Numerous half-tone and other illustrations, maps and tables of statistics aid the reader in obtaining a most satisfactory understanding of the extent and importance of the mining industries of California.

R. H. T.

BOOKS RECEIVED.

Richter's Organic Chemistry. Edited by PROFESSOR R. ANSCHÜTZ. Translated by EDGAR F. SMITH. Third American Edition. Philadelphia, P. Blakiston's Son & Co. 1900. Vol. II., pp. vi + 671. $3.00.

Malay Magic. WALTER WILLIAM SKEAT. With preface by C. O. BLAGDEN. London and New York, The Macmillan Company. 1900. Pp. xiv + 665. $6.50.

Lessons in Elementary Physiology. THOMAS H. HUXLEY. Edited by FREDERIC S. LEE. New York and London. 1900. Pp. xvi + 577.

The Teaching of Elementary Mathematics. DAVID E. SMITH. New York and London, The Macmillan Company. 1900. Pp. xv + 312. $1.00.

SCIENTIFIC JOURNALS AND ARTICLES.

The Plant World for February has for its leading article 'Notes on the Edible Berries of Alaska,' by Walter H. Evans, who states that they are of wonderful abundance and variety. John M. Coulter treats of the 'Geograpical Distribution of Conifers,' Byron D. Halsted presents a note on 'Coloration of Leaf for Seed Distribution,' and K. C. Davis discusses the 'Wild and Garden Pæonies in America.' Mrs. Caroline A. Creevey continues her series of articles on 'Plant Juices and their Commercial Values,' amber, copal and turpentine being among those discussed in this number. The Supplement on 'The Families of Flowering Plants' contains the Ginkgoales, the Pinaceæ and the Taxaceæ.

SOCIETIES AND ACADEMIES.

GEOLOGICAL SOCIETY OF WASHINGTON.

THE 97th regular meeting was held at the Cosmos Club, February 14, 1900.

Under informal communications, Mr. Bailey Willis stated that a diamond drill hole at The Dalles, on the Columbia River, had reached a depth of 916 feet and had penetrated several flows of Columbia basalt, distinguished by layers of clay and by differences of texture. No exact section has been kept. A piece of core from 916 feet in depth is shown by examination in thin section to be basalt. The object of the boring, which is a private enterprise, is to prospect for coal.

Mr. H. W. Turner proposed the adoption and use of the term *Sierran*, originally suggested by Professor Le Conte, to distinguish the erosion interval of the early Pleistocene. The actuality and importance of this early Pleistocene erosion were illustrated with reference to the eastern slope of the Sierra Nevada. It was shown that the *Sierran* cañons had in some cases been occupied by lava flows upon which the moraines of Glacial time are resting.

The following papers were presented on the regular program:

(1) 'A peculiar Clastic Dike and its Associated Ore Deposits,' by Mr. F. L. Ransome. This dike is exposed in the workings of the Wedge and Bachelor mines, near Ouray, Colorado. It fills a normal fault-fissure, of small throw, cutting nearly horizontal beds of sandstone and shale. The filling material came from above, and is largely composed of flakes of black shale, derived from a bed which is traversed by the fissure, but which limit the upward extension of the dike. This material was subsequently forced by pressure into all the branches of the fissure and has the form of an eruptive dike. It has been explored to a depth of 630 feet and has an average width of 2 or 3 feet. The ore, which is an argentiferous tetrahedrite, or freibergite, occurs alongside of, or in the dike, in spaces opened by later movements. These have been in part bedding faults, which have dislocated the dike along nearly horizontal planes.

(2) 'Wood River Mining District, Idaho,' by Mr. Waldemar Lindgren. The silver-lead mines of Wood River are located in southern central Idaho, some 50 miles north of Snake River. The geological formations consist of a sharply folded series of Paleozoic, probably very largely Carboniferous, sediments consisting of limestones, quartzites, and slates. Imperfect fossils indicating Upper Carboniferous were found in it at two localities. The large granite area of southern Idaho abuts against the sedimentary

rocks in this vicinity, showing at the contact undoubted intrusive phenomena. The Carboniferous series contains several isolated masses of granitic rocks of varying character, which are also intrusive into the sediments.

The deposits are fissure-veins with a west to northwesterly strike and southerly dip, occurring, as a rule, in the calcareous shales of the sedimentary formation. The principal minerals are galena and zincblende in a gangue of predominating siderite. Veins of the same character are also found in the granite areas enclosed in the sediments. The veins are pre-Miocene and post-Carbonifereus in age, their crossings being in part covered by andesitic flows. The granitic rocks also contain another series of veins of very different composition. They carry chiefly gold contained in pyrrhotite, chalcopyrite, pyrite, and arsenopyrite. Replacement has played an important part in the vein formation, especially in those veins which are contained in the sedimentary areas. The fissure plans are well defined but the ore-bodies do not follow these strictly in detail, and may exhibit considerable irregularity.

