horizontally banded; that is, the colors change regularly from clear to dark. At times, in the darker portions are observed harder layers of limestone rich in clay. In the lowest layers of these middle beds we find the greatest abundance of gypsum and pseudomorphs. A layer of compressed smooth lenses of sandstone frequently appears (*Metamynodon* and *Protoceras* sandstone). Where the lenses are thin and smooth the lamination is even, where the layers are thicker, with coarser material, we observe cross-bedding. The *Uppermost Beds* of the White River Oligocene are altogether different. They are composed of very uniform material (often of volcanic ashes according to Dr. Darton), containing numerous nodules and round concretions; there are also large concretions, with the turtles again abundant, in fact, arranged quite differently from the Lower and Middle Beds. This sedimentation is manifestly of æolian character.

"When we put together all these observations to form a conclusion as to the structure of these beds we come to the following result: At the beginning [of the Oligocene] a broad, slowly flowing stream spread out towards the east and formed a broad, widespread and uniform delta landscape (Titanotherium Beds); this even, swampy land was dry during the dry seasons, but was flooded in every high-water period; besides the water the wind frequently took part in the transport of the dust and materials. The concretions are structures of the percolating waters (Lower Oreodon Beds, numerous land mammals). Now followed a long period in which this region was flooded by a shallow rather than deep lake. The inflow of water did not exceed the evaporation, and so through the varying concentration there was a precipitation of the dissolved materials which gave rise to the banded layers. In the same manner the gypsum and barite in these layers is explained. Stronger currents poured in sand, which accumulated in low elevations (Middle Oreodon Beds). At last there came a widespread æolian condition in the form of loess, which spread out upon the gradually retreating or evaporated levels of the lake."

CHARLES ANTHONY SCHOTT.

With the death of Charles Anthony Schott, Assistant, United States Coast and Geodetic Survey, closes a most useful life, led by a remarkable man.

He was born at Mannheim, Baden, Germany, August 7, 1826, and began his studies very early, learning to read before reaching four years of age, and it is stated that his work began as a small boy. He graduated from the Polytechnic School at Carlsruhe with the degree of C.E. in 1847.

He came to the United States in 1848 and entered the United States Coast Survey, thus beginning his life of enthusiastic work in the advancement of science by the solution of the problems which confronted this organization created to obtain accurate charts of the extension coasts of the United States. He was immediately attached to the Computing Division in the office of the Survey where he remained until October, 1849, when he was assigned to the schooner *J. Y. Mason* and steamer *Walker* as hydrographic draftsman. In July, 1850, he returned to the Computing Division and on July 1, 1852, he was regularly appointed to the position of computer. From time to time he acted as chief of the Computing Division in the absence of the regular Chief and in 1855 was permanently placed in charge of this most important Division. In 1856 he was advanced to the grade of assistant, the highest in the survey after the superintendent.

The ability, zeal, indefatigable industry and vast mental resource so eminently

shown throughout his career, was thus recognized by Superintendent A. D. Bache at an early day. This assignment was most fortunate for the interest of science in general and particularly so for the advancement of the work undertaken by the Survey. In the Computing Division the fundamental data obtained in the field is digested and discussed for publication and this data, after passing through the Division, furnishes the foundation upon which the work of the Survey is built up. A wonderful opportunity was thus offered to a man capable of distinguishing himself, and this opportunity was seized by Mr. Schott and utilized to the fullest extent. The results of his painstaking labor are shown in the numerous publications bearing his name in the annual reports of the Superintendent and in scientific journals.

Mr. Schott's regular duties in the office were interrupted from time to time by assignments to special duty in the field. As early as 1855 the records show that he was in charge of the magnetic work of the survey and in 1863, during the time of the national peril, he was engaged in surveying the defences of Washington. In 1869 he took a party to Illinois to observe the total eclipse of the sun and in 1870 went to Catania, Sicily, as a member of the Superintendent's party to observe an eclipse of the sun. At various times during the absence of the assistant in charge of the Survey Office, he acted in his place.

