Verhandlungen des dritten Mathematiker-Congresses, by H. S. White; 'Notes' and 'New Publications.'

The Botanical Gazette for April contains the second paper of Dr. E. W. Olive on 'Cytological Studies on the Entomophthoreae,' being a presentation of the nuclear and cell division of Empusa; a second paper by Professor V. M. Spalding on the 'Biological Relations of Desert Shrubs,' in which the results of experimental work on the absorption of water by leaves is presented; descriptions of numerous new species of Californian plants, by Miss Alice Eastwood; and a sixth paper on North American grasses, by A. S. Hitchcock. The usual book reviews and notes for students close the number.

SOCIETIES AND ACADEMIES.

THE GEOLOGICAL SOCIETY OF WASHINGTON.

AT the 175th meeting of the society on February 14, the following papers were presented:

Paleozoic Stratigraphy of China: BAILEY WILLIS.

Mr. Willis presented certain stratigraphic results of the Carnegie expedition to China of 1903–4 for geological research. Stratigraphic sections were carefully observed in the northeastern province, Shan-tung, in northern Shan-si, and in the central region of south Shen-si and Ssi-ch'uan. In general, the Paleozoic system is extensively represented from late lower Cambrian to Carboniferous or Permian. The basement on which it rests is commonly a metamorphic complex of the general character of the Archean, but locally at least two pre-Cambrian systems, one of which resembles the Huronian and the other the Belt Mountain series, are distinguishable. In north China, north of latitude 34°, the Cambrian and Ordovician constitutes a continuous sequence of limestones, with occasional interbedded shales, about 3,500 feet thick. The basal shale, 350 to 500 feet thick, is distinguished by the prevailing red color of the sediments. The unconformity at the bottom is one of marine plantation across a previously developed peneplain, and is very even. There is no lithologic break at the top of the Cambrian, the passage to the Ordovician occurring in the body of limestones and being recognized only by the fossils. At the top of the Ordovician there is an eroded surface which closely parallels the bedding of the limestones, but exhibits hollows which are occasionally ten or fifteen feet deep and are filled with clay that is useful for pottery. Upon this surface rest shales which carry upper Carboniferous (Pennsylvanian) fossils and contain coal beds. In the upper part of the coal-bearing measures basaltic flows are interstratified with shales. Cross-stratified red sandstones succeed, and above these come in sandstones with coals which carry Jurassic plants. The sequence resembles that of the Permo-Mesozoic of India.

In central China the Paleozoic sequence differs from that in north China in several respects. At the base on the Yang-tzi there is a granite which may be Archean or Algonkian. It is locally overlain by 150 feet of quartzite, upon which rests an early Cambrian glacial till. Limestones approximately 4,500 feet thick rest upon the till and include in the lower layers a conglomerate containing pebbles derived from the till. These limestones represent the Cambro-Ordovician sequence and carry at their top a rich fauna of Trenton age. They pass by transition into thin bedded shales which are in part Carboniferous, suggesting the Devonian black shale of the Appalachian region, and in part greenish shaly sandstone like the Chemung. This formation is about 1,800 feet thick and represents all the Middle Paleozoic. It is overlain in apparent conformity by a limestone 4,000 feet thick, which contains coal beds and about 1,000 feet above its base yielded upper Carboniferous fossils of late Pennsylvanian association. From a layer at the contact of the limestone with the shales a few obscure forms, which may be late Devonian or lower Carboniferous, were obtained. Above the Carboniferous limestone comes in the sequence of Red Beds with thin marine limestone and coal beds, which some 600 or 800 feet above their base contain Jurassic plants. Thus in central

China we seem to have a continuous sequence of Paleozoic strata with very meager development of the Silurian and Devonian, and with a great limestone in place of the Coal Measures of Shan-si and Shan-tung.

Natural Coke in the Wasatch Plateau: J. A. Taff.

Mr. Taff described the occurrence of natural coke from two localities in the Book Cliffs coal field near the north end of the Wasatch Plateau in central Utah. The coal, of which there are extensive deposits, crops out in the Book Cliffs and eastern escarpment of the Wasatch Plateau. Along the outcrops the coals have been extensively burned, presumably by spontaneous combustion fusing the overlying strata in places into vesicular slag-like masses. At one of these localities, about ten miles southwest of Castlegate, an outcrop of metamorphosed coal having the columnar structure and luster of coke was found in association with fused siliceous deposits.

