the parts of the compound characters are to be read chiefly in the same way;

that is, from left to right and from the top downward. It shows, in the third place, that, although there are a number of conventional symbols, yet the great majority of the characters are truly phonetic, and the writing of a higher grade than has been hitherto supposed. Last, it shows that, after all, Landa's statements in regard to the mode of writing and the letters and characters are, to a large extent, correct. For example, his second *b* is correct if a central dot is inserted, giving five instead of four. His *c* is also correct, as are his *e*, *i*, and *ca*, his *k*, *ku*, *z*, *ha*, *ma*, and sign of aspiration. The *l* as given in his example of the mode of writing is correct. His first *x* (dz), if placed horizontally and slightly modified, is the symbol for *ch'*.

Landa's trouble as to the Maya mode of spelling, where he assumes that *le* is written thus, *ele*, arises from the fact that the beginning of the symbol for *l* is so nearly like that for *e*, that he has mistaken one for the other, thus considering the first part of the *l* as an *e*. This can be shown, as symbols for the same word, having the same meaning, are found at one point in the Codex Troano.

As one result of this discovery, I will introduce here an example, with illustration from page 32 of the Cortesian Codex. In the figure here shown the reader will observe a character in the hand of the human being represented as grasped in the mouth of the serpent and also one from which the serpent seems to rise. The latter is the symbol for *cab*, which in the Maya language signifies both earth and honey, here undoubtedly earth. The one in the hand of the human figure is a compound symbol for *yeb* or *yeeb*, signifying mist, dew, or humidity. We also observe in the eye of the human head a cross, which, like the serpent, is a rain or moisture symbol; thus agreeing with the view which has been advanced in regard to the signification of these symbols.

Without further reference at present to the discovery, I may say that I am preparing specimens of my interpretations and explanations, to be submitted to some of our leading archæologists and linguists.

In concluding, allow me to say that if I am correct in the above deductions, which have been reached after careful examination and tests, the Bureau of Ethnology, of which I have the honor to be a member, may claim to have rendered probable the solution of two important questions relating to the pre-Columbian times of our continent, to wit: Who were the mound builders? and, What is the significance of these curious Central American inscriptions and Maya writings?

CYRUS THOMAS.

Washington, May 17.

DR. D. H. STORER'S WORK ON THE FISHES.

SUCH of Dr. Storer's papers as have come to my notice, some of the minor articles possibly being overlooked, indicate that his activity as an ichthyologist extended over a period of about thirty years, beginning about 1836. His list of publications on the fishes is not a long one, and his standing amongst the workers of his own period, or of later periods, in this department of science, may be determined entirely from the latest, his greatest work, "The History of the Fishes of Massachusetts."

1. The earliest paper noted is entitled "An Examination of the 'Catalogue of the Marine and Fresh-Water Fishes of Massachusetts,' by J. V. C. Smith, M.D.," in Professor Hitchcock's "Report on the Geology, Mineralogy, etc., of Massachusetts." This appeared in Vol. I. of the *Boston Journal of Natural History*, pp. 347–365, pl. viii., occupying some eighteen pages, and bearing date of May, 1836.

2. In July, 1839, he published his "Remarks on the 'Natural History of the Fishes of Massachusetts,' by J. V. C. Smith, M.D.," in Vol. XXXVI. of *Silliman's American Journal of Science and Arts*, pp. 337–349, previously read before the Boston Society of Natural History at its meeting on March 20 of the same year.

3. His Reports on the Ichthyology and Herpetology of Massachusetts make an octavo of 253 pages and three plates. This was issued in connection with the report on the Birds, by Mr. Peabody. The Report on the Fishes was also pub-

lished in the *Boston Journal of Natural History*, Vol. II., pp. 289-558, where it differs very little from the separate. This report well represents the best American work done in ichthyology up to 1840.

4. In 1841 he published a short "Supplement to the Ichthyological Report," in the *Boston Journal of Natural History*, Vol. III., and in 1844, in the fourth volume of the same journal, his "Additional Descriptions of, and Observations on, the Fishes of Massachusetts."

5. The year 1846 saw the appearance of "A Synopsis of the Fishes of North America," an extensive work, mainly compilation, published in the Memoirs of the American Academy of Arts and Sciences, and reprinted separately, with different title-page, paging, and index, making a quarto volume of about 300 pages. In this work there are evidences that compiling was not so much to the author's liking as original work, in which he certainly attained a greater degree of success.

6. The "Catalogue of the Fishes of South Carolina" in Tuomey's Report on the Geology of South Carolina, of 1848, is a list of nominal species occupying several pages, for which dependence was placed on literature rather than on specimens.

