as the experiments and "conspicuous headlines and catchwords have been freely used."

Another part of the work that has been most conveniently and systematically arranged is the chapter on 'The Important Blowpipe and Chemical Reactions.' It consists of a tabulated arrangement of the reactions observed and is 'intended to be used especially for the interpretation of unknown reactions which are encountered in blowpipe analysis,' and it can be made to serve as a course in qualitative blowpipe analysis in examining unknown substances.

The chapter introductory to the tables as well as the tables are the same as in the former edition, but as stated by the author in the preface: "A complete revision of the tables for the determination of minerals will be made as soon as possible, and a short chapter on crystallography and the physical properties of minerals will be prepared."

One feature of the book that especially commends it to the mineralogist is that in the tests taken up, no one arbitrary method is employed, but the best ones, whatever their character, are described, thus making the work general and covering all the physical, chemical and blowpipe tests useful for the identification of the elements and minerals.

J. H. PRATT.

YALE UNIVERSITY.

SOCIETIES AND ACADEMIES.

ENTOMOLOGICAL SOCIETY OF WASHINGTON.

DECEMBER 3, 1896.

R. H. PETTIT, St. Anthony Park, Minn., and F. A. Sirrine, Jamaica, N. Y., were elected Corresponding Members.

Under the head of exhibition of specimens, Mr. J. D. Patten showed living examples of *Lasioderma serricorne*, and exhibited a cigar from which the beetles had emerged. Mr. Ashmead exhibited a small collection of micro-Hymenoptera, made by Mr. Townsend at San Rafael, Mexico. Mr. Howard exhibited specimens of two new Coccidæ allied to *Icerya*.

A paper by Mr. T. D. A. Cockerell was read which consisted of notes on the recently published No. 1, Volume IV., of the Proceedings of the Society.

In the discussion of this paper the fact was brought out by Messrs. Ashmead and Schwarz that *Eciton* and *Labidus* are unquestionably distinct and that the true female of *Eciton* has been found in North Carolina by the Rev. P. Jerome Schmidt, who has had a good drawing of it in his possession for at least two years.

Mr. Schwarz presented some notes on the 'Lerp Insects' (Psyllidæ) of Australia. After reviewing the literature on the subject he discussed the various forms of cases spun by these Psyllid larvæ on the leaves of Eucalyptus trees, illustrating his remarks with drawings and exhibition of specimens. For the more or less conical larval cases which on the surface are provided with longitudinal ribs Signoret's generic name, *Spondyliaspis*, has to be accepted and includes the *Psylla eucalypti*, described by Dobson. The remarkable structure of the first joint of hind tarsi already observed by Dobson as well as the structure of the hind tibiæ, the posterior apical edge of which is produced into a stout mucro, fully justify the erection of a new sub-family under the name Spondyliaspinæ for *P. eucalypti* and congeneric species. Another Psyllid, the larvæ of which weaves the beautiful shell-like structures described by Dobson as his third form of lerp, was made by Mr. Schwarz the type of a new genus and species under the name *Cardiaspis artifex*.

This paper gave rise to an animated discussion participated in by Messrs. Gill, Stiles, Howard and Schwarz, on the advisability or necessity of the adoption of generic and other names based upon excretions of or structures formed by insects or their larvæ and by other animals, the animals themselves being unknown. The general opinion seemed to be that where such a structure or secretion is an expression of morphological character it has sufficient taxonomic value to carry the name.

L. O. HOWARD,
Secretary.

ANTHROPOLOGICAL SOCIETY OF WASHINGTON.

THE 254th regular meeting of the Anthropological Society was held Tuesday evening, December 1, 1896.

The first paper, by Mr. Arthur Bibbins, Professor of Geology of the Women's College of

Baltimore, Maryland, entitled 'Some Paleontologic Folk-Lore of Maryland,' illustrated by a collection of fossil cycads of the Potomac formation.

The ideas of the residents of the rural and mining districts of the Potomac formation of Maryland, respecting the nature of fossil cycadean trunks were reviewed. One of the more notable conceptions was to the effect that they were a sort of stone plant endowed with a kind of life and the capacity in a marked degree, for *growth*. It was claimed by the owner of one of the trunks, and generally believed in the neighborhood, that when found, in 1830, it was a small stone, and was carried in the apron of Aunt Polly Jones, its discoverer, a distance of not less than two miles, and that since that date it had increased in dimensions until it now weighs 121½ pounds.

Discussed by Prof. Ward relative to geologic and paleontologic character and identification of the specimens; also by Prof. McGee and Dr. J. H. McCormick.

