the precocious development of the frontal horn, and the marked reduction of the nasals, at once suggested to the writer that this animal may possibly represent an ancestor of *Elasmotherium*, which, as is well known, was distinguished from all other Rhinoceroses by the smooth, narrow nasals and enormously developed frontal horns, as shown in the accompaning figures. It is true that in *A. incisivum* the horns are small, the rugosity, or horn core, being rudimentary; but in paleontology a rudiment is almost invariably prophetic of a fully developed organ in a later horizon. The question whether this type actually marks the first branching-off of the Elasmotheres from the Aceratheres turns, therefore, upon a detailed comparison of the skull and skeleton of the two types. Both skulls are dolichocephalic with high occiputs. A marked difference is seen in the very narrow space between the orbit and narial opening in *A. incisivum*, as compared with the broad space in *Elasmotherium*. These and other differences may be due to profound changes which occurred during the Pliocene period, for *Elasmotherium* is a well-advanced Pleistocene type. Other profound changes which would be involved in such a transformation are in the loss of old cutting teeth and the folding of the enamel in the molar teeth, so characteristic of the Pleistocene form.

Taken altogether, the evidence that *A. incisivum* is an ancestral Elasmothere is, however, decidedly slender at present, and we must probably await the discovery of intermediate stages in the Pliocene of Europe or Asia. Henry F. Osborn.

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*REPORT CONCERNING THE OFFICIAL STATE BUREAUS CONNECTED WITH THE JOHNS HOPKINS UNIVERSITY.**

I submit for your information the following report concerning the Maryland Geological Survey and the Maryland Weather Service during the past year. Much of the work of these bureaus is carried on in cooperation with the Geological Department, and the offices are provided by the University free of all charges to the State.

* A report presented to the President of the Johns Hopkins University.

THE MARYLAND GEOLOGICAL SURVEY.

The Maryland Geological Survey, which was established by an act of the General Assembly of 1896, began operations upon March 25th of that year, when, by the action of the Commission designated by the act, the organization of the Survey was formally effected. The General Assembly of 1898 passed two additional acts which added largely to the powers of the State Survey Commission by providing for the construction of topographic maps and the investigation of the question of proper highways for the State. By the first act an additional appropriation of $5,000 annually was granted, while the second act appropriated $10,000 annually, the original appropriation of $10,000 annually by the Assembly of 1896 still remaining in force. By these acts the Survey received the very generous appropriation of $25,000 annually.

During the two and a-half years that the Survey has been in operation several lines of investigation have been taken up, some of which have already been followed to a conclusion. The preliminary survey of the State, in which general information in regard to the geology and economic resources was secured, placed the Survey in a position to inaugurate those lines of investigation which would prove most beneficial to the people of the State and at the same time would contribute most largely to the sum of knowledge regarding the stratigraphy and structure of Maryland. In connection with this general survey there has been maintained a system of collection of statistical data regarding the output of each industry that has to do with the mineral

wealth of the State. Forms are annually placed in the hands of the producers of mineral products, which upon their return are filed at the office of the Survey. In this manner an accurate account is kept of the mineral products of the State, which aggregate in value from six to seven million dollars annually.

The work of the Survey has been systematically divided and a competent man placed in charge of each one of the divisions. Dr. E. B. Mathews, in addition to his duties as Assistant State Geologist, is Chief of the Division of Geology of the Piedmont Plateau; Professor Charles S. Prosser is in charge of the Division of Geology of the Appalachian Region, and Dr. George B. Shattuck is in charge of the Division of the Coastal Plain. The work of the Survey embraces many subjects related to geology, among which is the investigation of our highways, Dr. H. F. Reid being Chief of the important Division of Highways. Dr. L. A. Bauer is in charge of the Division of Terrestrial Magnetism. Several special assistants in charge of independent lines of work are also employed: Mr. A. N. Johnson in Highway Engineering; Dr. Cleveland Abbe, Jr., in Physiography, and Messrs. Basil Sollers and B. W. Barton in Botany.

At the same time active cooperation is maintained with several of the Washington bureaus, especially with the U. S. Geological Survey and the bureaus and divisions of the U. S. Department of Agriculture. The aid which has been rendered by the Washington scientific departments has been of great importance to the successful prosecution of the State work.

The topographic work of the Survey has been much extended during the past year, an area of several hundred square miles having been surveyed upon a scale of one mile to an inch in western Allegany and Garrett counties. The surveying force is provided by the U. S. Geological Survey through a plan of cooperation between the national bureau and the Maryland Geological Survey.

The magnetic work under the charge of Dr. Bauer was continued in the western part of Maryland. Dr. Bauer completed his work on the western boundary of the State during 1897, and was able to be of great service to the Attorney-General of Maryland, who had the matter in charge. All the magnetic and astronomical work was placed in charge of Dr. Bauer, and he was throughout recognized as the scientific authority upon the State force. During the summer of 1898 a part of Dr. Bauer's time was taken up in the survey of the boundary line between Allegany and Garrett counties, which had been authorized by a special act of the last General Assembly. This work, which had been many times unsuccessfully attempted, was satisfactorily accomplished, and a report published in September.

The more strictly geological work of the Survey was carried on by the instructors and students of the Geological Department of the University, with such cooperation as was deemed necessary along special lines. Professor George P. Merrill, of the United States National Museum, rendered the Survey a very important service in the conduct of the investigations upon the building and decorative stones of the State. Extensive areal and economic work was conducted both in the western and central counties of the State. Surveys of Allegany and Garrett counties were completed and a large amount of data collected for the special economic reports which will appear later.

