qualitative differences of mental states, must square their antipathy to Mach's theory with the prevailing acquiescence in the view that regards intensity differences as adequately explained by relating them to differences in the energy of excitation of the same physiological structure. It is only a step further to explain differences of quality by relating them to differences in the *ratios* of the energies involved in the excitation, either of the same, or of similar structures. Either our psychology of intensity must be brought into line with the progress of qualitative differentiation or the field must be left open to such theories as that of Mach.

The reviewer agrees with the translator that the matter contained in Mach's little work is by no means so limited as the number of pages. He offers this as an excuse for having passed over many points in the discussion more lightly than their importance deserved.

EDGAR A. SINGER, JR.
UNIVERSITY OF PENNSYLVANIA,
August, 1897.

SOCIETIES AND ACADEMIES.

ENTOMOLOGICAL SOCIETY OF WASHINGTON.

OCTOBER 14, 1897.—Mr. Schwarz spoke of the remarkable collection of insects recently made by Mr. H. G. Hubbard in southern Arizona. This collection is the most extensive and valuable which has been made in that part of the country. In Coleoptera alone it contains between 300 and 500 species new to the fauna of the United States. He exhibited a specimen of the myrmecophilous Scarabæid *Lissomelas flohri* Bates, a genus new to the United States and allied to Cremastochilus. The specimens collected by Mr. Hubbard were not found in ants nests, nor could any traces be found of thoracic glands which are supposed to be attractive to ants. The insect fauna of Arizona and southern California was discussed at some length by Messrs. Schwarz, Gill and Fernow. Mr. N. Banks exhibited specimens of *Chrysopa ypsilon*, each of which carried one or more minute Cecidomyiid flies on its wings. The specimens were collected by Mrs. Slosson in the White Mountains, and Mr. Banks considers that the Cecidomyiids use the Chrysopas as a means of locomotion. Mr. Ashmead mentioned a parasitic wingless fly of the family Borboridæ collected by Mr. O. F. Cook in Liberia, which uses a common snail for transportation purposes. Mr. Ashmead described a new genus of Cynipidæ from Liberia which he will call *Curriea*, after the collector, Mr. R. P. Currie. It is the only genus of the Cynipidæ with toothed hind femora, and bears a superficial resemblance to certain Chalcididæ. Mr. Howard read a short paper entitled 'Notes on the House-fly,' which gave rise to a discussion on the carrying of contagion by house-flies, in the course of which Mr. D. G. Fairchild described at some length a serious eye disease prevalent in the Fiji Islands, which is carried by the house-fly. Mr. N. Banks read a paper entitled 'A New Species of the Genus *Halarachne*,' the typical specimens of which had been taken from the bronchial passages of a seal which had died in the National Zoological Park. Mr. Ashmead read a paper entitled 'On the Genera of the Xyelinæ.'

November 4, 1897.—Mr. Ashmead showed specimens of the male of *Pelecinus polyturator* from Indiana. The female of this species is very common, but the male is extremely rare. Mr. Ashmead thinks that this insect, the habits of which are not yet known, is probably parasitic upon some Coleopterous wood-borer, a conclusion which was discussed at some length by Messrs Schwarz and P. R. Uhler. Mr. O. F. Cook exhibited specimens of *Peripatus novazealandica* and of two small species of *Peripatus* from the Bismarck Archipelago. Mr. Schwarz exhibited specimens of *Cychrus mexicanus* Bates, a species new to the fauna of the United States, captured by Mr. H. G. Hubbard, at Cave Creek, Arizona. Mr. Howard exhibited specimens of *Trypeta acidusa* Walker, reared from ripe peaches by Mr. A. Koebele, at Orizaba, Mexico, and spoke of the Mexican distribution of *Trypeta ludens*. The subject of the possible establishment of these fruit pests in the United States was discussed by Messrs. Howard and W. G. Johnson. Mr. O. Heidemann read a paper on 'Hemiptera found on the Ox-eye Daisy,' listing twenty-nine species and giving notes on their habits. Mr. O. F. Cook read a paper on 'New Dicellura,' an order which he has erected to include the allies of Japyx. He exhibited plates of ten species and showed specimens of a new