7. In the fifth volume of the Memoirs of the American Academy of Arts and Sciences, 1853-55, Dr. Storer put forth the first, second, and third instalments of "A History of the Fishes of Massachusetts." The fourth part appeared in Vol. VI., 1858, the fifth in Vol. VIII., 1863, and the last in Vol. IX., 1867. The whole was published separately as a handsome quarto of 287 pages and 39 plates. This work contains descriptions and drawings taken from specimens of more than 130 species, together with a great mass of detail concerning habits, capture, economic value, and the like.

To show how the author regarded his own work we may quote the following, the opening paragraphs of the History:

"As one of the Commissioners on the Zoology of Massachusetts, in the year 1839, I prepared a Report on the Ichthyology of the State. From the brief time occupied in its preparation, it was necessarily imperfect, and, not being accompanied by figures, was comparatively useless, except to scientific men. Since the appearance of that communication, much information has been obtained respecting several of the most common and valuable fishes, and quite a number of new species have been ascertained to exist in our waters.

"Having carefully re-described all the species, I trust the following paper will present an accurate history of the fishes of our State. Considering this as the completion of my former report, I have kept in view the primary object of the commission,— to ascertain the value of our fauna in an economical point of view, rather than to prepare labored scientific descriptions."

The estimate placed by the author on his work in the report of 1839 may leave an imperfect idea of its real value. As he was engaged in revising and enlarging it, it was but natural for him to consider it not what it should be; yet for many years it was the standard work on our fishes, and was only supplanted in New England esteem by the revised, extended, and fully illustrated work completed in 1867.

It is through this last our author should be judged, all of the others being preparatory. Comparing the records included in its pages with the other records of the period, we shall have to rank it with the best. At the present, details are valued more highly, but to a considerable extent the details are supplied in the excellent drawings from nature, by the pencil of the artist, Sonrel, so long and so happily employed by Professor Agassiz. If we place this work on our own fishes by the side of those devoted to the fishes of other States; Mitchell's New York, 1818; Rafinesque's Ohio, 1819-20; Dekay's New York, 1842; Thompson's Vermont, 1842; Kirtland's Ohio, 1839-44; Baird 'sNew Jersey, 1855; Holbrook's South Carolina, 1860; or Holmes's Maine, 1862, we find but one or two that approach it and none that surpass. The excellence of the descriptions and illustrations is generally admitted. Taking up economic considerations, the work is readily seen to be in advance of any of the others. Being a forerunner of the fishery commissions, of either the general government or of the different States, Dr. Storer had to gather his statistical or other information directly from the markets or from the fishermen. One who has not engaged in similar work can hardly realize the magnitude of such an undertaking. In the evidence that accumulates there is apt to be so much that is more positive than accurate that at times it seems an almost hopeless endeavor to discover the truth. The Doctor, however, has acquitted himself admirably. He seems to have been especially fortunate in selecting the men on whom he depended most for assistance. Such names as those of Captain N. E. Atwood of Provincetown or Captain Nathaniel Blanchard of Lynn are often cited as authorities for statements of fact, and I have never yet been able to learn of a single instance in which their testimony has proved other than absolutely trustworthy.

The "History of the Fishes of Massachusetts" is a Classic in North American ichthyology that must serve as the basis for the future histories of New England's fishes. In the quarter of a century that has passed since its publication we have changed our ideals of names; and discoveries of new genera or species, or in the anatomy, have compelled changes in the arrangement. The nomenclature of the book has become somewhat antiquated, and the systematic arrangement is not entirely suited to the present time, yet we must say the same of all the contemporaneous ichthyological literature, and it will not be long before a similar characterization will be equally applicable to the works of to-day. But it matters comparatively little to this book how much the names are changed, how radically the classification is modified, the things are described here, the illustrations are here, the facts are here, and these give the work a permanent value. It would be difficult to point out a work of greater accuracy in detail, or one that left less doubt in regard to the identity of the different forms to which attention is directed.

Dr. Storer was not led astray by desire for novelty; he used little of his energy in searching for generalizations; he appears rather to have given himself up to the careful preparation of a good record of what he could gather during years of collection and study. Most will admit that in this his judgment was good. For, though it sometimes happens that science is benefitted and fame is brought to an author by a revolutionary change in classification, or through a brilliant generalization or theory, the result most often is only an evanescent notoriety that soon dies away. It is through the patient elaboration of facts and success in recording them that one is most certain of contributing to the advancement of science. In this way Dr. Storer has made a contribution to ichthyology of lasting importance. In the amount of information given, its accuracy, and style of presentation, he has established his claim to present and future gratitude and has proved his right to rank amongst the foremost of American ichthyologists.

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