The second locality is at the Winterquarters mines, two miles west of Scofield. Dikes of an igneous rock ten feet in width have cut vertically across the coal bed, nine to sixteen feet thick, metamorphosing the coal into a coke-like substance to a distance of three feet on each side. The coal thus fused is distinctly columnar, the columns standing perpendicular to the face of the dike, and has a graphitic luster, but is not vesicular like artificial coke. While it has the structure in part and the luster of artificial coke it has not the composition. The following are analyses of the coal and coke from the same mine, made by the U. S. Geological Survey.

	Coke, Per Cent.	Coal, Per Cent.
Water	0.32	8.10
Volatile hydrocarbon	20.38	40.20
Fixed carbon	65.90	45.91
Ash	13.10	5.76

The hypotheses presented in explaining the composition are: (1) that the coal at the time of the metamorphism was deeply covered and excluded from the atmosphere, thereby preventing the escape of all the volatile hydrocarbons; (2) that the metamorphosed coal after having lost a large part of its volatile matter has become enriched to a certain extent by the gaseous products emanating from the surrounding coal; (3) that the natural coke, a product of the metamorphism of coal, is arrested by the cooling of the igneous mass before sufficient time was given for the escape of all the volatile hydrocarbons.

The Glaciation of certain Quartzite Ledges of Southeastern Wisconsin, and Boulder Trains derived therefrom: W. C. Alden.

This investigation will be published by the Geological Survey.

The meeting of the society on February 28, 1906, was devoted to a general discussion entitled 'The Early Paleozoic Succession in the Appalachians and the Effect of Barriers on the Distribution of the Formations and Faunas.' The members contributing to the discussion were Messrs. Bassler, Keith, Ulrich and Willis. The interest of fully twenty-five members was aroused to such a degree that three special conferences have been held for a continuation of the discussion.

On March 14, the following program was presented:

Maximum Glaciation in the Sierra Nevada (illustrated): Mr. Willard D. Johnson.

Geological Reconnaissance of the Coast of Olympic Peninsula (illustrated): Mr. Ralph Arnold.

On March 28, under the head of 'Informal Communications,' Dr. David T. Day described a sand storm observed by him in the Columbia River Valley in Oregon. In this district, though the ordinary so-called Chinook winds are continually moving the sands brought down by the river, the Oregon Railway and Navigation Company has been able to protect its tracks by placing boards inclined at an angle of 45° to the line of the tracks at critical points. The storm described was caused by a violent wind blowing in a direction opposite to that of the prevailing winds. The amount of sand moved was very large, a rough measure being furnished by the observation of four feet of sand accumulated in box cars standing with one door open toward the storm. From sam-

ples collected it was found that the greater part of the sand passed a one-hundred-mesh sieve, though sixteen per cent. of the material was coarser than twenty-mesh. In the latter portion, however, it is to be noted that there is a large amount of cinder, doubtless derived from locomotives.

Dr. Geo. P. Merrill exhibited one of fourteen fragments collected by various parties from a meteorite of the peridotite type which fell near Fort Scott, Kansas, September 2, 1905. Attention was called to the fact that the exterior of all the pieces of this meteorite which was seen and heard to explode are fused.

Regular Program. Report of Mr. S. F. Emmons as U. S. Delegate to the Congress of Applied Geology held at Liége, Belgium, June, 1905.

This was the first international congress devoted exclusively to economic geology, and its sessions were held simultaneously in four independent sections: mines, metallurgy, mechanics and applied geology, only the last of which the delegate was able to attend.

Liége is an appropriate place for the meeting of such a congress, being a center of old and well-established coal, iron and zinc industries, the seat of an important school of mines, and, during the past summer, the scene of an international exposition commemorative of the seventy-fifth anniversary of the independence of Belgium.

Mr. Emmons presented a summary of the geological and industrial conditions of the valley of the Meuse in which the flourishing and picturesque city of Liége is situated, and gave an abstract of the more important papers discussed by the congress under the following heads: (1) tectonics, (2) coal and petroleum, (3) ore deposits, (4) hydrology.