(3) 'Cretaceous fossils collected by J. B. Hatcher in Patagonia,' by Mr. T. W. Stanton. Among the collections brought back by Mr. Hatcher's last expedition to Patagonia there are some Cretaceous invertebrates that seem to represent a fauna new to South America. The localities from which they were obtained are near Lake Puerrydon in Latitude 47° 30′ S. and Longitude 72° W. There are about 35 species in the collection of which 28 are sufficiently well represented to be described and these all appear to be new. Although there are some indications of relationships with Lower Cretaceous faunas, consideration of the collection as a whole leads to the conclusion that the horizon is about the middle of the Cretaceous, at least not lower than the Gault.

F. L. RANSOME,
DAVID WHITE,
Secretaries.

BIOLOGICAL SOCIETY OF WASHINGTON.

THE 318th meeting was held on Saturday, February 10th. H. J. Webber exhibited photographs of the Melon Pawpaw, *Carica papaya*, which is a native of both the East and West Indies. The form native in Florida has a fruit about the size of an egg, but the cultivated varieties (of which there are several) bear fruits from the size of a small musk melon up to five or ten pounds in weight. The fruit is pyriform and much resembles a musk melon in taste and make-up and is sliced and eaten in the same way.

The most noteworthy character of the plant is its well known faculty of rendering meat tender when cooked with it. This is due to the presence of a soluble ferment known as papain which is similar in action to the animal pepsin. The fruit of *Carica* also contains this ferment in considerable quantity and bids fair to become a very valuable desert fruit, especially for invalids troubled with indigestion. It is a fruit which should be more widely known and sold in all markets.

Henry W. Olds spoke on 'Form in the Songs of Birds,' showing first that the study of bird music, while interesting, is of little, if any, value as an aid to the development of the science of ornithology. He then considered the question of the use of our scale. He gave a brief resumé of its evolution and stated that, wonderful as it seems, it is a fact that some of the birds do use our scale. He instanced several that unmistakably are governed by the intervals that compose it, although some of them occasionally wander from the key just as human singers do. Mr. Olds then considered various essential forms that give to music coherence and capability of æsthetic satisfaction. These he illustrated with blackboard notations and whistled examples of both human and avian music. He showed different means by which is produced that symmetry that is needed to satisfy the musical sense—the regular recurrence of phrases or kinds of phrases, repetition of one theme on different pitches, the regularity of these repetitions, antiphonal or answering themes, etc., and for every example in our music instanced its counterpart among bird songs he had noted. In conclusion he suggested that these were not accidental resemblances, but seemed to show on the part of the birds intelligent appreciation of musical effects; and that there appeared to be no

escape from the conclusion that the birds were subject to a musical evolution that paralleled our own.

Mr. M. G. Kains presented a paper upon 'The Effects of the Electric Arc Light in the Culture of Easter Lilies,' giving the results of experiments conducted during the winter of 1895, at Cornell University, under the direction of Professor L. H. Bailey. Three divisions of the plants were made, one in the full glare of the naked light, one in which the light first passed through a pane of glass, and one where no light was employed. The light burned nightly for four months and uniform cultural conditions were maintained throughout the tests. Plants in the light sections were taller, blossomed earlier, were less robust and their flowers shorter lived than those grown in the dark, blossoms in the naked light exhibited a dark brown burn upon the surface facing the lamp, and blossoms upon plants grown in the dark lasted two days longer than those in the light. From the experiments it is concluded that commercial use might be made of the arc light after the lily buds are an inch long, and that the light must pass through a glass to screen out the ultra-violet rays of the spectrum.

E. V. Wilcox discussed 'Lupines as Plants Poisonous to Stock,' saying that cattle and sheep varied greatly in their liking for the growing plants, some animals eating them with avidity and others caring little for them. The poisonous properties of the Lupines appeared to reside in the seeds or seed pods, for, while the plants were usually eaten with impunity, great mortality had been known to occur among stock which was forced by a fall of wet snow to feed on plants from which the leaves had mostly fallen while the seed pods remained. On the large ranges of the west, where forage plants were not cultivated, Lupines were frequently so abundant that they were cut and dried like hay for use in winter, and the speaker noted a case where sheep fed on this Lupine hay were seemingly driven mad.

T. W. Stanton,
Secretary.

THE PHILOSOPHICAL SOCIETY OF WASHINGTON.

The 512th meeting of the Society was held on February 3, 1900, at the Cosmos Club. After a general discussion on the method of publication of the *Bulletin*, the first regular paper of the evening was read by Mr. J. G. Hagen, on 'Recent Progress in Astro-physics.'

During the course of the address the following three points were discussed: *The cluster type of variable stars*, the *spectroscopic binaries*, and the *Potsdam photometric catalogue*.