African form which he thinks will form a new family in which the forceps are replaced by stylets. Dr. H. G. Dyar read a paper on 'Some Structural Points in Saw-fly Larvæ.' Mr. N. Banks presented a paper on an 'American Species of the Genus *Cæculus*,' a genus new to the United States and previously known only in Europe. Professor P. R. Uhler exhibited a series of American Notonectas and spoke of the distribution and structural peculiarities of the genus. As a result of the recent studies of Mr. G. W. Kirkaldy nine valid species are now known from the United States.

L. O. Howard,
Secretary.

BIOLOGICAL SOCIETY OF WASHINGTON—281ST MEETING, SATURDAY, NOVEMBER

Professor Lester F. Ward exhibited specimens of *Prosopis juliflora* from Kansas, a species not previously found in the region of Gray's Manual; also of *Psoralea tenuiflora*, remarkable as a tumble-weed, and of *Lotus americanus*, a peculiar 'compass-plant.'

Mr. E. L. Morris showed some alcohol specimens of various vertebrates and invertebrates illustrating methods of sectioning to show the alimentary canal.

Mr. Charles L. Pollard presented 'A Publication Problem in Botany,' drawn from Rafinesque's Florula Ludoviciana. This book was practically compiled from the list of plants given by a Frenchman, Robin, who had traveled extensively in Louisiana, and had made numerous field observations and descriptions. Rafinesque based many of his new genera and species on these field notes, never having seen any type material, and Mr. Pollard asked for an expression of opinion on the tenability of these names, explaining that botanists of the present day are divided on the question. The consensus of opinion in the Society, elicited by discussion, favored the retention of the names in all cases where they were identifiable.

Dr. M. G. Motter presented a paper on 'Underground Zoology,' being the result of a careful examination of a large number of disinterred human bodies with a view to ascertain the species of animals and particularly of insects that might be present in order to test Mégnin's 'Application of Entomology to Legal Medicine.' Some 75 species belonging to 60 genera were noted and the conclusion drawn that so far as the evidence of his observations was concerned the medico-legal aspect of cadaverine entomology was enveloped in a haze of uncertainty, not to say doubt.

Mr. F. A. Lucas spoke of the 'Fossil Bison of North America,' saying that while remains were widely scattered over the United States the species were known mostly from horn cores, and owing to lack of correlation of these with other parts they could not be satisfactorily diagnosed. He recognized six species besides *Bison bison*, viz.: *Bison alleni*, *antiquus*, *crassicornis*, *ferox*, *latifrons* and *scaphoceras*. *B. crassicornis* of Richardson, which had been confounded with various species, was perfectly distinct, while *B. crampianus* was probably synonymous with *B. alleni*.

Dr. C. Hart Merriam described the 'Life-zones of the Olympic Mountains,' noting the flora and fauna of the region at some length. But two zones were distinguishable, a Hudsonian and a mixed Transition and Canadian.

F. A. Lucas,
Secretary.

GEOLOGICAL SOCIETY OF WASHINGTON.

At the 67th regular meeting of this Society, the first meeting of the course of 1897–98, held in Washington, D. C., on November 10, 1897, Mr. Lester F. Ward read a paper on the Cretaceous Formation in Southwestern Kansas. Mr. Ward had made a study of the Cheyenne formation, as well as of all the Cretaceous deposits in that region lying between the Red Beds and the Tertiary.

