

air which would indicate that he had completely explained the phenomenon upon his theory, whereas there has never been even an attempt made to explain any thing by it.

The law of gravitation, suggested by the fall of an apple, was withheld by Newton for a number of years, because, on account of incorrect data, it was not confirmed by observation. With the reserve and caution characteristic of a true philosopher, he thought it should be fully tried and tested first. But now we have a theory thrust upon us for our assent which has not been developed, and applied in the explanation of a single phenomenon in the local disturbances of the atmosphere; and yet I am censured for thinking that there has been entirely too much haste in the matter, and that it should first have been shown that it will at least account for a few of the observed atmospheric phenomena. Let the advocates of this theory, if it can be so called, take up the matter now, and show that it accounts for the phenomena as well as, or better than, the condensation theory. Let them give me a chance to look into the workings of this new theory.

WM. FERREL.

Martinsburg, W. Va., Jan. 10.

BOOK-REVIEWS.

Tycho Brahe: a Picture of Scientific Life and Work in the Sixteenth Century. By J. L. E. DREYER. Edinburgh, Adam & Charles Black. 8°. (New York, Macmillan, \$3.50.)

THIS is a work of much value to students of the history of science. Tycho Brahe holds a prominent place in the annals of astronomy; and he was, moreover, a member of the Danish nobility and a man of considerable means, with a wide circle of acquaintances and many opportunities for travel. Hence his life was more dramatic and fuller of incident than the lives of scientific men usually are; and Professor Dreyer has here related it in an interesting way. The book is well written, with great

care in collecting and sifting the facts, and with an evident desire to be just to all parties. The early life and studies of Tycho are described somewhat briefly; but a full account is given of his early attempts at astronomical observation and of the endowments given him by King Frederick II. to enable him to pursue his chosen work. The Island of Hveen, which was assigned him to hold during the king's pleasure, became the scene of his most important discoveries; and the income it afforded, together with certain other revenues placed at his disposal by his royal friend and patron, enabled him to hire assistants and to prosecute his work vigorously for many years. But after the death of Frederick the authorities were less favorable to Tycho; so that at last his endowments were taken from him, and he left Denmark for a new field of labor under the German emperor at Prague. Professor Dreyer gives a very good description of the Island of Hveen, and the facilities available there for astronomical work, and then endeavors to explain how and why Tycho Brahe lost his position there, — a misfortune due quite as much to Tycho's own faults as to the disfavor of the authorities. His new station at Prague is also well described; and one of the most interesting passages in the book is that relating the meeting of the veteran Tycho with the young Kepler, an event of such significance in the development of science. Indeed, this meeting was the most important result of Tycho's residence at Prague, which was soon terminated by his death in his fifty-fifth year.

Of Tycho Brahe's scientific achievements, Professor Dreyer gives a full and detailed account. He was an observer rather than a thinker, and his biographer thinks that his observations could hardly have been surpassed in accuracy but for the invention of the telescope. The instruments he employed, many of which were devised by him, are described with some minuteness, and the importance of his observations as a basis for the theories of Kepler and Newton is clearly shown. Tycho's most important labors, in Professor Dreyer's opinion, were those relating to the

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movements of the moon and the planets, his catalogue of a thousand stars, and his observations of comets, which were the means of refuting Aristotle's opinion that these bodies belonged to our atmosphere. Considerable space is devoted to Tycho's work in astrology, to which he gave much attention, and in which his faith, though not as enthusiastic as that of some men, was never abandoned. Altogether, Professor Dreyer's work is worthy of its theme, and will hold an honorable place among biographies of scientific men.

Introduction to the Study of Federal Government. By ALBERT BUSHNELL HART. (Harvard Historical Monographs, No. 2). Boston, Ginn. 8°. \$1 net.