Regarding the first point, the cluster Messier No. 5 was mentioned as presenting a remarkable uniformity in its variable stars. Out of 900, visible on the plates obtained in Arequipa with the 13-inch Boyden refractor, 63 were recognized as variables, and 40 of them were measured accurately from nearly a hundred plates. The mean period of all except two is about $12\frac{1}{2}$ hours, with a mean range of 1.1 magnitude. It was suggested that, with Pogson's light factor 0.4, the common range of 1.1 magnitude could be explained by supposing each variable to be a binary system, with components of equal brightness. The cluster would then consist of many binary systems, each with its orbital plane passing through the sun, and with a period of revolution equal to 25 hours.

With respect to spectroscopic binaries, Campbell's discovery of Polaris as a double system was mentioned. The center of gravity approaches our sun with a velocity of 12 kilometers, while Polaris oscillates around it in a period of about four days. The fact that three years previous the mean velocity was found eight kilometers larger, might point to a disturbing body. Yet, to pronounce Polaris a triple system, would be premature. Another interesting discovery of a periodic change in the spectrum was recently made by Mrs. Fleming in the case of Zeta Centauri, with intervals of two and six days, thus making a period of eight days. The intervals of two and six days were graphically illustrated by an eccentric orbit. Attention was also called to experiments made by Humphrey, Mohler and Wilsing, to the effect that changes in the normal spectrum may be produced by changes of pressure in the source of light.

The third point consisted in a summary of a review of the Potsdam photometric catalogue, recently published in the *Vierteljahrsschrift*, XXXIV., pp. 288–297.

At the close of the paper two Goerz Trieder Binoculars were exhibited.

The second paper read was by Mr. J. F. Hayford, on 'Recent Progress in Geodesy.' As it is expected that this will soon be published in SCIENCE in full, no abstract is here given.

A paper by Mr. T. J. J. See, on 'Recent Progress in Astronomy,' went over to the next meeting on account of the absence of the author.

E. D. PRESTON,
Secretary.

TORREY BOTANICAL CLUB.

THE annual meeting on January 9th, resulted in the election of the previous board of officers, including as *President*, Hon. Addison Brown; *Treasurer*, Maturin L. Delafield, Jr.; *Secretary*, Edward S. Burgess, Ph.D.; *Editor*, Lucien M. Underwood, Ph.D. Annual reports of officers were rendered, that of the Treasurer showing a balance in the treasury.

The Secretary, Professor Edward S. Burgess, reported an average attendance of 31 at the 15 meetings held during the year, one death, a present active membership of 237, corresponding membership 142, honorary membership 3, total membership 382. Among the 18 scientific papers presented, 5 had been accompanied by lantern views; 4 papers related to ferns. Nine illustrative exhibits of photographs, plates and flower paintings, etc., had been held. Brief reports of collections and of botanical progress numbered 55.

The editor, Professor L. M. Underwood, reported the regular monthly issue of the *Bulletin*, forming the largest volume published to date, including 650 pages, besides 23 heliotype plates and 38 figures in the text, and including 65 articles representing 39 authors. The publication of the *Memoirs* has been carried on with unusual activity, including Dr. M. A. Howe's monograph on the Californian Hepaticæ (208 pages, 35 plates), Mr. Tracy E. Hazen's Life-history of '*Sphærella lacustris* (*Hæmatococcus pluvialis*)', pp. 33, 2 colored plates, and the beginning of Professor F. E. Lloyd's 'Comparative Embryology of the Rubiaceæ' (pp. 21, 4 plates).

Miss Ingersoll, as curator, reported upon the condition of the herbarium of the Torrey Club, suggesting its transfer to the New York Botanical Garden. Discussion followed looking toward its treatment there as the nucleus for a distinct local collection, but no definite action was taken. Dr. T. F. Allen remarked upon the beginnings of the collection as dating from a persistent botanical exploration of parts of New Jersey, especially about New Durham and the Secaucus swamps, made by himself and Mr. Wm. H. Leggett, Dr. Bunstead, etc.

Dr. Allen's own private herbarium at Litchfield, Ct., is also richly representative of those localities and others now destroyed or altered, and contains much of interest to the history of local botany of New York City.

Miss Marie L. Sanial, as Secretary of the Excursion Committee, reported 38 excursions held, with the new feature of excursions for bryological and other collections in December, at one of which 15 persons were present.

The Committee appointed to consider a program for a Torrey Day in connection with the A. A. A. S. meeting here next summer, reported through the Secretary, a provisional program.

