

ginning with the Jurassic and continuing down to the present.

M. E. Wadsworth makes a strong plea for the introduction of the elective system in engineering colleges, based upon practical experience in the Michigan Mining School.

Orotaxis; A method of geologic correlation: C. R. KEYES. This may be defined as a systematic arrangement of mountains, or orotaxis, in which the cycles of elevation and degradation, together with the consequent unconformities in the sediments of separate cycles, are made the basis of geological chronology. The method has had its greatest use in pre-Cambrian and other nonfossiliferous series. The author claims that it may serve equally reliable and serviceable ends in the correlation of even richly fossiliferous horizons.

Human relics in the drift of Ohio: E. W. CLAYPOLE. The principal specimen, and the one on which the main argument rests, is a small grooved axe found at a depth of 22 feet in boulder clay. All the collateral evidence, such as the oxydized condition of the axe and the circumstances of the find, points to the genuine antiquity of this relic.

SOCIETIES AND ACADEMIES.

GEOLOGICAL SOCIETY OF WASHINGTON.

THE 51st meeting of the Geological Society, the first of the winter season of 1896, was held in Washington on November 11th. Mr. J. E. Spurr briefly described the reconnaissance of the gold resources of the Yukon region of Alaska, from which he has just returned. The Geological Survey party in his charge crossed the Chilkoot Pass, about the middle of June, to the headquarters of the Yukon, and proceeded down the river to the chief gold-bearing localities. The principal producing districts, those of Forty-Mile Creek and Birch Creek, were thoroughly explored, as well as other less important localities. The party then continued down the Yukon, examining the younger sedimentaries which overlie the gold-bearing formation, as far as Nulato. At this point passage was taken by steamer to St. Michael's, and the homeward journey begun.

One of the principal results of the expedition was the recognition of the gold-bearing rocks

from which the gold in the river gravels is derived. These gold-bearing rocks constitute a distinct broad belt, running northwest into Alaska from British territory. They are in their lower portions schists and gneisses, with intrusive rocks, and in their upper portion somewhat altered sedimentaries. They are all older than Carboniferous, for the Carboniferous and younger rocks overlie them on both sides of the gold-bearing belt. In this belt the gold occurs partly in quartz veins, partly in deposits formed along shear-zones; in both occurrences it is contained in pyrite, and becomes free on weathering. The quartz veins are distinctly older than the shear-zone deposits, and were formed before the alteration of the enclosing rock to a schist; they have, therefore, partaken of this shearing, and have been broken and sheared so that they are typically non-persistent. The deposits along shear-zones are, however, of later date than the shearing, and can be continuously followed.

The younger beds which overlie the gold-bearing belt consist in part of conglomerates, and some of these conglomerates are fossil placers, which give promise of being productive.

Mr. S. F. Emmons, of the United States Geological Survey, gave a brief description of the gold deposits of the northern end of the Black Hills of South Dakota. The geological structure of the region is that of a series of steeply upturned Algonkian slates, on the baset edges of which rest nearly horizontal beds of Cambrian, Silurian and Carboniferous age. All these rocks are abundantly intersected in the mineral-bearing region by dikes and intrusive sheets of various porphyritic rocks, mostly of acid types. Erosion has removed the later rocks and included porphyry sheets from the valleys, but portions of them remain in the higher ridges and peaks. There are three types of gold deposits: The Homestake type of deposit, the siliceous gold ores of the Cambrian and the placer deposits. The first occur in sheets often several hundred feet wide along a mineral bearing zone, which is mostly controlled by the Homestake Company, and is now worked to a vertical depth of 800 feet. The placer deposits are partly ancient or fossil placers at the base of the Cambrian (Middle Cambrian, and

not Potsdam sandstone, as it has hitherto been called), and modern placers along present stream beds, resulting in part from the disintegration of the older placers. The so-called siliceous gold ores occur in the remnants of Cambrian beds and included porphyry bodies in the elevated region around Grey's Peak and Bald Mountain, to the west of the Homestake belt. The ore bodies are siliceous replacements of certain beds in the upper and lower parts of the formation near eruptive sheets or dikes, which have been mineralized from certain north and south cracks or fissures—locally called 'verticals'—which traverse both sedimentary beds and eruptive sheets. The ores are finely disseminated pyrite, generally oxidized with gold, either free or combined with tellurium. The ore bodies are of great longitudinal extent, having been traced continuously in the Golden Reward mine for many thousand feet; in some cases they are twelve feet thick and more than a hundred feet wide. They give promise of important future developments.

WM. F. MORSELL.

ENTOMOLOGICAL SOCIETY OF WASHINGTON NOVEMBER 12, 1896.

MR. ASHMEAD exhibited specimens of *Proctylis grandis*, a European species, which had been collected by Mrs. Slosson, at Franconia, N. H. Some discussion ensued on the occurrence of European species in North America.

Mr. Schwarz exhibited two European beetles recently found in North America, viz., *Attagenus schaefferi* from Wyoming, and *Lathridus hirtus* from Montana. He also showed the Madeiran *Cartodere watsoni*, which now occurs at Washington, D. C.