The first discussion had mainly to do with the structure of the Belgian coal basin in which the Paleozoic rocks are compressed into a series of anticlines and synclines, and complicated by many overthrust faults. It also considered the probable extension of the coal-basin rocks of Alsace-Lorraine beyond the boundary into France in the region where they are buried by the transgression of Mesozoic beds to depths of 2,000 to 2,500 feet. It is, of course, a question of great industrial importance to France whether the workable coal beds may be developed within their boundaries in that region.

The question as to the origin of coal and petroleum was discussed in a most interesting manner by Professors Bertrand, of Lille, and Potonié, of Berlin, based on studies with the microscope and in the field; a brief statement was given of the latter's theories, which are entirely on the autochthonous side of this much-mooted question.

In metallic ore deposits the discussion touched the genesis of the zinc ores of Belgium and ores of mercury and other metals in Italy, besides making a brief mention of platinum-bearing placers in the Congo.

The discussion on hydrology involved the fresh-water-bearing dunes along the shores of the North and Baltic seas, from which in Holland the city of Amsterdam draws its supply of potable water.

Interesting considerations were also presented by French hydrologists on the influence of forests and deforestation in different European countries on their resources of white fuel or water (*la houille blanche*).

The Hamilton Mine, New Mexico: W. LINDGREN.

The Santa Fe Range, in northern New Mexico, consists chiefly of pre-Cambrian granites, gneisses and schists. Among the latter are many smaller masses of amphibolites, evidently derived from pre-Cambrian intrusions of basic igneous rocks in the granite. Carboniferous beds, chiefly sandstones and limestones, occupy large areas on the east side of the range on both sides of the upper Pecos River, and are separated from the pre-Cambrian crystalline rocks by a fault of great throw. The Hamilton mine is situated on the upper Pecos River about twenty-five miles east of Santa Fe, at the place where the erosion by the river has exposed a small part of the pre-Cambrian basement underneath the Carboniferous beds. The latter contain small but workable coal mines, and the fossils indicate a Pennsylvanian age. The amphibolites,

which strike in a northeasterly direction, contain a deposit of chalcopyrite, zinc blende and pyrite which has been worked intermittently since 1885. The workings consist of a shaft 250 feet deep, together with drifts and crosscuts extending for a short distance along the deposit. The ore minerals are directly imbedded in the amphibolite and the gangue minerals consist of biotite, amphibole, tourmaline and quartz. Interest centers in the age of the deposit, which is clearly and unmistakably older than the Carboniferous beds which cover the decomposed and oxidized croppings of the ores. Unquestionably it is also pre-Cambrian, for Cambrian strata are present in both southern Colorado and southern New Mexico. Their absence in this particular region indicates simply that this vicinity constituted a land area during the earliest Paleozoic times.

Examination of other points in the ranges north of Santa Fe by the author and Mr. L. C. Graton, revealed the fact that at a great many other points pre-Cambrian deposits also exist, although in few cases was it possible to prove it so conclusively as was the case at the Hamilton mine. Details of these occurrences will be described in a forthcoming reconnaissance report of the mineral deposits of New Mexico. In general, there are two types of deposits, both of which most frequently contain chalcopyrite. The first consists of stringers and irregular lenses of quartz and calcite enclosing copper ores; the second forms disseminated ores or 'fahlbands' in schists, either amphibolites or gneisses.

It has been known for a long time that the gold deposits in the southern Appalachian states are of early Paleozoic or pre-Cambrian age. The pre-Cambrian age of the Homestake mine in South Dakota has also been firmly established. The author indicated some years ago the probability of pre-Cambrian deposits occurring in Wyoming, and recently Dr. A. C. Spencer has shown that the copper deposits of Grand Encampment, in the same state, most likely also belong to the same early period. This leads to the inference that pre-Cambrian deposits must be present in Colorado.

The pre-Cambrian deposits, as stated above, are apt to contain copper as the most valuable metal. Their tenor in gold and silver is usually low.

ARTHUR C. SPENCER,
Secretary.

THE TORREY BOTANICAL CLUB.

THE meeting of November 29, 1905, was held at the New York Botanical Garden, with Vice-president Underwood in the chair. Twenty persons were present.

Dr. D. S. Martin exhibited specimens of glassy cinders formed by the burning of masses of rice-hulls near Charleston, S. C., illustrating in a striking manner the presence of silica in these hulls.