Mr. Schott continued in charge of the Computing Division until December 31, 1899, and on January 1, 1900, was relieved of this duty and assigned to the discussion of the arc measurements in the United States resulting from the extension triangulation already executed by the different organizations engaged in survey work. All the available triangulation of a sufficient degree of accuracy is utilized in these discussions. 'The Transcontinental Triangulation and American Arc of the Parallel,' has already appeared as Coast and Geodetic Survey Special Publications No. 4, and 'The Eastern Oblique Arc of the United States' is now ready for the printer. The discussion of an oblique arc in California was far advanced before Mr. Schott's health failed and will bear the mark of his genius when it finally appears in print.

It is impracticable to give a *résumé* of Mr. Schott's work in the survey at this time and reference can only be made to the 'Annual Reports' of the survey covering the years of his services for the innumerable results of his labor.

The following extract from SCIENCE of January 12, 1900, is a fitting tribute to Mr. Schott's work as Chief of the Computing Division.

> With the close of the year, assistant Charles A. Schott, who for nearly fifty years has been the distinguished and energetic chief of the Computing Division of the Coast and Geodetic Survey, retired from that important position in order to devote his whole time to special scientific work.
>
> Under Mr. Schott's careful supervision and training has developed a corps of skilled computers equalled by no other scientific bureau. To his labors, perhaps more than to any other one man's, is due the high scientific character of the results which the Survey has given to the world. The completion last year of the great arc, begun over a quarter of a century ago, marks an epoch in the history of the Division, and the beginning of the triangulation on the 98th meridian would seem to be a fitting occasion for relieving Mr. Schott of the burden he has borne for so many years.
>
> His official career has been coincident with the development of the Survey, and his untiring zeal and fidelity have done much to bring about its present standard.

In 1898 Mr. Schott attended the 'International Conference on Terrestrial Magnetism' held in Bristol, England, as the representative of the United States Coast and Geodetic Survey.

He took part in the discussion, and his proposal that a permanent magnetic observatory should be maintained for a series of

years in the Hawaiian Islands was received with acclamation.

Later in the year the French Academy of Sciences awarded him the Wilde Prize on account of his researches and publications in the field of terrestrial magnetism. This prize was founded by Henry Wilde, an English scientist who gave the French Academy of Sciences a sum of money, the income from which forms a prize described as follows, in the *Comptes Rendus Académie des Sciences*, France, No. 126, p. 144: "This prize will be awarded each year, beginning with 1898, by the Academy of Sciences, without regard to nationality, to the person whose discoveries or publications under astronomy, physics, chemistry, mineralogy, geology, or experimental mechanics, shall be judged by the Academy most worthy of reward, whether that discovery or publication was made in the same year or in some other year before or after the foundation of the prize."

In accordance with the deed of gift this prize was awarded for the first time in 1898, and Mr. Schott received it in due form through the Department of State and from the hands of the President. The following extracts are of interest from their bearing on this memorable incident:

Extract from *Comptes Rendus Académie des Sciences*, France, No. 127, p. 1097.

The Henry Wilde Prize.

Committee M. M. Sarrau, J. Bertrand, Berthelot, Michel Lévy; Mascart, Secretary.

At the session of July 12, 1897, M. H. Wilde presented to the Academy of Sciences, under the name of Magnetarium, a remarkable apparatus now in the Museum of Arts and Industries which permits of the reproduction on the surface of a sphere, with marvelous accuracy, the distribution of the elements of terrestrial magnetism and their secular variations.

The Commission has decided that, in order to render homage to the inventor of that great work, it is desirable to make the first award of the prize founded by M. Henri Wilde to researches relating to terrestrial magnetism.

Since 1869, the 'Annual Reports' of the United States Coast and Geodetic Survey contain, almost every year, memoirs of the greatest interest by Mr. Charles A. Schott, on the determination of the magnetic elements at the permanent observatories of the United States, and at a great number of temporary stations. The extensive work accomplished by Mr. Schott can not be stated in a brief *résumé*. * * * One finds in his memoirs an explanation of the methods employed in the observatories and in the course of journeys; a comprehensive view of the results obtained since the first observations on the American continent and a certain number of foreign stations; an exhaustive discussion of the readings made of the apparent variations in certain observatories with the study of the diurnal change for the different months of the year, of the lunar influence and perturbations; and lastly a considerable number of personal observations in many isolated stations; this work permits the establishment of the lines of magnetic distribution in North America. The whole of this work furnishes one of the most important contributions in the history of terrestrial magnetism and the Commission is unanimous in awarding the Henry Wilde prize to Mr. Charles A. Schott.