Mr. Howard exhibited specimens of *Coccophagus orientalis*, originally described from Ceylon, but now occurring in Louisiana.

Mr. O. F. Cook exhibited specimens of two new American species of Japyx, one from Alabama, and the other from Ventura County, California. He also showed a specimen of Casey's genus *Gastrotheus*, originally described as a possible coleopterous larva, but which the speaker considered a genus of true Thysanura, distinct, however, from recognized families by

the presence of two pairs of several-jointed abdominal legs, acting as supporters to the abdomen. He thought it necessary, in consequence, to admit at least a new sub-order, which he would call *Gastrotheoidea*. The same speaker also exhibited two specimens of an African insect closely related to or identical with *Dyscritina* Westwood. He also showed a specimen of Walker's remarkable genus *Hemimerus*, collected in Liberia, but not on a rat, the supposed habitat of *Hemimerus*. He also showed a specimen collected in Liberia, under rotting wood, which will possibly form a new order of insects of the Orthopterous series. He also showed a specimen of *Cryptostemma* Westwood, an African Arachnid, now recognized as the type of a distinct order originally based on a fossil genus and now known by Thorell's name of *Meridogastrea*. Finally he exhibited a small Arachnid collected under stones at Muhlenberg Mission, Liberia. It has an 11-jointed abdomen distinct by a constriction from the cephalothorax, which has an evident transverse suture. The palpi are not chelate nor modified for prehension, as in the Pedipalpi. The genus has been named *Artacarus* and will probably constitute a family distinct from the Schizonotidæ and also serve as the type of a distinct order of Arachnida, which may be known as *Artacarida*, although this name should not be supposed to carry an implication of especial affinity with the mites.

Mr. W. G. Johnson presented a paper entitled 'Notes on the Morelos Orange Fruit-worm,' in which he recounted rearing *Trypeta ludens* from maggots found in oranges purchased at Chicago, Ill., last February. He traced these oranges through a Chicago dealer to Mexico. He described the different stages of the insect, and concluded that the establishment of the species in orange growing regions in the United States is probable.

Mr. Howard, in discussion, called attention to the peculiar present danger of such establishment, owing to the fact that the failure of the orange crop in Florida has induced extensive importation of Mexican oranges.

Mr. Schwarz read a paper upon a new cave beetle, reviewing the subject of recent additions to the Coleopterous cave fauna of North America, and referring particularly to a new species

which he will call *Ptomaphagus cavernicola*, collected by Dr. C. Hart Merriam, in Stone Cave, Mo.

The general subject of cave animals was discussed by Messrs. Gill, Ashmead, Cook and Schwarz.

Mr. Howard presented some notes on the parasites of *Orgyia leucostigma*, which was followed by a general discussion of parasitism in insects, in which Messrs. Schwarz, Fernow, Swingle, Dr. Otto Lugger and Prof. W. B. Alwood took part.

L. O. HOWARD,
Secretary.

ACADEMY OF NATURAL SCIENCES OF
PHILADELPHIA, OCTOBER 27.

CHARLES MORRIS read a paper on 'The Primeval Ocean.' While evaporation takes place at 212 degrees Fahrenheit under one atmosphere of pressure, if the ocean temperature were raised to 212 degrees the increased atmospheric moisture would greatly increase the pressure, and the resulting loss of oceanic water would consequently be small. The highest limit of evaporation under pressure known experimentally is about 440 degrees, producing a pressure of about twenty-five atmospheres, and if the ocean were raised to this temperature there would probably be not more than one-twelfth of the water evaporated. But as the energy of evaporation increases more rapidly, with increased temperature, than that of pressure, all the water would probably be evaporated at between 600 and 800 degrees, and at this temperature the atmospheric pressure would reach 300 to 350 atmospheres, equal to from 4,500 to 5,200 pounds to the square inch, a pressure which would probably prevent seismic action on the earth's surface, and tend to condense gaseous and liquid materials into solids.

These conditions must have been attended with great chemical activity, and this was possibly the era, in the world's history, of inorganic chemistry; which was succeeded by organic chemistry when the water cooled to 212 degrees. Hence the great period of inorganic chemism was prior to that of organic chemism; as the former is largely a process of oxidation it practically exhausted itself when all the materials were oxidized; while the latter, be-

ing in the main a process of deoxidation, may continue indefinitely while temperature conditions permit.

As to the derivation of organic from inorganic chemism, it probably occurred during the period in question, when, owing to its great chemical activity and increased solvent power, the water may have been so charged with foreign matter so as to be nearly jelly-like in consistency. Under present conditions organic chemical material could not be reproduced should it be swept away; at the same time the conditions are favorable to its continuance, having once been produced.

Papers under the following titles were presented for publication: 'New Species of Fresh-water Mollusks from South America,' by Henry A. Pilsbry. 'Geology of the Mussel-bearing Clays of Fish-House, N. J.,' by Henry A. Pilsbry.

