to a discussion of the experimental data which have a bearing upon Nernst's theory of the E. M. F. of a voltaic cell. Dr. Bancroft is inclined to look upon certain aspects of this theory with considerable distrust. His conclusions may be summed up as follows:

1. The potential difference between a metal and an electrolyte is not a function of the concentration of the salt solution, nor of the nature of the positive ion, except in certain special cases.

2. It is a function of the electrode, of the negative ion, and of the solvent.

3. In aqueous solutions the potential difference is the sum of the term due to the electrode and the term due to the negative ion in the normal cases.

4. For most metals in most electrolytes the term due to the negative ion has the same numerical value and the same sign.

The tables accompanying this article, in which are collected the results of some ten different observers, will be found of especial value.

On the Freezing Points of Dilute Aqueous Solutions: By E. H. LOOMIS. The phenomenon of the lowering of the freezing point of a liquid by the presence of a dissolved salt has so important a bearing upon the theory of solutions that innumerable experimenters have made it a subject of study. That such determinations are extremely liable to serious error is shown by the disagreement between the results of different observers. In some previous work on this subject Dr. Loomis was led to make several improvements in methods and apparatus. The present paper gives the results of his new methods in the case of certain electrolytes, the salts studied being principally chlorides, carbonates and nitrates. In general the results may be said to be in fair agreement with the theory of electrolytic dissociation. With KCl and K_2SO_4 the agreement is complete. With half a dozen other salts it is not so good, but fairly satisfactory. K_2CO_3 and Na_2CO_3 show considerable discrepancies, which, however, may be due to uncertainty in the determination of the conductivities of these salts.

Dr. Loomis devotes considerable time to a discussion of the probable accuracy of his results, and in a minor article in the same number of the *Review* answers certain objections which have been raised against his earlier determinations.

A Comparison of two Concave Rowland Gratings: By ALICE H. BRUÈRE. Miss Bruère subjects the well-known irregularities in the intensity of the different spectra from a concave grating to a careful photometric study. The results show the same general character as those reached by Paschen by bolometric methods. The curves which accompany Miss Bruère's article show in a most striking manner the irregularities in intensity in different parts of the same spectrum, as well as in the spectra of different orders.

A New Apparatus for the Study of Color Phenomena: By E. R. VON NARDROFF. Mr. von Nardroff describes an ingenious apparatus to be used with a lantern for conveniently showing the various experiments dealing with color mixing, contrast, complementary colors, etc. The apparatus has been used by Mr. von Nardroff for several years and found satisfactory and convenient.

On a New Form of Water Battery: By L. W. AUSTIN and C. B. THWING. The writers have devised a cell which is constructed out of a homeopathic vial and strips of sheet copper and zinc, and which appears to possess considerable advantages. The chief novelty consists in the form of the two electrodes. Ease of construction, convenience in filling, and permanence of action are the advantages urged.

Books Reviewed: Daniell, Principles of Physics; Whetham, Solution and Electrolysis; S. P. Thompson, Polyphaze Currents; Palaz, Industrial Photometry; Walter, Oberflächenfarben; Clerke, The Herschels and Modern Astronomy.

SOCIETIES AND ACADEMIES.

JOINT COMMISSION OF THE SCIENTIFIC SOCIETIES OF WASHINGTON.

THE memorial meeting held by the Scientific Societies of Washington, on Wednesday evening, January 14th, at which addresses were made in honor of Dana, Pasteur, von Helmholtz and Huxley, was followed on the following evening, the 15th, by a meeting of the Joint Commission, in honor of the late Charles V. Riley, the entomologist. The memorial address by

Dr. G. Brown Goode will be published in this journal.

At this meeting the Joint Committee elected officers for the ensuing year, with the following result:

President—Gardiner G. Hubbard.

Vice-President—G. Brown Goode.

Secretary—Joseph Stanley-Brown.

Treasurer—Perry B. Pierce.

The Executive Committee elected will consist of the above and one member from each of the component societies, as follows: Anthropological, L. F. Ward; Biological, Dr. George M. Sternberg, U. S. A.; Chemical, Dr. E. A. De Schweinitz; Entomological, Wm. H. Ashmead; Geological, S. F. Emmons; National Geographic, G. K. Gilbert, and Philosophical, Prof. F. W. Clarke. W. F. Morsell.

THE PHILOSOPHICAL SOCIETY OF WASHINGTON, JANUARY 4.

E. D. Preston read a paper on a new graphic method of reducing stars from mean to apparent places, which gave detailed exposition of a new graphical method of finding the apparent places of stars. The reduction was carried out by having the day numbers plotted on a scale sufficiently large to read two decimal places, and then multiplying these graphically by the star numbers which are calculated by construction on the same sheet. The calculation of these last quantities is facilitated in several ways. Two quadrants are drawn, and the right ascension and declination of the star to be reduced being selected, the simple trigonometrical functions are immediately read off from the figure.