The principal section lay along the Medicine Lodge River, extending from a point near Sun City, in Barber county, to Fullington's ranch, near the extreme head of that stream, in Kiowa county. The center of operations was at Belvidere, and all of the most typical exposures of the Cheyenne occur within a radius of ten miles from that point. A reconnaissance was also made to the southwest as far as the Avilla Hill, five miles south of the town of Avilla, in Comanche county, and thence northwestward to Mt. Nebo, St. Jacob's Well, the Big Basin,

and the various draws and breaks on Little Sandy creek, Chatman creek, Bear creek, Bluff creek and Hackberry creek, where the Cretaceous formation, is extensively exposed. The following is a brief summary of the general results:

The Cheyenne formation rests everywhere unconformably upon the Red Beds, occasionally with a gravel bed at its base. It is a good geological unit, clearly marked off from the overlying Kiowa, the lowest member of which forms a thin ledge of marine shells, the Champion of Cragin. The lower part of the Cheyenne is almost always a massive sandstone, often cross-bedded, pure white, or more frequently stained yellowish. It contains no admixture of clay, but occasional thin clay shales, and very rarely more or less lignite. Near its base silicified wood occurs, at some points in considerable abundance. This bed, No. 1 of Hill, the 'Coral Sandstone' of Cragin, varies greatly in thickness, but where well preserved reaches 50 feet. In typical exposures this is overlain by some 15 feet of carbonaceous shales, consisting largely of dark, sandy, stratified clays, much lignite, and abundant vegetable remains, usually matted and confused so as to yield few determinable impressions. This is the No. 2 of Hill's section, the 'Lamphier Shales' of Cragin. Above this is the 'Stokes Sandstone' of Cragin, Hill's No. 3, having a thickness of some ten feet and consisting of stratified sandstone of a somewhat darkish or grayish color, considerably argillaceous and carbonaceous and often holding plant impressions. The character and relations of these upper beds, however, were found to vary so extensively that this subdivision has very little value. A large collection of fossil plants, amounting to 44 boxes, with an aggregate weight of about 3,000 pounds, was made in these upper beds and has been received at the U. S. Geological Survey.

The Cheyenne is confined exclusively to what may be called the Belvidere region, chiefly along Medicine Lodge river, as above noted, but passing southward along the head of Elk creek, across Mule creek and Indian creek, some six miles southeast of Nescatunga, forming a sort of crescent. It does not occur in the Avilla Hill nor anywhere in Clark county, so far as Mr. Ward was able to observe; the rocks of the former region, supposed by Prosser to represent the Cheyenne, being wholly different and belonging to the lower Kiowa beds, underlain by black papyraceous shales; and the Big Basin Sandstone, which Prosser also referred to the Cheyenne, being clearly, as Cragin states, nothing but the upper indurated portion of the Red Beds, the top of which is almost always whitened.

Perhaps the most important result of this expedition was the discovery of the true base of the Dakota group in a series of remarkable beds, nearly 200 feet in thickness and not hitherto described, forming an uninterrupted transition from the Kiowa Shales, holding Gryphæa and Exogyra, to the typical Dakota Sandstone, yielding characteristic dicotyledonous leaves, a small collection of which was made. Mr. C. N. Gould, who was a member of Mr. Ward's party, and who had previously seen most of these deposits, will soon publish a paper setting forth their relations in detail.

Under the title 'The Geological Sequence in Jamaica,' Mr. Robert T. Hill presented an account of the stratigraphic succession in Jamaica, describing the various rocks of igneous, sedimentary, oceanic and organic origin and their relations. Mr. Hill's paper was an extract from his report to Professor A. Agassiz, under whose auspices the studies were made. In discussing the elevated coral reefs he stated that there can be no possible doubt but that they were formed around emerging land, as held by Agassiz.

W. F. MORSELL.
U. S. GEOLOGICAL SURVEY.

NEW YORK ACADEMY OF SCIENCES—SECTION OF GEOLOGY—NOVEMBER 15, 1897.

