ican Association for the Advancement of Science. Referred to the officers.

The following papers were read during the sessions:

R. Matheson: "Remarks on the External Anatomy of the Haliplidæ."

W. M. Wheeler: "On the Effects of Parasitic and Other Kinds of Castration in Insects."

Miss A. H. Morgan: "Some Correlations of May-fly Structure and Habit."

C. R. Crosby: "Some Observations by the Late Professor Slingerland and the Speaker on the Life History of *Heterocordylus malinus*" (read by title).

C. J. Triggerson: "The Life-cycle of the Oak Hedge-hog Gall-fly (*Acraspis erinacea*)."

F. L. Washburn: "A Jumping Seed-gall on the Burr Oak."

A. D. MacGillivray: "The Female Reproductive Organs of *Corydalis cornuta*."

W. L. W. Field: "The Offspring of a Captured Female of *Basilarchia proserpina*." To be published in April number of *Psyche*.

H. H. Lyman: "An Improved Drawer for Insect Cabinets and a New Substance for Lining them."

C. T. Brues: "Some Notes on the Geological History of the Parasitic Hymenoptera."

J. C. Bradley: "The Plaiting of the Wings of Hymenoptera."

T. J. Headlee: "An Apparatus for the Determination of Optimums of Temperature and Moisture for Insects."

A. D. MacGillivray: "The Radial Sector in *Phlebatrophia mathesoni*."

W. T. M. Forbes: "A Structural Study of some Caterpillars."

M. J. Elrod: "The Blackfoot Glacier as an Entomological Burying Place" (read by title).

J. J. Davis: "*Chaitophorus populifoliæ* Fitch versus *Chaitophorus populifoliæ* Oestland" (read by title).

L. Haseman: "The Life History of a Species of Psychodidæ" (read by title).

A. G. Hammar: "Notes on the Life History of *Fidiobia flavipes* Ashmead, an Egg Parasite of the Grape Root Worm (*Fidia viticida* Walsh)."

A very interesting and extensive exhibition was held in conjunction with and under the auspices of the Cambridge Entomological Club in rooms adjoining the meeting hall.

The annual public address was given by Dr. John B. Smith on the evening of December 30 in the hall of the Boston Society of Natural History, title, "Insects and Entomologists: Their Relations to the Community at Large."

On Tuesday evening the visiting entomologists were the guests of the Cambridge Entomological Club at a most enjoyable smoker held in Copley Hall.

J. Chester Bradley,
Secretary-Treasurer

THE ASSOCIATION OF OFFICIAL SEED ANALYSTS

The second annual meeting of the Association of Official Seed Analysts was held in Boston, December 28–29, 1909, in connection with the meeting of the American Association for the Advancement of Science.

Agricultural colleges, experiment stations and state departments of agriculture in twelve states and the Canadian and the United States departments of agriculture were represented.

Three papers were presented as follows:

"The Effect of Alternating Temperature, on the Germination of Seeds," by W. L. Goss, U. S. Department of Agriculture.

"Importance of Uniform Methods of Seed Testing," by A. D. Selby, Ohio Agricultural Experiment Station.

"The Sale of Adulterated Farm Seeds in the United States," by E. Brown, U. S. Department of Agriculture.

The greater part of the time of the meeting was devoted to consideration of the reports of the committees on methods of seed testing and on legislation. The report on methods of seed testing for purity was adopted as official by the association and that on germination as provisional. The report on state legislation was adopted and the secretary was instructed to prepare both reports for publication.

E. Brown,
Secretary

SOCIETIES AND ACADEMIES

THE GEOLOGICAL SOCIETY OF WASHINGTON

The 228th meeting of the society was held at the George Washington University on Wednesday evening, February 23, 1910.

Mr. E. W. Shaw, in an informal communication. described a log-shaped mass of sandstone included in coal at Murphysboro, Illinois.