WE noticed the first of these monographs a short time since, and we are now glad to receive the second. It is only an introductory work, forming a pamphlet of two hundred pages, and the author tells us in his preface that it is to be followed in due time by an extended treatise on the same subject; yet it is of real value in itself. Professor Hart opens his work with a discussion of the nature of federation and of the various types of federal government that are known in history, — a discussion that shows a clear view of the questions involved, and considerable power of philosophic thought. He next proceeds to a brief but very clear account of the ancient and mediæval confederations from the first conception of the federal idea among the Greeks to the Holy Roman Empire, then gives a description of the four great existing federations, — those of the United States, Switzerland, Germany, and Canada, — and closes with a short chapter on the Latin-American federations, in which he has no great confidence. The monograph is written in a good style, and shows throughout not only a careful study of the facts, but also the fruits of thought and meditation, which are not always found in American historical writings. Besides the text of the work, there is a long and elaborate appendix, containing a conspectus of the four chief ex-

isting federations mentioned above, arranged in parallel form, and giving the provisions of each of the four constitutions on every important point. This appendix thus presents a large amount of information in a form convenient for reference; and there is also another appendix containing a bibliography of federal government. Altogether, the pamphlet is a creditable one; and historical writers in our other universities will have to do better than they have done heretofore if their work is to rank on a level with these Harvard monographs.

AMONG THE PUBLISHERS.

THE latest number of the "Proceedings of the United States Naval Institute" opens with an interesting article on the protection of the hulls of vessels by lacquer, detailing the results of experiments on several Japanese men-of-war. The experiments seem to prove that lacquer is a perfect protection against the action of sea-water so long as the coat remains unbroken.

—Norman W. Henley & Co., publishers and importers of scientific and technical books (150 Nassau Street, this city), announce for immediate publication "Rubber Hand-Stamp Making and the Manipulation of Rubber," by T. O'Connor Sloane, A.M.; and "Arithmetic of Electricity," by the same author. They have also in preparation the "Manufacturers', Mechanics', and Business Men's Assistant," by Benjamin Franklin, LL.B.

—Among the principal articles in the *Journal of the Military Service Institution* for January are the following: "A Practical Scheme for Training the Regular Army in Field Duties for War" (a prize essay), by Lieut. Read; "A Proposed Change in Artillery School Methods," by Lieut. Hunter; "Modern Bobadilism," by Capt. Chester; "Strategy, Tactics, and Policy" (a summary), by Lieut. Bush; "The Gyroscope and 'Drift,'" by Lieut. Richmond; "Practical Education of the Soldier," by Lieut. Parkhurst; and "The Battle of Plattsburg," by Gen. Macomb.

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- OPTICIAN, The. Vol. I. No. 1. m. New York, Frederick Boger. 16 p. 8°. 50 cents per year.
- SCUDDER, H. E. Fables and Folk Stories. Part II. (Riverside Literature Series, No. 48.) Boston and New York, Houghton, Mifflin, & Co. 200 p. 16°. 15 cents.
- SZCZEPANSKI, F. v., ed. Bibliotheca Polytechnica. Directory of Technical Literature. New York, Internat. News Co. 80 p. 12°.
- U. S. GEOLOGICAL SURVEY, Ninth Annual Report of the, to the Secretary of the Interior, 1887-88. Washington, Government. 717 p. 4°.
- UPHAM, W. Report of Exploration of the Glacial Lake Agassiz in Manitoba. Montreal, W. F. Brown & Co. 156 p. 8°. 25 cents.
- VOOGDES, A. W. A Bibliography of Paleozoic Crustacea from 1698 to 1889. Washington, Government. 177 p. 8°.
- WATKINS, J. E. Report on the Section of Transportation and Engineering in the U. S. National Museum, 1888. Washington, Government. 5 p. 8°.
- WEED, W. H. The Formation of Travertine and Siliceous Sinter by the Vegetation of Hot Springs. Washington, Government. 62 p. 12°.
- WILSON, T. A Study of Prehistoric Anthropology.—Hand-Book for Beginners. Washington, Government. 75 p. 8°.
- Results of an Inquiry as to the Existence of Man in North America during the Paleolithic Period of the Stone Age. Washington, Government. 26. 8°.
- WRIGHT, G. F. The Glacial Boundary in Western Pennsylvania, Ohio, Kentucky, Indiana, and Illinois. (Bull. U. S. Geol. Surv., No. 58.) Washington, Government. 112 p. 8°.

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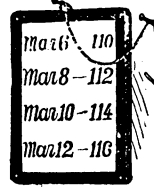
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