THE first paper of the evening was by Dr. F. J. H. Merrill, of the State Museum at Albany, entitled 'Geology of the Vicinity of Greater New York.' Dr. Merrill considered the distribution, relations and structure of the Crystalline, Metamorphic and Intrusive rocks east of the Hudson. He noted particularly in the vicinity of New York City the Pre-Cambrian Fordham Gneiss, overlain at certain places, as

at Lowerre, Hastings, Sparta and Peekskill, by a very thin bed of Quartzite, probably representing the Georgian Quartzite of Dutchess county. Above this is a thick series of Crystalline Limestones, forming the river valleys of the Harlem, Bronx and other rivers, and underlying most of the navigable water ways in the vicinity of New York. The upper rocks are Mica-schists, which are probably of Hudson River age, and make most of the highlands of New York City and vicinity. These rocks are extensively folded in a general direction of N. 40° E., with occasional cross foldings, producing the cross valleys. The whole series is crossed by the Manhattanville Fault, running from Manhattanville, North River, southeastwards to the East River, between Ward's and Blackwell's Islands, into Astoria Bay. The fault, along which there has been a throw of a number of hundred feet, was long ago described by Professor Dana.

The second paper of the evening was by Captain J. J. Riley, entitled 'The Guano Deposits of the Islands of the Southern Pacific, and their Prehistoric Remains.' Capt. Riley considered in detail the depth, value and manner of working of the guano deposits in the Chincha Islands, off the southern coast of Peru, from which guano was first taken by Humboldt in 1804, and which have since been very famous for their guano deposits. Between 1850 and 1880 it is estimated that guano to the value of $550,000,000 in gold was taken from three islands alone. The islands lie in the rainless region, and the preservation of the guano is due to the absence of water. Once in about seven years there is a season of quite a little rainfall, which has undoubtedly a great effect upon the guano, and was considered by Captain Riley to be the cause of the blacker bands in the layered deposits. Two burial tombs containing bodies of great antiquity have been discovered in the guano. The bodies were evidently those of royal personages, and apparently, from the evidence of slabs containing certain symbols, related to the Incas. These tombs were found at a depth of 35 and 68 feet, but it is not possible to state whether they were buried in the guano or later covered by it. The islands, three in number, are granitic in character, and were covered by a varying thickness of guano, reaching in the more important island a depth of 203 feet in places. The exportation of guano has, however, ceased since 1880.

In the discussion Dr. Julien compared these islands with other guano-bearing islands of the West Indies, paying particular attention to the absence of any evidences of human remains showing life coincident with the formation of the guano.

The third paper, read by title, was by Mr. Stuart Weller, and entitled 'A New Crinoid from the Coal Measures of Kansas.'

Richard E. Dodge.
Secretary.

BOSTON SOCIETY OF NATURAL HISTORY.

The first general meeting of the season was held November 3d, seventy-five persons present.

Mr. J. B. Woodworth spoke of Mr. Saville-Kent's work concerning the Great Barrier Coral Reef of Australia. He sketched briefly the chief results of the studies of Darwin and others upon the theory of coral reefs and showed a series of lantern slides giving a general view of the life upon the Great Barrier Reef. This reef stretches along the coast for a distance of more that 1,200 miles; the distance from the outer edge of the reef to the mainland varies from 10 to over 100 miles. The reef and adjacent waters abound in Nullipores, Madrepores, Alcyonarians, Holothurians, etc. The pearl and pearl-shell, Trepang and oyster fisheries are of very great importance.

Samuel Henshaw,
Secretary.

NEW BOOKS.

Bau und Leben unserer Waldbäume. M. Büsgen. Jena, Gustav Fischer. 1892. Pp. viii+230.

Handbuch der Klimatologie. Julius Haun. Stuttgart, J. Engelhorn. 1897. 2d edition, revised and enlarged. Vol. I., pp. xii+404; Vol. II., pp. viii+384; Vol. III., pp. viii+576.

Essai sur les conditions et les limites de la certitude logique. G. Mulhaud. Paris, Alcan. 1898. 2d edition. Pp. viii+202. 2 fr. 50.