The second communication was entitled 'Seri Stone Art,' by W J McGee. About a score of more or less artificialized pebbles and bowlders were exhibited. Two of these were naturally shaped angular masses of stone, which had been used as metates or nether millstones in simple grinding operations, one so far as to slightly polish the surface, and the other so long as to produce a basin-shape depression nearly an inch deep, in one side; and there were three or four cobblestones which had been used as anvils in simple domestic operations. The greater part of the collection consisted of natural pebbles, more or less completely worn and shaped by use as hammers, manos (or grinding stones), etc.; none of these were differentiated, but all bore marks of use for the various purposes required in the simple domestic art of the Seri Indians. The process of manufacture, or more properly evolution, of the implements, as observed among the Indians and studied in the contents of scores of their rancherias, was described: The Seri matron, requiring implements to crush and grind mesquite beans or to crush bones and sever tendons of turtle or deer, selects a suitable pebble for use as hammer or grinder, with a larger stone which serves as metate or anvil; commonly both are abandoned after a single use, but if the smaller stone is found especially convenient it is preserved for future use, while the larger is used again only if it is near a rancheria; in use the stones are worn, and if improved thereby they are retained and the smaller is carried about by the matron as a part of her domestic paraphernalia; and occasionally a pebble is so satisfactory at the outset and so far improved by gradual reshaping in use that it is completely artificialized, though still used for various purposes, especially grinding and crushing. Eventually the form assumed by such pebbles is a flattened ellipsoid, the sides of which are smoothed and polished by use in grinding, while the ends and perhaps the edges are roughened by battering in the use as a hammer. It was pointed out that even the best worn examples are not the product of purposive manufacture, in accordance with preconceived design, but are simply natural pebbles modified by wear in use, and thus that they cannot be regarded as representing either the neolithic or paleolithic types of many archeologists; and it was suggested that the class be distinguished as protolithic. It was observed that the Seri Indians do not habitually chip stone, and that their stone chipping is limited to the manufacture of arrow-points of a common pattern, and was probably acquired from neighboring tribes, through contact in warfare.

J. H. McCormick,
Secretary.

GEOLOGICAL SOCIETY OF WASHINGTON.

At the 53d meeting of the Geological Society, held on November 25th, 1896, Mr. Arthur Keith, of the United States Geological Survey, gave a resumé of the essential features of a communication presented by him at the previous meeting on the structure of the Cranberry district.

The district lies mainly in the northwestern corner of North Carolina. It extends into Tennessee to the northwest, but the formations under consideration lie entirely within North Carolina. The district consists almost entirely of metamorphic rocks, the great body being gneisses, hornblende schists and allied rocks. All the ordinary features of Appalachian struc-

ture are developed. The rocks are very much deformed, by folding, faulting and metamorphism. The two former are as extreme as in any part of the Appalachians, and the metamorphism is unusually developed. The principal fault, which constitutes the essential feature to be considered, almost encircles an area of Cambrian rocks which are overthrust by granite. The positions and relations of the formations were pointed out on a map of the district. Mr. Keith stated that in the processes of metamorphism the diabases became schists and the granites gneisses. One of the chief features developed is the offsetting of the different formations on opposite sides of a shear zone extending nearly west across the strike.

The great question was, how the deformation of the basement rocks occurred. He mentioned two theories. One is that the sediments above were thrust and defined against the crystallines. This theory he combatted as being untenable. The other theory is that the force that produced the deformation originated in the crystallines and was propagated toward the northwest.

The subject was discussed by Messrs. Hayes and Willis.

Mr. George F. Becker read a paper, entitled 'Some Queries on Rock Differentiation.' The theory now almost generally received ascribes the origin of many igneous rock species to the segregation of a single homogeneous magma under differing physical conditions. Mr. Becker considered segregations due to differences of temperature (Ludwig's or less properly Soret's method) and segregation caused by varying pressure. The active force in these processes is osmotic pressure and this produces segregation by 'molecular flow.' Molecular flow, one case of which is ordinary diffusion, is an exceedingly slow process when the distances involved are considerable; even an aqueous solution of copper sulphate diffuses in sensible quantity to no more than 35 cm. in a year and to ten times this distance in 100 years. Temperature in underground strata diffuses more than 4,000 times as fast as this sulphate. Mr. Becker thinks the process of segregation too slow to produce the observed rock differences. Ludwig's method involves the heating of masses of magma from the top. If such a case were to occur in nature, and this could only be under very exceptional conditions, the temperature would be equalized by conduction through the walls before considerable segregation had had time to take place. Differences of pressure would produce only a very slight segregation even after an infinite time. The separation of a magma into immiscible fractions under changes of temperature was also considered. This involves a superheating of the magma, which seems impossible in the presence of solid rock. It also implies very fluid magmas; too fluid, for example, to hold phenocrysts in suspension. In a superheated magma a decrease of pressure would promote miscibility, not separation. Mr. Becker suspects that the differences between the main rock types is due to the original heterogeneity of the solar nebula, and that many rocks are mere fortuitous mixtures originating at the contacts of primordial masses.

