taining a brief *résumé* of the principal characteristics of the period, together with a short account of the progress made during the period in each of the branches of the mathematical science of the time, — geometry, arithmetic, physics, and astronomy. This is followed by the biographies of the mathematicians and physicists of the period and an analysis of their work.

The three introductory chapters, taken together, form a short and interesting history of Greek mathematics; while the biographies are sufficiently full, and the analyses are remarkably clear and concise.

SECONDARY BATTERIES.

The chemistry of the secondary batteries of Planté and Faure. By J. H. GLADSTONE and ALFRED TRIBE. London, *Macmillan & Co.*, 1883. (Nature series.) 11+59 p. 16°.

THE valuable papers of Gladstone and Tribe, originally printed in *Nature*, have been published in a collected form in the present volume, which contains much information as to the chemical actions going on in the Planté and Faure batteries. In successive chapters the authors consider the subjects of local action, the chemical changes occurring in the charge and discharge of the cell, the function of the sulphate of lead formed, and some minor topics. The chapter devoted to the function of the sulphate of lead, which the authors have shown to be formed in the normal action of the battery, is especially interesting. In the formation of a Faure cell, sulphate of lead, originally produced by local action, is oxidated to a peroxide on one plate, and reduced to spongy metallic lead on the other; and, when the cell is discharged, lead sulphate is finally produced on both plates. On recharging the battery, the authors consider that the lead sulphate is again oxidated on one plate, and reduced on the other, as when the cell was originally formed, — a point which is a very practical one, as the lead sulphate, if not oxidated, will soon prove fatal to the usefulness of the cell. This view, announced in the original papers, is substantiated by a number of recent experiments, notwithstanding the doubts that have been thrown upon it; so that, in charging and recharging, the plate of the cell is not corroded. It is also shown that the fact noticed by Planté, that elevation of temperature facilitates the formation of the cell, is explained by the more rapid formation of lead sulphate under these conditions.

RECENT PROCEEDINGS OF SCIENTIFIC SOCIETIES.

Vassar brothers' institute, Poughkeepsie.

Dec. 5. — Professor W. B. Dwight gave the results of a recent re-examination by himself of Van Duzer's iron-mine, Cornwall station, Orange county, N.Y. Here a low ridge presents a red rock of sandstone and conglomerate, running into red shales to the south, in contact conformably with a highly fossiliferous limestone in nearly vertical layers. No other combination of the kind is apparent in this region, and there was much speculation among early geologists as to the horizon. W. B. Rogers called the red rock the triassico-jurassic sandstone; Dr. W. Horton considered it the Medina group, and assigned the limestone some place lower; Prof. Mather, with some doubt, concurred with Horton, and further assigned the limestone to the Catskill shaly limestone. Prof. Dwight, after a careful study of the locality, is satisfied that the red rocks are of the Medina epoch, and the limestones lower Helderberg; but by the fossils he identifies, in addition to the Catskill shaly limestone, the tentaculite limestone and the lower pentamerous groups. He finds no foundation for the statements of Horton, indorsed by Mather, that the iron ore occurs in layers between the layers of limestone. On the other hand, it is a bed of limonite formed at the base of the ridge superficially, as in other iron-mines of the region, by the decomposition of the red ferruginous shales at the junction with the limestone.

Five hundred and sixty-two specimens, representing various departments of natural history and archeology, were reported to the museum by the secretary.

Franklin institute, Philadelphia.

December 19. — A special committee, appointed to consider the propriety of recommending the councils of the city of Philadelphia to pass an ordinance requiring steam-engineers to pass an examination and to be provided with a license, as evidence of their competency, made majority and minority reports; the first taking the view that such action on the part of the society would be inexpedient, and the latter recommending such action. The reports were freely discussed, *pro* and *con;* and the subject was postponed for final action until the stated meeting in January.

Mr. G. Morgan Eldridge then read a paper on 'The British patent designs and trade-marks act of 1883 as affecting American inventors,' explaining the provisions of the new law to go into operation on the 1st