For those terms where a product of functions appears, the method enables the operator to construct the quantity by different processes. That one is chosen which arrives at a resulting line lying at right angles to the day numbers already plotted. This makes their multiplication a very easy matter. In actual practice the construction lines shown on the diagram are of course not drawn. The whole sheet being divided into small squares, the computer is able to project the point visually, and to determine the intersections of the necessary constructions without actually drawing them.

The method has been principally used for checking the regular computation, and this can be done in less than one-half the time required to make the first reduction. But with a scale sufficiently enlarged there seems to be no reason why the system should not be used with entire success for a complete and separate solution.

January 18th the following papers were read: Dr. G. Brown Goode, on 'The Principles of Museum Administration;' Mr. Isaac Winston, on the 'Present form of precise levelling apparatus in use by the U. S. Coast and Geodetic Survey;' Mr. G. R. Putnam, on the 'Results of Recent Pendulum Observations.'

Bernard R. Green,
Secretary.

CHEMICAL SOCIETY OF WASHINGTON, 83D REGULAR MEETING, THURSDAY, NOVEMBER 14, 1895.

The President, Chas. E. Munroe, in the chair, with thirty-five members present. The following were elected to membership: H. B. Hodges, Allan Wade Dow, W. W. Skinner and F. B. Bomberger. Dr. Marcus Benjamin read a paper on 'The Smithsonian Institution's Contributions to Chemistry from 1846 to 1896.' He referred to the fact that Smithson in his time was considered as among the most expert of chemists in elegant analysis. This he thought had much to do with the provision made for a chemical laboratory in the original 'programme of organization of the Smithsonian Institution.' He traced the history of the laboratory, mentioning the chemists who have occupied it, among whom was J. Laurence Smith. The chemical publications of the Institution were reviewed, beginning with that of Dr. Robert Hare 'On the Explosiveness of Nitre,' in 1850, down to that 'On the Density of Oxygen and Hydrogen, and on the Reduction of their Atomic Weights,' by Edward N. Morley, in 1895. The lectures by Cooke, Johnson, Hunt and others were mentioned and the grants of funds to Genth, Gibbs and Morley for chemical research were described.

The work of Booth as shown in his 'Report of Recent Instruments in the Chemical Arts;' of Clarke in his 'Constants of Nature,' and of Bolton in his 'Bibliography of Chemistry,' as

well as the many indexes to chemical literature by Magee, Bolton, Traphagen, Tuckerman and others were mentioned and discussed. The paper was concluded with a full bibliography of the chemical papers published by the Smithsonian Institution.

Mr. Cabell Whitehead read some 'Notes on a recent visit to European Mints.' In the discussion of this paper mention was made of the explosions that occur commonly in lighting a 'Buffalo Dental Company's' muffler furnace, and Mr. Dewey said they could be avoided by raising the whole body of the furnace by a simple arrangement of movable levers and then slipping a lighted paper over the burners.

Under the title 'Calcium Phosphide,' Prof. Chas. E. Munroe described the process of manufacture which he invented and carried into operation at the United States Naval Torpedo Station in 1891. The novelty consisted in the use of the iron crucibles, in which quicklime was heated to redness, after which sticks of white phosphorus were added through an iron tube which penetrated the cover. The process was so simple that eventually it was carried on by unskilled laborers, and the phosphide which was then selling in the market for $2.25 per lb. was produced at a cost of 20 cents per lb. It was manufactured for use in Automobile torpedoes while at practice, and was found so efficient that when a pound in its container was submerged in 18 feet of water it gave a flame 2 feet in height on the surface, which continued to burn for three hours.

A. C. PEALE,
Secretary.

BOSTON SOCIETY OF NATURAL HISTORY.

THE Society met December 18; one hundred and six persons present.

Mr. F. W. Crosby described a remarkable locality in Cephalonia where the water runs from the sea into the land at a rate varying from 4,000 to 10,000 cubic feet per minute. This immense quantity of water is utilized as power for mills, but what becomes of it is not known.

Prof. G. Frederick Wright discussed the present status of Glacial man in America. He showed an ancient chipped knife found by Mr. Huston at Brilliant, Ohio, and gave additional evidence, the result of a renewed study upon the ground, to prove that the implement was not intrusive but was found in the undisturbed strata of the original terrace. Prof. Wright's paper was illustrated by a series of lantern slides.

Prof. H. W. Haynes reviewed the evidence of early man in America as presented by Mr. Upham and Miss Babbitt, and showed some of the rudely flaked quartzes found by Miss Babbitt, at Little Falls, Minn.

SAMUEL HENSHAW,
Secretary.

GEOLOGICAL CONFERENCE OF HARVARD UNIVERSITY, JANUARY 7, 1896.

Some occurrences of Eruptive Granite in the Archean Highlands of New Jersey: By J. E. WOLFF.