Biological Section, November 2d: Dr. M. V. Ball, Recorder. Dr. A. H. Stewart made a communication on the effects of rattlesnake poison on the blood. The snakes in captivity are fed only once or twice in six months. The venom is obtained by engaging the head of the snake in a leather loop and then making pressure on the glands while the fangs are protruded. The color of the venom varies from a light lemon to a rich straw or even orange. When the fluid evaporates yellow crystals are formed.

When a drop of the venom is injected under the skin of a rabbit death will result in four hours. The dried poison is fatal to a rabbit in a dose of four milligrammes in from ten to twelve hours. The venom becomes less poisonous the more frequently it is taken from the snake; the quantity is also much lessened.

From the point of entrance of the fangs subdermal hemorrhages occur; the parts become almost black; the peritoneum appears gangrenous. The blood passes through the vessels freely, producing an extensive oedema, while the internal organs—the kidneys, liver and lungs—are almost bloodless. The blood remains fluid for a long time after death. The corpuscles are reduced in size and seem to be stuck together by the edges. They retain their shape for weeks and the blood of the snake

itself is affected in the same way by its own venom. Pure venom is not as speedily fatal as when mixed with normal salt solution. The oval corpuscles of the frog's blood are rendered more circular and the nucleus is thrown out. When fed by the mouth there is no action from the poison. Immunity had been produced in rabbits against ten times the lethal dose.

NOVEMBER 10, 1896.

DR. HARRISON ALLEN presented a paper for publication on *Tarsius fuscomanus*. In a verbal synopsis he exhibited the undissected half of this curious little creature from the eastern Malayan Islands, pointing out its anatomical peculiarities. In referring to the muscular structure, he called attention particularly to the large muscle on the fore part of the thigh, which in the human subject, it is claimed, is necessary to maintain the erect position, but *Tarsius*, in which animal this muscle is greatly developed upon a relatively very long thigh, is unable to assume an erect position, the leg being flexed against the thigh and the possible divarication slight. He referred to the species *Tarsius spectrum*, lately the subject of investigation by Hubrecht. Dr. Allen pointed out some differences between Burmeister's description of the same species and those of *T. fuscomanus*, the result of his own dissection. The upper molars of *T. fuscomanus* exhibit meta-conules and para-conules. These are absent in *Anaptomorphus*. Dr. Allen claimed that Burmeister and Specht were in error in representing the hind foot as having a transverse grasp. The foot has a longitudinal grasp, as correctly delineated by Cuvier. *Tarsius*, he said, though generally classed with the lemurs, in the opinion of some naturalists, should be classed separately next to the apes.

Dr. Calvert stated that while at Utrecht the past summer he had the pleasure of meeting Prof. Hubrecht, and with him examining his specimens of *Tarsius*, which included both anatomical and embryological preparations. He also referred to the contention that the line of descent to man was from the lemurs or the Eocene representative of *Tarsius*, *Anaptomorphus*, and through the man-like apes, to man, leaving the other Old and New World monkeys as side branches.

Mr. Vaux reported that the fossil tree at Lin-

denwold, N. J., is a conifer completely silicified, measuring 26 feet in length and $7\frac{1}{2}$ feet in diameter at the base, tapering to 5 feet 12 feet up, where it branched. It was, however, so fragile that it was impossible to get a section of it for the Academy.

EDW. J. NOLAN,
Recording Secretary.

THE ACADEMY OF SCIENCE OF ST. LOUIS.

At the meeting of the Academy of Science of St. Louis on the evening of November 16, 1896, Dr. Charles R. Keyes, the State Geologist of Missouri, read a paper entitled 'How shall we subdivide the Carboniferous?' and Prof. J. H. Kinealy exhibited a chart for determining the number of square feet of low pressure steam heating surface required to keep a room at 70° F., and gave a description of the method of making the chart.

Two active members and one life member of the Academy were elected.

WILLIAM TRELEASE,
Recording Secretary.

NEW BOOKS.

Electro-physiology. W. BIEDERMANN. Translated by FRANCES A. WELBY. London and New York, The Macmillan Co. 1896. Vol. I. Pp. xii+517. \$5.50.

Grasses of North America. W. J. BEAL. New York, Henry Holt & Co. 1896. Vol. II. Pp. viii.+706. \$5.00, net.

Allgemeine Erdkunde. J. HANN, ED. BRÜCKNER and A. KIRCHHOFF. 5th Edition, 1st part. Die Erde als Ganzes, ihre Atmosphäre und Hydrosphäre, DR. J. HAHN. Prag, Wien, Leipzig, F. Tempsky. 1896. Pp. 336. M. 10.

Versuch einer Philosophischen Selektions Theorie. JOHANNES UNBEHAUN. Jena, Gustav Fischer. 1896. Pp. 150.

Erratum: In the last paragraph of the review by C. S. M., on page 764, the quotation marks should include the last four words, making the paragraph read:

The note of personal exultation predominates in the pamphlet, and the author closes with the following words: "All the things mentioned above, and many more, are in agreement with the view of an antithetic alteration as underlying Metazoon development and—where are the *facts* that are opposed to it? And echo answers—'where?'"