The announced paper of the afternoon was by Dr. N. L. Britton, under the title of 'The North American Cactaceæ.' The speaker remarked that the Cactaceæ of North America were being carefully studied by himself in cooperation with Dr. J. N. Rose, of Washington, in anticipation of preparing a systematic account of this group for the 'North American Flora.' The Mexican forms have been extensively collected by Dr. Rose and are being kept under cultivation in Washington and New York. Numerous species from Arizona, New Mexico, Lower California and the West Indies have been secured by expeditions sent out by the New York Botanical Garden and now are under cultivation in New York. Herbarium material is, as a rule, peculiarly inadequate to a proper appreciation of the relationships of the members of this family and it is hoped soon to have all of the North American species under observation in the living state. Herbarium specimens are being supplemented by photographs and by material preserved in fluids.

The most recent of the more important papers on the classification of the Cactaceæ is one by Berger, entitled 'A Systematic Revision of the Genus *Cereus* Mill.' and published in the Sixteenth Report of the Missouri Botanical Garden (1905). This paper has been based chiefly on the studies made in

Sir Thomas Hanbury's famous gardens in Italy, and gives much importance to characters of flowers and fruit, characters which have been largely ignored in previous schemes of classification because unknown. The genus *Cereus* is divided into eighteen subgenera by Berger. The studies of the speaker and of Dr. Rose indicate that both in the old genus *Cereus* and in other groups of the cactus family, well-marked differential characters of flower and fruit are coordinated with those of the stem in such a way as to make the recognition of several new genera natural and convenient. After these introductory remarks, the meeting was adjourned to the propagating houses of the garden, where numerous living specimens of Cactaceæ were demonstrated and commented upon. Of the genus *Cereus* in the current sense, various types representing subgenera or possible generic segregates were discussed. Among these were *Cereus peruvianus,* the proper type of the genus *Cereus;* species of the *Pilocereus* group, with which the older *Cephalocereus* is historically identical; *Cereus* Schottii of Berger's subgenus *Lophocereus; Cereus geometrizans,* representing Console's genus *Myrtillocactus; Cereus Pringlei* of Berger's group *Pachycereus; Cereus sonorensis,* representing *Stenocereus,* also of Berger; *Cereus triangularis,* a species much cultivated in the West Indies and southern Florida, with large beautiful nocturnal flowers, a member of Berger's subgenus *Hylocereus; Cereus grandiflorus,* the best-known night bloomer, belonging in Berger's subsection *Selenicereus;* the curious *Cereus Greggii* with slender stem and very large tuberous subterranean part, representing the subsection *Peniocereus* of Berger; the Central American *Cereus baxaniensis* of the group *Acanthocereus;* the Costa Rican *Cereus Gonzalezii,* of Berger's subgenus *Leptocereus;* and also representatives of Engelmann's subgenus *Echinocereus.* Other specimens were exhibited to illustrate the genera *Phyllocactus, Epiphyllum, Cactus, Echinocactus, Melocactus, Ariocarpus, Pelecyphora, Rhipsalis, Opuntia, Nopalea,* and the curious *Pereskia,* with its leafy, vine-like or shrubby stems.

THE meeting of December 12, 1905, was held at the American Museum of Natural History, with President Rusby in the chair. Thirty-four persons were present.

The announced paper of the evening was by Dr. Henry Kraemer and was entitled 'Some Studies on Color in Plants and the Artificial Coloring of Flowers.' The subject of color in plants was considered first from a morphological and chemical point of view, and the speaker performed various illustrative chemical experiments involving changes of color in liquid media. The results of numerous experiments on the control of color in living plants and on the artificial coloring of cut flowers were given. Dr. Kraemer's paper will be published in full in the *Bulletin* of the club. The following is his abstract of the more important results of his observations and experiments:

1. Unorganized or cell-sap color substances are distributed usually in largest amount at the termini of the branches, as in flowers and terminal leaves, or in roots, or in both tops and roots. Their occurrence in those portions of the plant, which are young and growing, points to the conclusion that they are not to be disregarded in the study of metabolic processes. Goebel holds a similar view. He says that it is 'very probable that the feature of color which so often appears when the propagative organs are being brought forth has some connection with definite metabolic processes, although till now we can not recognize what these are.'