The scientific paper of the evening was by Professor Francis E. Lloyd, on 'The Relationships of certain Rubiaceæ,' forming part of an investigation in the embryology of that order now in course of printing among the *Memoirs* of the Torrey Club. The ground of relationship considered was the ovary, which is classed as inferior, but developmentally proves a receptacle hollowed out. The flower seems to be derived from one or more separate corolla-lobes. The Rubiaceæ are very polymorphic externally, and there is the greater need of discovery of stable internal characters. Such characters for the ovary of the Stellateæ were discussed in detail. That of the common Buttonbush, *Cephalanthus*, was alluded to as possessing certain ovary characters in form and relatively rapid and prolonged growth of the basal partition, which accord most significantly with the unusually compressed position of the ovary.

Discussion followed regarding the passage of pollen tube through tissues rather than loosely in the cavity of the ovary. In some Rubiaceæ, said Professor Lloyd, these tubes seem stimulated by contact with the enlarged collar-cells of the funiculus, and appear to owe their

guidance into the micropyle to such stimulus. Dr. MacDougal remarked upon recent conclusions that pollen tubes show negative reactions to oxygen, but positive to sugars, and to albuminoid substances in the ovary or near the embryo-sac.

EDWARD S. BURGESS,
Secretary.

THE NEW YORK SECTION OF THE AMERICAN CHEMICAL SOCIETY.

THE February meeting of the New York Section of the American Chemical Society was held at the Chemist's Club, 108 West 55th street, on Friday evening, the 9th inst., Dr. C. F. McKenna presiding. After consideration of a series of resolutions submitted by the Committee on Standards for Instruments of Measure, the following papers were read: 'The Technical Analysis of Rope and Twine,' by Durand Woodman; 'A New Synthesis in the Phen-Miazin Series,' by Marston Taylor Bogert; 'On the History of Photo-Chemical Improvements,' by Maximilian Toch.

Dr. Woodman described the chief commercial grades of Cordage, 'oiled' and 'unoiled,' 'tarred,' 'plumbagoed,' etc., and exhibited samples of manila, sisal and jute fiber with analyses; also analyses of the different grades of rope above mentioned.

Dr. Bogert described a new method of preparing the salts of the Phen-miazin series as developed in the organic laboratories of Columbia University, which consists in heating anthranilic acid with any nitrile in a sealed tube for several hours at a temperature of 200 degrees to 250 degrees C., according to the nitrile used. Since many foreign chemists, as well as several in this country, are working on this same subject, it is very gratifying to have a successful result on a new line of experiment from the University in this city.

Mr. Maximilian Toch described chiefly the progress in photo-chemistry, and illustrated the method of printing and developing some of the more rapid bromide papers. His paper was listened to with great attention and was followed by remarks and reminiscences from several members

DURAND WOODMAN,
Secretary.

THE ACADEMY OF SCIENCE OF ST. LOUIS.

AT the meeting of the Academy of Science of St. Louis of February 5, 1900, some 250 persons were given a demonstration of the use of the microscope in the sciences, arts and industries, by experts, under the direction of Dr. H. M. Whelpley, as follows:

Anatomy, Dr. R. J. Terry; *Bacteriology*, Dr. Amand Ravold; *Blood examination*, Dr. Ludwig Bremer; *Botany*, Mr. H. F. Roberts; *Diseases of forest trees*, Dr. H. von Schrenk; *Drug adulterations*, Mr. O. H. Elbrecht; *Flour inspection*, Mr. Victor Goetz; *Insects parasitic on man*, Mr. C. F. Baker, *Living protoplasm*, Dr. Otto A. Wall, Jr.; *Microphotography*, Mr. Robert Benecke; *Mineralogy*, Dr. G. Hambach; *Photographic dry plate testing*, Mr. Robert Benecke; *Photomicography*, Dr. Adolph Alt; *Physiology*, Dr. Hartwell N. Lyon; *Seed adulterations*, Mr. F. W. Maas; *Spice adulterations*, Mr. William K. Ilhart; *Textile fibers*, Mr. Peter J. Weber, Jr.; *Trichina*, Dr. G. C. Crandall.

Through the courtesy of the Historical Society, the rooms of that Society were thrown open to the members of the Academy and their guests, and the Society's important collections, as well as the demonstration offered by the Academy, proved a source of interest and instruction to the ladies and gentlemen present.

WILLIAM TRELEASE,
Recording Secretary.

NOTES ON PHYSICS.

DRUDE'S ANNALEN.

A NEW series (the fourth series) of the *Annalen der Physik*, begins with the current number, January, 1900, under the editorship of Paul Drude. This great periodical will now be known as *Drude's Annalen*. The third series, the *Annalen der Physik und Chemie*, edited by G. and E. Wiedemann, contains sixty-nine volumes. The entire series, 305 volumes to date, represents a large part of the progress of the physical sciences during the eighteenth and nineteenth centuries.

RADIANT HEAT.

PROFESSOR MAX PLANCK gives, in *Drude's Annalen*, January, 1900, a reprint of his electro-magnetic theory of radiation which was com-