material detached from it than the other. This is the whole question in a nut shell; certain Washington geologists claim to know everything about palæolithic man, and that those who disagree with them are utterly ignorant of the subject. But they have put forward this preposterous claim in the most offensive and contemptuous manner possible, using language in regard to those who differ from them such as no gentleman would employ, and wrapping up their conceited ignorance in a cloud of fustian, which appears to pass for philosophical writing in the atmosphere which surrounds them. That this style of "argument" is confined to a very limited circle would seem to show either that the word of command has been given out from some autocratic source, which they dare not disobey, or that they are actuated by jealousy at the success that has crowned the labors of those who maintain the existence of palæolithic man in North America.

Only a jury of the acknowledged pre-historic archæologists of the world is competent to pronounce judgment upon this question.

HENRY W. HAYNES.

Boston, Mass., Jan. 24.

Criticism of the U. S. Geological Survey.

THE frequent complimentary notices and encomiums upon the U. S. Geological Survey that have appeared in *Science* without any adverse criticisms, might lead one not conversant with the subject to suppose that the Survey reflects the geological learning of this country, or that it is rapidly discovering the resources, or in some other way is giving *quid pro quo* for the money expended.

Looking upon the Survey as a public matter, it is a proper subject of criticism, by any citizen, and among those who have given it any attention, with whom I converse or correspond, not one expresses satisfaction, and generally they have only words of severe condemnation.

The Director has called special attention to it by his article in *Science* of Jan. 13, and stated his claims for the work accomplished. He says:

"When the bureau was instituted, in 1879, it was found at the outset that there were no adequate maps of the regions selected for survey; and it soon became evident that the geologic work could not be carried on without maps showing the relief of the land as well as the hydrography and culture. Accordingly, topographic surveys were instituted in each of the regions selected for examination. At first these surveys were planned to meet immediate needs, and the methods of mapping were not systemized or unified; the scales were diverse and the methods various; the areas were selected by geologic needs and were not fitted to a general scheme for the geologic map of the country, and the resulting maps were discordant in their conventions. At this stage the topographic surveys were executed under the direction of the chiefs of the geologic divisions. After two or three years of trial this form of organization was found unsatisfactory, and the topographic surveys were separated from the geologic work and assigned to a geographic division, which has ever since been maintained."

In short, he says, at the outset, it soon became evident that the geological work could not be carried on without maps made by a topographical survey and accordingly the topographical surveys were instituted, but after two or three years of trial this form of organization was found unsatisfactory, and the topographical surveys were separated from the geological work. I will agree with him that, for the first two or three years, "the methods of mapping were not systemized or unified," and I am willing to believe they were of little or no geological value, and I am willing to agree that after two or three years of experience and study he ascertained that a topographical survey belongs to geographical work; but there are two matters arising from his statement that are not exactly clear, viz.:

1. If it was evident, at the outset, that geological work could not be carried on without a topographical survey, why was it necessary, within two or three years, to separate the topographical surveys from the geological work?

2. Was there, at the outset, any intelligent geologist or geographer, in the United States, not connected with the U. S. Survey, who did not know that topographical surveys belong to geographical work?

We do not desire any play on words and, therefore, come at once to the question, What geological work has been done by the Survey that is of any general benefit to the science, or that is of any economical value, or that is of any general application to the stratified rocks of the continent? For my part, having examined nine of the Annual Reports, and observed nothing of general scientific value or utility (excluding a few definitions of fossils), I would answer this question negatively. And if there is work that might possess some geological value as a preliminary reconnoissance, such work is more than destroyed by inexcusable provisional names for the groups, without characterizing them or stating the fossils by which alone their places in the geological column are to be determined. (I do not use the word "group" in the sense in which it is used, generally, in the survey, but I use it in its established geological sense.)