The paper will be printed in the January number of the *American Journal of Science.*

Mr. Whitman Cross was on the program of the meeting for a communication on Landslides in Colorado, but for lack of time the paper was deferred until the next meeting.

W. F. MORSELL.
UNITED STATES GEOLOGICAL SURVEY.

ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA, NOVEMBER 24.

MR. J. H. HAMILTON recorded his recent discovery of what may prove to be an undescribed trap dyke in Fairmont Park, on the line of the newly opened trolley railway, about 175 feet from the Elm Avenue entrance. The trend of the trap is N. by 5°E.

Mr. Richardson stated that he had found, detached, not *in situ*, masses of zoosite at the same locality.

December 1, 1896. Mr. Theodore D. Rand gave an account of a recent trip made to the Wilmington gabbro region, and described the distribution of the quarries as reported by Prof. Chester and as throwing light on the geology of Delaware and Pennsylvania. He referred specially to a mass of the gabbro on the Brandywine Creek, just below the Jessup and Moore paper

mills. In the middle of it is to be observed a distinct schistose structure.

Mr. Edw. Goldsmith described a similar deposit two miles north of that referred to. The masses of the rock which had been mined are so resonant as to merit the name gabbro-phonolite.

Mr. H. A. Pilsbry described a collection of mollusks obtained by himself and Mr. C. W. Johnson in Florida in 1894. Their main object had been to determine the relation of existing mollusks to those of the shell heaps. *Vivipara georgiana* was one of the commonest of the latter, associated with *Unio* and *Ampullaria*. Certain forms of *V. georgiana* from the shell heaps have the spire extremely high. He had called this variety *altior*. The distribution of this form was indicated as being confined to a short stretch of the River St. John's.

He believed that the shell heap *Viviparas* belonged to a race which is now extinct. Another variety of *Vivipara* from the same region was extremely flattened and broadly shouldered. This he had called *limnothauma*. He considered its peculiarity a mechanical result of an acceleration of the reproductive process. This form is also extinct, although some were found more recent than those of the mounds. The characters of both these varieties had appeared during the human period.

Ampullaria depressa was found in the mound three times the size of the living shell. The *Unios* did not vary. Edw. J. Nolan,
Secretary.

BIOLOGICAL SOCIETY OF WASHINGTON. 267TH MEETING, SATURDAY, DECEMBER 5TH.

The evening was devoted to the address of the President, Surgeon General Geo. M. Sternberg, who spoke of 'The Malarial Parasite and other Pathogenic Protozoa.'

F. A. Lucas,
Secretary.

NORTHWESTERN UNIVERSITY SCIENCE CLUB.

At the November meeting Prof. Jos. P. Iddings presented the topic 'Petrology as related to other branches of Natural Science.' The outline of his address was as follows:

Petrology deals with theories regarding the origin and formation of rocks, as well as the facts of their existence, and the alteration they may undergo. From geology, as generally defined petrology derives data concerning the occurrence of rock bodies as part of the earth's crust; establishing their formal and quantitative relations, and also their age and time relations. It also derives from geology conceptions of their sources and of the processes of their formation and alteration in general terms. Petrology contributes to geology conceptions of the possible condition of the interior of the earth and of its constitution, and also of the processes of molecular change taking place within it.

From mineralogy petrology derives data cencerning the form, constitution and composition of the mineral components of rocks, which furnish the internal evidence regarding the mode of formation of and the mechanical and chemical changes that take place within rocks. Microscopical study of rocks involves intimate knowledge of geometrical and physical crystallography. While research into the nature and crystallization of igneous rocks necessitates excursions into the realm of molecular physics and chemistry; having to do with the physics of molten rock magmas, and their behavior as solutions in which the dissolved salts are in various molecular conditions, and are capable of diffusion and differentiation. Saturation and crystallization from solution must also be considered, together with the formation of simple and of mixed salts. Chemistry is also called upon to furnish a means of analysis, and to explain processes by which many mineralogical alterations take place. While physics further supplies the laws controlling the transportation and deposition of sediments, and the conceptions of rigidity and plasticity, of stress and strain, of fracturing and shearing that constitute factors of dynamic metamorphism.

To biology petrology is indebted for data regarding the source of material forming certain kinds of rocks. But the processes of growth in the biologic kingdom and those in the mineral realm are strongly contrasted, and the character of an organism and that of a crystal are totally different. A. R. Crook,
Secretary.

Evanston, Ill.