odal group or lower polar nucleus; the upper polar nucleus migrates to the antipodal end of the sac and there divides, one daughter-cell remaining in that position and becoming cut off by a wall across the sac, the other moving back to the egg and eventually forming a considerable mass of endosperm; fertilization takes place very soon after pollination, material killed within eighteen hours after pollination showing the embryo in a two-celled stage; in addition to the ordinary development of a single embryo, polyembryony may occur, as in *Erythronium* and *Tulipa,* by the division of the suspensor cell to form an extensive embryogenic mass of tissue. C. L. Shear, of the Department of Agriculture, discusses generic nomenclature, bringing up the difficulties connected with determining generic names among certain fungi. He does not offer a set of rules, but reaches the conviction that the so-called 'type-method' is both desirable and practicable. He urges the importance of selecting a starting point for genera, definite provision being made for the treatment of genera having no binomial species referred to them at the time of their original description. W. W. Ashe, of Raleigh, North Carolina, describes new species of *Fraxinus, Tilia* and *Cratægus;* while Newton B. Pierce, of the Department of Agriculture, describes as a new species (*Alternaria citri*) the fungus disease of navel oranges that has attracted attention in California for the past eight or ten years, and which is popularly known as 'black rot of oranges.'

IN *Popular Astronomy* for April, Percival Lowell, of Boston, gives an 'Explanation of the Supposed Signals from Mars of December 7 and 8, 1900.' Many will recall that it was then reported that Mars had been signaling the earth; that lights had suddenly shone out brightly, and then vanished. The explanation is that this misrepresentation came from a telegram sent to Mr. Lowell as to a projection then observed on the surface of Mars, similar to those more often seen on the moon. From a study of the projections on Mars, the writer believes that these are due to clouds floating in the air rather than to mountains on the surface.

George C. Comstock writes of the 'Motion of Comets when far from the Sun.' He speaks of comets as they are commonly considered, as mere visitors who come from the region of the fixed stars, and after a temporary sojourn here return. An interesting popular article on the 'Zodiacal Light' is written by Arthur K. Bartlett, of Battle Creek. This light which is seen at this time in the year on any clear moonless night after sunset might be mistaken for the aurora borealis by those unacquainted with astronomy, were it not for its position and form. Its form is that of a cone or pyramid having its top rounded, and its base directed toward the sun, and with a light like that of the Milky Way. Mr. Bartlett speaks of the various theories to which this illumination has been, and is, attributed, inclining towards the one most generally accepted, though not established, viz., that of meteors combining in unknown millions, reflecting to our eyes the peculiar light in question, borrowed from the sun, around which they revolve probably as do the planets. The usual amount of space is given to current news and notes of comets, asteroids, planets and variable stars, and to various short articles.

SOCIETIES AND ACADEMIES.

NATIONAL ACADEMY OF SCIENCES.

THE annual stated session of the Academy was held in Washington, D. C., April 15 to 17, inclusive.

President Alexander Agassiz presided at the meetings, which were attended by the following members: Messrs. Abbe, Abbot, Agassiz, Allen, Becker, Billings, Boas, Boss, Brewer, Brooks, Cattell, C. F. Chandler, S. C. Chandler, Chittenden, C. B. Comstock, Crafts, Dall, Emmons, Farlow, Gilbert, Gill, Hague, Hall, G. W. Hill, Langley, Minot, S. W. Mitchell, Moore, Morley, Newcomb, Nichols, Osborn, Peirce, Penfield, Pickering, Prudden, Remsen, Richards, Sellers, E. F. Smith, Walcott, Welch, White, and Woodward.

Most of the time during the sessions was devoted to routine business, hearing reports from the officers of the Academy, chairmen of

standing committees, trust funds, etc., and reading scientific papers.

Mr. Samuel F. Emmons, of Washington, D. C., was elected treasurer of the Academy in place of Mr. C. D. Walcott, resigned.

The following gentlemen were elected members of the Academy: William W. Campbell, Director of Lick Observatory, Mount Hamilton, California; George E. Hale, Director of Yerkes Observatory, Williams Bay, Wisconsin; C. Hart Merriam, Chief of the Division of Biological Survey, U. S. Department of Agriculture, Washington, D. C.; William Trelease, Director of the Missouri Botanical Garden, St. Louis; Charles R. Van Hise, Professor of Geology, University of Wisconsin, Madison.

The Academy will next meet in Baltimore on November 11.

The scientific program was as follows:

'Evolution of the Titanotheres, III.,' Models and Restorations: HENRY F. OSBORN.

'Homoplasy and Latent Homology; A Correction': HENRY F. OSBORN.

'Evidence that North America and Eurasia Constituted a Single Zoological Realm during the Mesozoic and Cenozoic, and that Correlations can be Established as a Basis for Uniformity of Geological Nomenclature': HENRY F. OSBORN.

'Monograph of the Bombycine Moths of America, including their Transformation; with a Revision of the Known Genera, Part III., Sphingicampidæ': ALPHEUS S. PACKARD.

'On the Coral Reefs of the Maldives': ALEXANDER AGASSIZ.

'On the Theory of the Formation of Coral Reefs': ALEXANDER AGASSIZ.

'Psychophysical Fatigue': J. McK. CATTELL.

'On Some Optical Properties of Asphalt': EDWARD L. NICHOLS.

'The Classification of the Sciences': CHARLES PEIRCE.

'The Postulates of Geometry': CHARLES S. S. PEIRCE.

'The Color System': CHARLES S. PEIRCE.

'The Compulsory Introduction of the French Metrical System into the United States': WILLIAM SELLERS.

'The Disintegration of Comets': ASAPH HALL.

'A New Computation of the Coefficients of Precession and Nutation': : IRA IBSEN STERNER. Introduced by Asaph Hall.