A lawyer in any State can go into any court in any other State or into any of the courts of the United States or into those of Canada or England and hear and understand the technical words of the science. No word will be used by any judge or attorney with which he is not familiar and it will be used in the exact legal sense in which he learned it and used it at home. More law books have been published than belong to all the sciences of natural history combined, but no one in centuries has proposed a substitute or provisional word for any technical one in use, though it cannot be denied that more expressive or euphonious words might, in some instances, be proposed. Blackstone made his fame by abstracting the technical definitions from the opinions of the courts, as written in the books, with full references and citations to his authorities, and it is for that reason alone that the use of his commentaries can be justified in any law school in this country. The whole value of precedents and court reports is in the fixity of the technical words used and their established definitions. What the science of geology demands is fixity in the names of the subdivisions of the stratified rocks, and the accurate determination of the fossils that characterize each subdivision, for by the fossils alone can the subdivisions be determined. And these demands have been wholly disregarded and set aside by the U. S. Survey since 1879, and we have synonym after synonym for equivalent rocks, vague and worthless definitions, and what seems to me the culmination of absurdity if not crime against the progress of geological knowledge, the pretension that they are developing a "New Geology."

This matter of nomenclature alone, in my opinion, will everlastingly condemn the Survey, so far as it deals with stratigraphical geology, and make students of the science wish there had been some power to suppress the publication even if it was necessary to expend the appropriations. It would have been better to have given the money to the printer and consigned the stratigraphical manuscript to the flames.

But, aside from the questions of nomenclature, that are so intimately connected with learning, and so vital to the understanding of any subject, there are numerous fundamental errors. If any one will turn to page 372 of the Seventh Annual Report, under the head of "Paleontological Characters as a Basis for Classification," he may read pages in consecutive connection where every idea expressed will be recognized as absolutely erroneous by any competent paleontologist. I will quote only a single sentence. He says:

"We have now constantly to remember that paleontology is based wholly upon stratigraphy, and consequently that the conclusions that we would draw from our fossils must constantly be checked by stratigraphical observations."

This statement is made, in the face of the fact, that no species in the great Subkingdom Echinodermata is known to have a vertical range of 500 feet, in the palæozoic rocks of North America; that not one is known to cross the line subdividing the groups of rocks recognized in the Geological Surveys of New York, Pennsylvania, Illinois, Indiana, or Canada; and in the face of the fact, that science has not recognized a group of rocks within the

past twenty years, in America or elsewhere, except the subdivision was based on the fossil contents.

There is not space in a scientific journal to review the ponderous volumes of the Survey, but I do not discover any attempt to make a geological survey of the United States or of the Territories; but instead thereof, the volumes contain theoretical discussions about the glacial period, that have no economical value, and which period, I think, is fiction, and they contain a vast amount of extremely localized and temporary matter of no general utility. This is well illustrated in the Seventh Report now before me. One of the principle articles is entitled "The Geology of the Head of Chesapeake Bay." It covers more than one hundred pages, has sixteen plates and six additional illustrations. The author says:

"The investigation here recorded was made under the joint auspices of the U. S. Geological Survey and the U. S. Fish Commission, for the purpose of determining the probable success of an artesian boring at Fishing Battery station, off Spesutie Island, five miles south of Havre de Grace, Md., and near the head of Chesapeake Bay. The field-study occupied a portion of July, 1886."

The article is so free from geology and so extremely localized that I have been unable to discover the object in publishing it in the U. S. Geological Survey. The author, however, says, on page 564, under the head of "The Geologic Exposures":

"So variable are the different formations of the region in the several exposures that the differences exceed the resemblances, and, since the local diversities are due to local causes the characteristics of the formations cannot be elucidated by generalized description with sufficient minuteness for the purposes of the local student."

Another one of the principal articles, hugely illustrated, in the Seventh Report is entitled "Report on the Geology of Martha's Vineyard." I have lookod through it, in vain, to find an item of geological information. It would certainly take the cake in any walk where pretension and nothingness were to be the winners.

