discovered the above records while exploring the prehistoric cavern at Montesqui-Avantes in Ariège.

The first finds of Count Begouen and his sons, which we mentioned when brought forth in 1914, before the war, were of great interest to the institute.

Some months later the three brothers departed for the front. What they have done there may be learned from the numerous and splendid citations which we have published. But that which they accomplished for science during their furloughs was not known. Yet it is of consequence that we learn and for that reason their father came yesterday to tell the academy that in June last during one of these furloughs which reunited all three sons at Montesqui-Avantes he continued with them the exploration of the Ariège cave.

This time Count Begouen and his sons discovered on the walls of the subterranean galleries some engravings estimated to be thirty thousand years old, and in such quantity and variety that the extraordinary ensemble of prehistoric art work constitutes a veritable museum.

The animals figured in the cave are considerable in number and include reindeers, bisons, horses, both isolated and in groups; bears, elephants and rhinoceroses. The representations of felines are very rare in prehistoric art; but MM. Begouen have photographed in their cave a genuine lion, executed in bas-relief. They have made out also several birds including swans, ducks, as well as three predatory night fliers.

The human figure is likewise represented in the cave, which in recognition of the sons of Count Begouen has been baptized "the Cave of the Three Brothers." A silhouette is particularly remarkable, almost baffling. It represents a man in motion; a man of powerful body, whose head and shoulders are joined by an enormous neck; a man whose upper and lower limbs and whose hands and feet are perfectly human, but whose vertebral column is prolonged in an exterior appendage resembling that of the anthropoids; a man, at last, *qui marche a quatre pattes!*

The suggestions prompted by the magnificent discovery of MM. Begouen have long held the attention of the academy. MM. Dieulafoy, Salomon Reinach, Edmond Pottier, Langlois, Louis Leger, Bouché-Leclercq are particularly interested.

Several communications have been made on the subject by MM. Homolle and Clermont-Ganneau.

N. C. NELSON

SCIENTIFIC BOOKS

The Destinies of the Stars. By SVANTE ARRHENIUS. G. P. Putnam's Sons. 1918. Pp. xvii + 256, illustrated.

In 1903 Dr. Arrhenius was awarded the Noble Prize for his researches in the field of electro-chemistry. To the study of the development of the celestial universe, he, therefore, brings the mind of a trained chemist; the mind of one who is especially fitted to grapple with the intricate problems of the evolution of the stars and planets from the formless masses of gaseous nebulae.

In "The Destinies of the Stars" this evolution is traced through the spiral nebulæ, the gaseous stars, the sun, the worlds to be, Jupiter and Saturn, the world, to the final destiny of all, the dead planets, Mercury and Mars. In this general theory of growth and decay there is, of course, little that is new, but Dr. Arrhenius treats the matter in a new way and brings out many new points.

The chapter devoted to the planet Mars is especially interesting. In this the so-long popular fantastic ideas of Lowell are scientifically and clearly discussed, and the utter impossibility of any life, such as we have any conception of, existing on Mars is conclusively shown. The inhabitants of this planet, the wonderful system of irrigating canals, the whole fabric of intensely interesting fact and fancy so cleverly woven by Lowell, are shown by the clear, concise reasoning of the chemist to be only "such stuff as dreams are made of."

The book is decidedly interesting and well worth careful reading. It lacks, however, continuity. This is due, undoubtedly, to the

fact that the book was not written as a whole, but is a collection of lectures, delivered at various times and places, on different aspects of the general problem of the evolution of the universe.

CHAS. LANE POOR

Modern Navigation. By FRANK SEYMOUR HASTINGS. D. Appleton & Co. 1918. Pp. xvi + 84, illustrated. With introduction by Rear-Admiral Albert Gleaves, U. S. N.

In "Modern Navigation" the author has rendered a real service to all interested in the safe navigation of the seas. In the last quarter of a century there have been many improvements in the art of finding one's place at sea, and the officers of our Navy have been quick to take all possible advantage of these inventions and improvements. Not so, however, with those responsible for the vessels of the mercantile marine. These vessels have been navigated and are being navigated to-day by methods requiring long and cumbersome calculations, by methods long obsolete in the Navy.

When the necessity of manning the vessels, now being built under the emergency of war, was recognized, the government started schools for the training of many thousands of seamen to rank as mates and masters in the new mercantile marine. The attention of those in charge of this training was early called to these new methods and they were urged to start the future navigators right, to discard all the obsolete methods, and to substitute the simple modern method. This was not done: the training has gone on along the old fashioned and antiquated ideas of a past generation. The time and energy of thousands of bright, aspiring young men are being wasted, and old, worn out methods are being fastened on the next generation, all because the power to grant licenses to masters and mates rests in the hands of a few retired seamen, who have failed to keep abreast of the advances in their profession. For this reason the book of Mr. Hastings is most timely; it may help to bring the great advantages of modern methods before the officers and students of the training schools.

This small book gives a short account of the St. Hilaire method. Very wisely all extraneous matter is eliminated, and the book is confined to the bringing before the merchant officer the advantages of the Navy method. The working of this method is shown by a number of concrete examples, and the book is well illustrated with carefully prepared diagrams. The book, however, lacks a clear explanation of the fundamental principles of a "line of position," and of the real underlying basis of the St. Hilaire method.

It is certainly refreshing to see a book on navigation, which is something more than a mere compilation from treatises of a past generation.

CHAS. LANE POOR

SPECIAL ARTICLES

RHINEODON TYPUS, THE WHALE SHARK—FURTHER NOTES ON ITS HABITS AND DISTRIBUTION

IN a brief note published in SCIENCE in 1913[1] I recorded the second taking in Florida waters of this great fish. As an interesting coincidence it may be pointed out that this specimen is the second ever taken in the Atlantic Ocean, or, so far as records go, ever seen therein. In a later and more extensive paper,[2] I gave the details of the capture of this fish with as full a description and as many photographs as possible, and followed these with the natural history of the fish as contained in the writings of those scientists who have been privileged to study it at first hand. Reproduced in this larger paper were all the known figures of this great shark. Inasmuch as in the course of this work there were brought to light a number of accounts and descriptions of this greatest of all sharks which up to that time had remained unknown, it was believed that the paper contained a

[1] Gudger, E. W., "A Second Capture of the Whale Shark, *Rhineodon typus*, in Florida Waters," SCIENCE, 1913, N. S., Vol. 38, p. 270.

[2] "Natural History of the Whale Shark, *Rhineodon typus* Smith," *Zoologica:* Scientific Contributions, New York Zoological Society, 1915, Vol. I., pp. 349–389, 14 figs.