Mr. P. S. Smith spoke on the formation of plain surfaces above base-level, with particular reference to such features observed in Alaska.

Mr. D. B. Sterrett presented a description of peculiar boulder or toadstool-like erosion forms occurring over the outcrop of a batholith of coarse porphyritic granite in York County, S. C. Some of these "toadstools" are ten to fifteen feet high and of similar thickness, and are still firmly attached to the underlying granite mass by stems which may be only one third as thick as the boulder. The granite also outcrops as floors or bosses similar to the occurrences at some of the quarries of the Piedmont region.

Regular Program

Some Mineral Relations from the Laboratory View-point: ARTHUR L. DAY.

The fundamental problems of rock formation, to which petrologists are now giving serious attention, require much more than a perfunctory application of chemistry and physics. The present relations of the minerals in the rocks are accessible to the microscope under convenient conditions of observation, but their development from the fluid magma requires a laboratory study of the rock-forming minerals over a wide range of measured conditions of pressure, temperature and concentration. It is of the first importance that the evidence gathered be quantitative and pertinent to the problem.

Recent laboratory studies have developed the fact that the temperature of crystallization of a mineral from its own liquid or from a mixture is generally variable and therefore untrustworthy in revealing the conditions of equilibrium during formation. Melting point measurements therefore furnish better determinations of the temperature of change of state. It is also necessary that the methods chosen for such determination be appropriate to the substance under investigation, for minerals are characterized by strong individuality of behavior near the melting temperature, which makes it impossible to apply a single property (the appearance of fluidity, for example) to determine when melting occurs in all substances. The lack of sharpness in melting point determinations is partly the result of carelessness in preparation of experimental conditions, partly of molecular inertia or viscosity which prevents any rapid rearrangement of the molecules of the liquid, and occasionally (in isomorphous mixtures) to changing composition during the change of state. The first of these can be eliminated; the second is characteristic of certain minerals and therefore a matter of record; the third is an essential feature of the problem requiring special study. The earlier melting point data offer little evidence upon which to discriminate between these cases. An important factor in rock formation is brought to light by the second of the properties noted above, of which an excellent illustration is found in quartz. In the laboratory, the fusion of pure silica does not occur below 1600° and is accompanied by conditions of extreme viscosity. In nature, vein quartz appears to have crystallized below 800° and to have been very fluid at that temperature. This suggests that volatile ingredients must have assisted in the formation of natural quartz of which only traces now remain, and its proper laboratory study must include these ingredients. The situation also reveals what is perhaps the chief function of pressure in rock formation—namely, in holding the volatile ingredients in solution.

Igneous Metamorphism: A. C. SPENCER.

Platinum in Southeastern Nevada: HOWLAND C. BANCROFT.

At the Key West and Great Eastern prospects in the Copper King Mining District of Clark County, Nev., platinum occurs in peridotite dikes of the enstatite-mica-picrite variety. The properties are situated in the rough foothills of the Virgin Range at an elevation of approximately 3,600 feet and are eight or nine miles from the Virgin River.

The rocks in the immediate vicinity are gneisses, probably of pre-Cambrian age, and are intruded along the planes of schistosity by basic dikes which contain, in addition to platinum, primary pyrrhotite (probably nickeliferous), magnetite, chalcopyrite and pyrite. Besides the peridotite dikes there is also present a typical hornblendite dike which shows upon analysis a trace of platinum. Alteration and concentration of the sulphides in the rock by solutions seems to increase the percentage of platinum and nickel, one analysis showing the presence of .55 of an ounce of platinum to the ton and over 5 per cent. nickel. The dikes as exposed upon the surface vary in width from 10 to 50 feet and are about 100 feet long.

One car-load of ore has been shipped from the Key West workings. If these properties were near a railroad, or if the ore could be treated on the ground, it is quite probable that they would be able to produce bullion. Under present conditions, however, working expenses would be very high.