In conclusion, I am opposed to the continuation of the U. S. Geological Survey, under the present management, because, I think, it is not prosecuted in the interest of science but quite the contrary, and because the publications now hang, like a millstone, around the neck of progress, in the dissemination of geological information among the people. S. A. MILLER.

Cincinnati, Ohio, Jan. 23.

Monument to Hirn.

IN a letter, just received from Mon. G. Kern, President of the Commission established for the purpose of securing the erection of a monument to his late distinguished friend and colleague, Mon. G. A. Hirn, the great engineer-physicist and investigator, on account of which subscriptions have been received in considerable amounts, both in Europe and America, he writes as follows:—

"The monument proposed for Hirn, and of which the plans were made by Mon. Bartholdi, will consist of a bronze figure, seated, with pedestal, and will cost about 30,000 M. To complete the subscription, there still remains a balance of 10,000 M., and I have knocked at the doors of many friends and acquaintances of Hirn, finding welcome, in Paris and in Bordeaux; I anticipate full success."

It has been the hope of the gentlemen engaged in this enterprise that a fair proportion of the subscription might come from citizens of the United States of North America, among whom Mon. Hirn counted some personal friends, and many warm admirers. He was always peculiarly appreciative of such good will and such praise of his work as came to him from this side of the Atlantic. Those who desire the privilege of contributing may send their drafts on Paris to the "Comité-Hirn," I Obstmarkt, Marché aux Fruits, I, Colmar, Alsace.

Very respectfully yours,
R. H. THURSTON.

Ithica, N. Y., Jan. 25, 1893.

CALENDAR OF SOCIETIES.

Society of Natural History, Boston.

Feb. 1.—H. L. Harris, A New Instance of the Capture of Streams; W. T. Sedgwick, The Natural History of Disease.

Publications Received at Editor's Office.

ANDERSON, W. Mineral Springs and Health Resorts of California. San Francisco, The Bancroft Co. 384 p. 8°.

BEECHER, H. W. Bible Studies. Edited by J. R. Howard. New York, Fords, Howard & Hurlbert. 438 p. 12°. $1.50.

DANA, EDWARD SALISBURY. Catalogue of American Localities of Minerals. New York, Wiley. 51 p. 8°. $1.

DE MOTTE, J. B The Secret of Character Building. Chicago, S. C. Griggs & Co. 130 p. 12°. $1.

DREYSPRING, A. French Reader on the Cumulative Method. New York, Amer. Book Co. 171 p. 12°. 75 cents.

HOLMAN, SILAS W. Discussion of the Precision of Measurements. New York, Wiley. 176 p. 8°. $2.

HOREY, HENRY T. Theory of Structures and Strength of Materials. New York, Wiley. 817 p. 8°. $7.50.

HUTCHINSON, H. N. Extinct Monsters. New York, Appleton. 254 p, 8°.

PARSHALL, N. C. Proofs of Evolution. 5th 1000. Chicago, Chas. H. Kerr & Co. 70. p. 12°.

PEET, S. D. The Mound Builders: Their Works and Relics. Chicago, The American Antiquarian. 376 p. 8°.

SHALER, N. S. The Interpretation of Nature. Boston, Houghton, Mifflin & Co. 305 p. 12°. $1.25.

STYX. Hermetic Philosophy. Vol. III. Can Virtue and Science be taught? Philadelphia, Lippincott. 221 p. 12°. $1.25.

SYKES, JOHN F. J. Public Health Problems. New York, Scribner. 370 p. 12°. $1.25.

THE SONG BUDGET, The Song Century, The Song Patriot. Syracuse, C. W. Bardeen. 12°. 50 cents.

WEYL, THEO. The Coal-Tar Colors. A Sanitary and Medico-Legal Investigation. Preface by Professor Sell. Tr. by H. Leffmann. Philadelphia, Blakiston. 154 p. 8°. $1.50.

WHITBY, BEATRICE. In the Suntime of Her Youth. New York, Appleton. 365 p. 12°. 50 cents. Paper.