From the *Public Press*, February 4, 1899.

"An interesting episode took place at the White House this afternoon at 4 o'clock, when, in the presence of the Secretary of the Treasury, the Superintendent of the Coast and Geodetic Survey, and twenty-five of Mr. Schott's colleagues, the President presented to Mr. Charles A. Schott the prize recently conferred upon him by the Academy of France. This prize of 4,000 francs was founded by an Englishman about two years ago, and was to be conferred by the Academy on any person, in any country, whose discoveries in science, or whose original investigations had been most valuable and had contributed most to human knowledge, in the direction of mathematics, mechanics, physics, chemistry or geology. The Academy, after due consideration, conferred the prize on Mr. Schott for his investigations into the laws of terrestrial magnetism.

"After the officers of the survey had been duly introduced to the President and to the Secretary, by the Superintendent of the Coast and Geodetic Survey, the official papers containing the award were placed by

the President in Mr. Schott's hands, and in doing so he alluded in the following words to the international character of the prize, and to the catholicity of scientific work:

"I have great pleasure in placing in your hands the formal papers which convey to you the 'Wilde Prize.' This prize, founded by an Englishman who has a deep interest in science, has been adjudged to you by a committee of eminent men chosen from the most famous organized body of scientists in the world—the Institute of France. According to the terms accepted by the Institute of France in founding the prize, it was to be given to the person from any nation whose discoveries in physics or mathematics, mechanics, chemistry or geology are most valuable, or whose original researches in these branches of science have been most successful. The prize has been awarded to you for researches in the important field of terrestrial magnetism.

"I congratulate you and American science, and in particular the Coast and Geodetic Survey (the scientific organization of which you are a member), that you have been chosen from all the world as the most worthy to receive this great honor.

"It is especially pleasant in this age when international relations are of high importance, when the methods of modern applied science have brought all nations, however geographically remote, into close contact, to know that in science there are no international boundaries; and no pleasanter proof of this catholic spirit could well be given than this fine prize —one of the highest that can be conferred by a scientific body—founded by an Englishman, has been awarded by a Frenchman and won by an American."

Mr. Schott's ability and attainments have been widely recognized by learned bodies and scientific societies as shown by his election to membership on the following dates:

1871. Philosophical Society of Washington, D. C. (Founder).

1872. National Academy of Sciences.

1874. American Association for Advancement of Science (Fellow).

1896. Sociedad Cientifico Antonio Alzate, Mexico.

1898. Washington Academy of Sciences (Founder).

Accademia Giocenia di Scienze Naturali, in Catania, Sicily.

The long list of publications bearing Mr. Schott's name bear testimony to his untiring industry and his devotion to the interest of the service, which he honored as a member and to the advancement of human knowledge.

ISAAC WINSTON.

GEORGE K. LAWTON.

IN the unexpected death of George K. Lawton, of the U. S. Naval Observatory, a young astronomer of great promise has passed away. The loss to American astronomy can be appreciated as yet only by those who had the good fortune to know him intimately. He was born October 20, 1873, and died at Washington, July 25, 1901, after a brief illness of twelve days, of typhoid fever; and was thus less than twenty-eight years of age. Under the guidance of his father, Professor U. W. Lawton, of Jackson, Michigan, he had enjoyed from childhood excellent educational advantages, and in 1895 graduated in classics at the University of Michigan, where he also pursued advanced astronomical studies under Professor Asaph Hall, Jr., at the Detroit Observatory. He then spent a year in post-graduate study at the University of Chicago, where the writer had the honor to be one of his teachers. He showed distinguished abilities in the study of celestial mechanics and of higher mathematics. He was afterwards attached to the Observatory of Yale University for a short time, occupied mainly with work on meteors; and then came to the Naval Observatory as one of the regular computers. In 1897 he took the degree of M.A. at the University of Michigan. While attached to this Observatory he participated in all the transit circle observations of the past five years, much of which has recently appeared in the *Publications of the U. S. Naval Observatory*, Vol. I., new series. Last year he bore an important part in the observations of the total eclipse of the sun, at Pinehurst, North Carolina. More recently he took a leading part in the reductions and revision of the Eros observations of this Ob-