2. The distribution of the so-called flower color substances in other parts of the plant than the flower also points to the same conclusion, and that the part which they play in attracting insects to flowers, is, if indeed they have any function of this kind, incidental rather than fundamental. The fact that certain colored flowers, as in the spruce and red maple of early spring, are pollinated by the wind, would tend to confirm this view. The food in the nectar and pollen are no doubt sufficient attraction for insects and other animals.

3. The occurrence of chromoplastids in a reserve organ, as in the tuberous root of the carrot, and the similar occurrence of chromoplastids and of reserve starch in the petals of the buttercup, lead to the inference that the petal of the buttercup, like the root of the carrot, has the function of storing nutrient material. In each case cells containing chromoplasts rich in nitrogenous sub-

stances are associated with cells containing reserve materials. In the case of the carrot the reserve materials are utilized by the plant of the second year, and in the case of the buttercup they are utilized in the development of the akene.

4. The feeding of plants with chemicals for the purpose of controlling color, as certain iron, aluminum, potassium and other salts as well as certain organic acids, has not so far, in the author's experiments with carnations, roses and violets, produced any marked changes in the colors of the flowers, only some slight effects being noted which might be attributed to other causes. Knowing that plants have a certain individuality and certain inherent qualities or tendencies, other than negative results could hardly be expected. On the other hand, the plant is a rather plastic organism, and for this reason experiments along the line indicated are more or less justified.

5. Experiments in supplying plants and cut flowers with vegetable coloring matters and aniline dyes showed that none of the vegetable color substances were taken up and that only a comparatively few of the aniline dyes would color flowers. The fact that of thousands of dyes or color substances, only a few are carried as high as the flower, would tend to show that only certain chemicals or substances would be taken up by the plant, and thus exert an influence on the coloring matter in the flower. If such profound changes occur in plants as are provided by the mutation theory, is it too much to suppose that certain definite changes might be produced by means of which we have knowledge or control?

Dr. Kraemer's remarks were illustrated by a hundred or more freshly cut flowers such as carnations, roses, hyacinths and callas, which had been artificially colored in the few hours preceding the demonstration by placing the stalks of the flowers in solutions of certain dyes. Numerous dried specimens of artificially colored flowers of various plants were also exhibited.

Dr. Rusby showed fresh fruits of the so-called 'tree-tomato,' a species of *Cyphomandra* native to South America.

MARSHALL A. HOWE,
Secretary pro tem.

THE ST. LOUIS CHEMICAL SOCIETY.

THE regular meeting of the society on March 12 was devoted to a consideration of matters connected with the organization of the society.

April 9. The paper of the evening, communicated by the secretary, was entitled 'Phosphorescent Zinc Sulphide.' The paper dealt with phosphorescent zinc sulphide prepared by Mr. John Esmaker. The method followed was detailed briefly, with a view to emphasizing the slight changes in procedure, which result in failure to obtain the phosphorescent variety of zinc sulphide. The changes in the method were so slight, that apparently they should have had no influence on the character of the result. The remainder of the paper, and the general discussion which followed, dealt with phosphorescence and similar phenomena, and endeavored to assign some reason for the observed effects.

C. J. BORGMEYER,
Corresponding Secretary.

DISCUSSION AND CORRESPONDENCE.

A PLAN TO ENSURE THE DESIGNATION OF GENERIC TYPES. AN OPEN LETTER TO SYSTEMATIC ZOOLOGISTS.

PROBABLY no other single factor has caused so much confusion in systematic zoology and nomenclature as has the failure on the part of some authors to definitely designate the type species for the new genera they have described. Such failure, indeed, so frequently produces confusion, that the suggestion has been made that a rule be inserted in the International Code of Nomenclature to the effect that no new generic name proposed after a given date, say December 31, 1909, may claim recognition unless its author definitely designates its type at the time of the publication of the name in question. A rule of this nature, extreme though it may appear to some persons, seems to be fully warranted in view of the experience zoologists have had with genera proposed without types. It seems somewhat doubtful, however, whether the International Congress would see its way clear to adopt the proposition just referred to.

Another plan has occurred to me by which practically the same result may be obtained, without recourse to the adoption of the pro-