The highway investigations have occupied the attention of the Survey since the spring of the present year, and a considerable force was employed under the direction of Dr. Reid and his associate, Mr. Johnson, in the study of the highway conditions of

Maryland. The distribution of those rocks which are adapted for highway construction has been carefully surveyed and points for the subsequent locations of quarries of road metals indicated.

The agricultural conditions of the State have also been considered and a study made of many of the relations of the geological formations to the soils derived from them. This classification of the soils has been conducted under a plan of cooperation with Professor Milton Whitney, of the U. S. Department of Agriculture and the Maryland Experiment Station, and, outside of its scientific interest, will prove of much practical benefit to the agricultural interests of the State.

The distribution of plant and animal life is so closely connected with the soils and geology that the Survey plans a study of the fauna and flora from this standpoint. Already some work has been done under the direction of Messrs. Sollers and Barton upon the botany of Maryland, more particularly in the western counties. It is planned in the future to carry on this work in cooperation with the newly organized State Horticultural Bureau.

Much advance was made during the year in the preparation of the manuscript for subsequent volumes. Professor Merrill completed his work upon the Building and Decorative Stones of Maryland, and Mr. Henry Gannett, of the U. S. Geological Survey, furnished an elaborate treatise upon the Aims and Methods of Topographic Work for the report upon the cartography of the State. These and other reports by the regular staff of the Survey are now being collected for the second volume, which will be brought out during the autumn of 1898.

THE MARYLAND WEATHER SERVICE.

The Maryland Weather Service was established in May, 1891, under the joint auspices of the Johns Hopkins University, the Maryland Agricultural College and the United States Weather Bureau, and became an official organization by an act of the General Assembly approved by the Governor April 6, 1892. Under authority granted by this act the Maryland Weather Service was permanently established at the Johns Hopkins University, under the direction of a Board of Control nominated by the heads of the institutions above mentioned and commissioned by the Governor.

During the first five years of the existence of the Service the investigations were confined largely to a study of the general meteorological conditions of the State. Numerous stations were established in the different counties, volunteer observers having been obtained at a sufficient number of points to render it possible to determine the more important features of the climate of the State. Throughout the same time monthly Meteorological Reports, extending through the year, and weekly Crop Bulletins, covering the growing and harvesting seasons, were published. Two biennial reports to the General Assemblies of 1894 and 1896 were also prepared and subsequently printed with the necessary maps, diagrams and tables. A series of large Climatic Charts was also published and placed on exhibition in the Maryland Building in Chicago at the time of the Columbian Exposition, and copies of the same were subsequently distributed.

Somewhat over a year ago an entire reorganization of the work of the Maryland Weather Service was effected. It seemed desirable to transfer the accumulation of the general climatic data to the Climate and Crop Service of the Weather Bureau, which is much more fully equipped for carrying on that phase of the work, and to devote the money and energies of the Maryland Weather Service to the study of special problems connected with the climatology of the State. It was thought possible, by con-

ducting the work in close cooperation with the State Geological Survey, the State agricultural institutions and the United States Department of Agriculture, to take up lines of research that would be of much permanent value to the people of the State. Arrangements were made for the publication of these investigations in a new series of reports which should conform in all particulars to those already adopted for the State Geological Survey. These volumes, for which arrangements have now been perfected, will contain the results of investigations upon the climate of the State and will include reports upon the physiography, meteorology, medical climatology, agricultural soils, forestry, hydrography, crop conditions, botany and zoology of Maryland.

The reports upon physiography and meteorology are already largely prepared and will constitute the first volume of the series. Dr. Cleveland Abbe, Jr., has prepared a report upon the physiography, while the longer and more elaborate statement regarding the meteorology of the State is divided into three parts, the general treatment of the subject being from the pen of the distinguished Professor Cleveland Abbe, of the U. S. Weather Bureau. Mr. F. J. Waltz, the Local Forecast Official of the U. S. Weather Bureau in Baltimore and the Meteorologist of the State Weather Service, will contribute the part relating to the meteorology of the State; while Mr. O. L. Fassig, his associate, will prepare those chapters which relate to the history of meteorological investigations in Maryland since early colonial days. The cordial support of Professor Willis L. Moore, Chief of the U. S. Weather Bureau, has been secured in this work, as well as in many of the lines of special investigations which will be later pursued.

The investigation of the agricultural soils of the State, already referred to in connection with the State Geological Survey, are closely related to many of the climatological problems which will be considered in the future, and the active cooperation of Professor Whitney along these lines will add much to the effectiveness of the State work. Mr. C. W. Dorsey, of the State Agricultural Experiment Station, has been carrying on investigations in this field under the supervision of Professor Whitney, and the results of their combined work will be later brought out in the reports of the State Weather Service.

The questions of hydrography are closely related to those of climatology, and already considerable progress has been made in the study of the drainage basins of Maryland through the cooperation secured from Professor Newell, in charge of the Division of Hydrography of the U. S. Geological Survey, and special reports upon this subject will be incorporated in a later volume of the State Weather Service.

The other lines of investigation above referred to have been projected, but little work has been done upon them thus far. They will occupy the attention of the local Service during the coming and subsequent years.

WM. BULLOCK CLARK,
State Geologist and Director State Weather Service.

THE BIOLOGICAL STATIONS OF BRITTANY.

THE marine laboratories of the coasts of France and England can be reached with so little loss of time by students of zoology and botany who live near the Atlantic seaboard in America that a knowledge of the facilities for work at these stations and of their accessibility is of great importance to Americans.

Aside from the hygienic advantages of the ocean voyage and a complete change of scene to a hard-working naturalist who devotes his summer vacations to scientific research, one will in many cases find at some