Occurrences of eruptive granite have been described in the white limestone area from Franklin northeastward, to which the present crystalline condition of the limestone is ascribed as due to contact metamorphism. These occurrences lie in the valley at the west base of the Highlands. The object of this communication was to describe the occurrence of a large area of granite within the area of the gneisses themselves, lying near the west edge of the plateau formed by the Archean gneisses and nearly due east of Franklin. The area so far as determined is about six miles from north to south and two miles wide; the field evidence seems to prove its eruptive character through the bounding gneisses.

JANUARY 14, 1896.

1. *National Concentration of Ore Deposits:* By A. C. LANE. (To be published in the Engineering and Mining Journal.)
2. *Plains of Marine and Subaërial Denudation:* By W. M. DAVIS. (To be published in Bulletin of the Geological Society of America.)

T. A. JAGGAR, JR.,
Recording Secretary.

TORREY BOTANICAL CLUB.

THE annual meeting of the Torrey Botanical Club was held on Tuesday evening, January

14th. The reports of the officers and committees exhibited the most flourishing condition in the history of the Club. The following officers were elected for the ensuing year: President, Hon. Addison Brown; Vice-Presidents, T. F. Allen, M. D., and L. H. Lighthipe; Recording Secretary, Henry H. Rusby, M. D., College of Pharmacy, New York City; Corresponding Secretary, John K. Small, Columbia College, New York City; Treasurer, Henry Ogden, 11 Pine Street, New York City; Editor, N. L. Britton, Ph. D., Columbia College, New York City; Associate Editors, Emily L. Gregory, Ph. D., Anna Murray Vail, Arthur Hollick, Ph. B., Byron D. Halsted, Sc. D., A. A. Heller; Curator, Helen M. Ingersoll; Librarian, Wm. E. Wheelock, M. D.

The scientific paper of the evening, by Miss Alice M. Isaacs and Miss Marian Satterlee, and read by Miss Isaacs, was on the 'Anatomy of the Leaf of Solidago Pauciflosculosa.' The study had been suggested by Prof. Britton in order to throw light upon the generic position of the plant, a subject involved in some doubt.

The leaf was compared with that of the typical dicotyledonous plant and with other members of the genus Solidago. The points of difference noted are as follows: 1st, an unusual surface whose punctate appearance is caused by an irregular development of the parenchymatous tissue; 2d, the absence of palisade tissue characteristic of a dicotyledonous leaf. The depressions in the surface are found to be caused by the fact that the leaf is contracted just above and below the bundles, scarcely any mesophyll being found between the bundles and the epidermis. The blade expands between the bundles, and in these expanded parts the mesophyll is found. The epidermis following the outline of the leaf may be cut off in small patches instead of in a continuous piece as is usually the case.

Of the many species examined, Solidago sempervirens was the only one that at all resembled S. pauciflosculosa. The fact that S. pauciflosculosa is a shrubby plant, together with these leaf peculiarities, seem almost sufficient to justify Nuttall in classing this plant as a separate genus Chrysoma.

H. H. Rusby,
Recording Secretary.

THE ACADEMY OF SCIENCE OF ST. LOUIS.

At the meeting of January 20, 1896, 23 persons present, Mr. C. H. Thompson exhibited specimens of a number of Lemnaceæ, and gave in detail the results of some recent studies which he had made on Wolffia gladiata, var. Floridana, from the sluggish streams of southeastern Missouri, and Wolffia lingulata, which he had collected in Kern county, California, last autumn. Both species belong to the subgenus Wolffiella, of which flowers and fruit are quite unknown. The species found in southern Missouri occurs associated with Leitneria and other distinctively Floridan forms, of which it is one, while the species collected in California seems to have been known heretofore only from central Mexico.

Prof. E. A. Engler, in continuation of his remarks at the last meeting, spoke of certain properties of the parabola, from which it resulted that from any point on the convex side of the evolute of a parabola three normals can be drawn to the latter; from any point on the evolute, two; and from any point on the concave side of the evolute, one. Suggestion was made of the probable bearing of this demonstration on other curves.

Dr. A. C. Bernays exhibited a slide of the epidermis of Fritillaria, exhibiting karyokinetic patterns.

William Trelease,
Recording Secretary.

NEW BOOKS.

Die Chemie in Taglichen Leben. Dr. Lassar Cohn. Hamburg & Leipzig, Leopold Voss. 1896. Pp. vii.+258. M. 4.

Chemistry for Engineers and Manufacturers. Bertram Blount and A. T. Bloxam. London, Charles Griffin & Co.; Philadelphia, J. B. Lippincott Co. 1896. $3.50.

Chemical Experiments. R. P. Williams. Boston and London, Ginn & Co. 1895. Pp. x.+102.

Die Spectralanalyse. John Landauer. Braunschweig. Friedrich Vieweg & Sohn. 1896. Pp. 174.

The Child and Childhood in Folk Thought. Alexander Francis Chamberlain. New York and London, Macmillan & Co. 1896. Pp. x.+464. $3.00.