EDSON S. BASTIN,
Secretary

THE NEW YORK ACADEMY OF SCIENCES
SECTION OF BIOLOGY

At the regular meeting held at the American Museum on February 14, 1910, Professor C. C. Curtis presiding, the following papers were read:

Variability of Land Snails (Cerion) in the Bahama Islands with its Bearing on the Theory of Geographical Form Chains: Charles B. Davenport.

Professor Plate has described, in the *Archiv f. Rassen- und Gesellschaftsbiol.*, Bd. IV., the different forms of a genus of land snails (*Cerion*) from the Bahama Islands; and declares that the *Cerions* of the north coast of New Providence constitute the best known and most known and most manifold example of such a morphologic-geographic "form chain" as the Sarasins describe. Going from the west to the east end of the island "regular and definitely directed changes" are said to occur "conditioned by the amount of precipitation together with an inner factor—a high responsiveness of the protoplasm."

In January, 1910, I collected shells in New Providence from the localities specified by Plate and from several others. I am now attempting to breed them. Meanwhile the evidence seems opposed to Plate's view, since the "western" type is found at various localities in the east alongside of the eastern type. The facts seem to accord better with the view of the immigration into the eastern end of New Providence of snails having the characteristics of *Cerions* from the Eleuthera Island (an immigration facilitated by geographic conditions) and by the formation of varied combinations of characters and pseudo-blends by hybridization.

Application of the Quadrate-incus Theory to the Conditions in Theridont Reptiles and the Genetic Relations of the Latter to the Mammalia: W. K. Gregory.

Reichert's conclusion that the incus and malleus of mammals represent the vestigial and metamorphosed jaw elements of lower vertebrates, together with the opposing view that these ossicles in the mammalia have been derived directly from the supra- and extra-stapedial cartilages of reptiles, were considered. Exception was taken to Dr. Broom's form of the latter theory, which took the auditory ossicles of the crocodile as a theoretical starting point. All the bones surrounding these elements in the crocodile had evidently undergone certain peculiar specializations and it would be surprising if the auditory ossicles themselves had not also suffered considerable modification in the endeavor to evolve an improved auditory apparatus; the resemblances in the ossicles between crocodile and mammal may therefore be due chiefly to convergent evolution. The modern upholders of the incus-quadrate, malleus-articular theory demand for the ancestral mammal a freely movable quadrate, similar to that of the lizard; but this was because they seem to push too far the biogenetic law. The incus or supposed homologue of the quadrate at present appears in the embryo as a freely movable bone, but this does not prove that it has always been freely movable. These investigators had passed by the theridonts of the Permian and Triassic because in these reptiles the quadrate was fixed at its upper end; but a slight atrophy of the posterior border of the squamosal would have greatly increased the mobility of the quadrate.

Paleontological and embryological evidence showed that the existing joint between the skull and the lower jaws in mammals is a neomorph, probably developed *pari passu* with the atrophy of the quadrate and articular bones. The application of Reichert's theory to the Theriodontia required only that the vestigial quadrate should be freed from its squamosal socket, and secondly that it and the articular should be brought into contact with the stapes or primary auditory rod. But how can we conceive an adaptive, mechanical motive for this extraordinary change? Such seems to be furnished by the embryology of the tympanic chamber of mammals. As is well known, this chamber appears below the ossicles as a diverticulum of the first gill opening. It grows upward and embraces the ossicles, which finally appear to be inside the cavity but are morphologically outside of it, since they never pierce its epithelium. So in the hypothetical pro-mammal the vestigial quadrate and articular on the one hand and the stapedial rod on the other may have been embraced by the up-growing tympanic sack or chamber and finally pressed into contact with each other. The vestigial jaw elements may thus have come to share in the vibrations of the chamber and of the stapes, and thus was initiated their career as accessory auditory ossicles. A somewhat analogous case is the transformation in siluroid fishes of certain vertebral appendages into a chain of ossicles for transmitting vibrations from the air bladder to the internal ear.

L. Hussakof