position, and that, indeed, of phytopaleontology, that Saporta has prepared a really noble volume. He first examines the conditions of the vegetable remains, their mode of preservation, the evidence of their vegetable nature compared with the impressions produced by animals or mechanical agency. On this subject he adds a note of Dr. Marion, who has followed the same line of research as Nathorst, in carefully studying the character of the cells produced by animal agency, and who points out the great difference between these tracks and vegetable impressions. The second part of Saporta's memoir contains a detailed examination of some types of fossil Algae. The species described are represented, as well as their living related types, with admirable care and precision. Some of the documents from which Saporta has derived valuable assistance are from the works or communications of American authors; Harlania Hallii, among others, is beautifully figured. With few exceptions, all the evidence adduced in the admirable work of Saporta is opposed to the opinions of Nathorst, and renders great service to phytopaleontology.

BOLTON'S QUANTITATIVE ANALYSIS.

The student's guide in quantitative analysis, intended as an aid to the study of Fresenius' system. By H. CARRINGTON BOLTON, Ph.D., Trinity college, Hartford, Conn. New York, *John Wiley & Sons*, 1882. 6+124 p. 8°.

THE above title is somewhat misleading; for the book, as stated in the preface, is a series of notes on a system of quantitative analysis, as developed and modified by the author, from a course of instruction originally organized in the School of mines, Columbia college, by Prof. C. F. Chandler. Viewing the book in this light, two things must be taken into consideration, — first, whether the analyses given are typical ones, such as would enable the student, on the completion of the course, to work out by himself the common problems of quantitative analytical chemistry; second, whether the notes given under the various determinations are such as explain, not only the different steps of the process, but also the reasons that necessitate them. The first of these two questions we can answer decidedly in the affirmative. The only criticism that we might make is, that possibly too much attention has been paid to alloys, and not quite enough to complex mineral determinations. The first analysis given is baric chloride, then magnesic sulphate, and other simple salts where no process of separation is necessary. The book then takes up, in well-chosen order, almost all the common alloys and minerals, gives the simpler problems of volumetric work, the determination of carbon, hydrogen, and nitrogen in organic compounds, and many of the most striking commercial tests; such as the examination of sugar, milk, mineral-water, coal, and petroleum. The notes, however, under these different analyses, we cannot consider as perfectly satisfactory. They consist of a short account of the process, with references to Fresenius or the original article, and sometimes a tabulated plan; but no explanation of the various steps is given. If, after each analysis, the reasons why the different reagents had been added, and other numerous details, had been explained, the value of the book would have been much greater; for it is the want of such elucidations in Fresenius that makes his system seem confused and difficult to the young student. As a whole, however, when studied, as intended by the author, in connection with Johnson's translation of Fresenius, or when supplemented by a thorough series of lectures, we can recommend the book as giving a valuable course in quantitative work.

WEEKLY SUMMARY OF THE PROGRESS OF SCIENCE.

ASTRONOMY.

Encke's comet, and a resisting medium in space. — Dr. O. Backlund, in a paper entitled *Kurzer bericht ueber meine untersuchungen ueber die hypothese eines wiederstehenden mittels* (*Mélanges math. et astron.*, vi.), makes the following statement of the results of his researches on Encke's comet: "The investigations hitherto made of the theory of Encke's comet really prove nothing as to the existence of a resisting medium in space. Even if we should succeed by such a hypothesis to explain sufficiently the increase of the mean motion and the decrease of the eccentricity during the period 1819–48, a simple hypothesis like this will not at the same time suffice for the motion of the comet after 1865, as the variation of the mean motion after that time has most probably become different. Not until the period 1865–81, and its connection with the earlier one, have been fully discussed, will it perhaps become possible to find indications of the nature of the unknown forces which act on the comet." — (*Copernicus*, Feb.) D. P. T.