'The Distribution of the Stars': E. C. PICKERING.

'The Variability in Light of Eros': E. C. PICKERING.

'The Physiological Station on Monte Rosa': H. P. BOWDITCH. (With lantern illustrations.)

'On Catalysis': JAMES M. CRAFTS.

'The Atomic Weight of Cæsium': T. W. RICHARDS.

'The Significance of Changing Atomic Volume': T. W. RICHARDS.

'Determination of the Weight of the Vapor of Mercury at Temperature Below 100°': EDWARD W. MORLEY.

'Biography of Professor William A. Rogers': ARTHUR SEARLE. Presented by Edward W. Morley.

'Biographical Memoir of General J. G. Barnard': HENRY L. ABBOT.

'Biographical Memoir of General Francis A. Walker': JOHN S. BILLINGS.

'Biographical Memoir of J. S. Newberry': C. A. WHITE.

'The Present Aspect of Our Knowledge as to the Constant of Aberration': S. C. CHANDLER.

THE GEOLOGICAL SOCIETY OF WASHINGTON.

AT the meeting of the Society on March 26 the first paper, by Mr. M. L. Fuller, was entitled 'The Catskill Rocks in Northern Pennsylvania.' The term Catskill was used by the speaker to indicate the great series of shales and sandstones, predominantly red in color, which constitute the upper portion of the Devonian sediments in Pennsylvania and New York. The progressive rise of the plane of the lowest red beds to the westward was shown by sections. In the Catskill mountains the lower red beds rest upon the Hamilton, while in Columbia County, Pennsylvania, they appear only after some 1,850 feet of Ithaca and 450 feet of Chemung beds had been deposited. Again, near Tioga, Pennsylvania, 1,500 to 2,000 feet or more of Chemung rocks are exposed beneath the red beds without the bottom being shown, while still further west, near Salamanca, New York, the red beds occur within an interval of some 250 feet below the Olean conglomerate (Pottsville?). At the same time the thickness of the red division has decreased from nearly 5,000 feet in Columbia County, Pennsylvania, to practically nothing in the northwestern portion of the Salamanca quadrangle in New York.

The two divisions of the red series in northern Pennsylvania, provisionally called the Catskill and Oneonta divisions, were described. The Oneonta division was shown to be some 300 feet thick in western Bradford County, Pennsylvania, and to be separated from the Catskill by 350 feet or more of typical marine Chemung. Some 25 miles further west, near Mansfield, the division is represented only by one or two thin beds occurring about 400 feet below the Catskill. Both the lower and upper limits of the Oneonta division were shown to be rising to the westward, indicating that the incursion of the sea and its marine fauna probably took place in Bradford County while red beds were still being deposited in Tioga County on the west.

In considering the age of the red beds at their extreme western limits near Salamanca, New York, it was shown that their stratigraphic position agrees with that of the Pocono in eastern Pennsylvania and with the Waverly in western Pennsylvania. A marked change of fauna, including the introduction of fifty new species, of which seven were of Carboniferous type, was shown to have occurred immediately below the red beds in the region just east of Salamanca, and was regarded as marking the beginning of a transition into the Carboniferous, or possibly the introduction of the Carboniferous itself. The proposition that these beds, with the included red shale, belong beneath the Waverly, and that the latter may have been entirely cut out in this region by the unconformity at the base of the Pottsville was regarded as possible, but as not established.

Mr. Thomas H. Means, of the Bureau of Soils, then presented a very interesting paper, entitled 'Some Results of the Soil Survey.'

Mr. Means reviewed briefly the development of soil studies in the United States and described the methods in use in the Bureau of Soils. Sixteen thousand square miles have been surveyed, the areas being generally distributed through the principal physiographic provinces of the country. A survey is now in progress in Porto Rico. Large areas have been surveyed in the irrigated lands of the western United States. In these areas, besides a study of the soils, the question of alkali in the soils has received particular attention and methods for the reclamation of the alkali lands have been worked out. The maps as issued by the Bureau are principally for the use of the farmers and therefore the classification of the soils is agricultural rather than geological. Mr. Means exhibited a number of soil and alkali maps and described their principal features.

Mr. F. C. Schrader presented a paper, entitled 'The Geological Section of the Rocky Mountains in Northern Alaska,' illustrated by lantern. The southern end of the section is on the Koyukuk River, a northern tributary of the Yukon, and it extends northward to the Arctic Ocean, following approximately the 152d meridian. Beginning at the southern end, the first hundred miles of the section traverses a dissected upland, made up of sandstones and slates and some limestones. These are known to be in part Lower Cretaceous beds, and the remainder are believed to be Cretaceous, or at least Mesozoic. North of this upland is a rugged mountain range, having a width of some eighty miles and reaching altitudes of some 6,000 feet.

Orographically this range is considered to be the northwestward continuation of the Rocky Mountains of the United States and of British Columbia, which here trend nearly east and west across northern Alaska, forming the great trans-Alaskan watershed between the Yukon on the south and the drainages of the Arctic Ocean on the north. On the south the rise from the rolling Koyukuk country to the mountains is rather abrupt; on the north the mountains break off abruptly, much as they do along the edge of the Great Plains in the western United States. Pronounced faulting and uplift are evidenced by marked deformation of the strata and the presence of prominent fault scarps, often miles in extent. A view across the top of the range has the general appearance of a dissected plateau or uplifted peneplain, whose former surface is marked by a sea of peaks which rise to a general level of about 6,000 feet, while the valley floors lie approximately at 2,000. The range, however, seems to be somewhat higher near its

northern and southern margins than in its central mass. It may therefore be regarded as having two axes, each formed by the older Paleozoic rocks, which seem to mark lines of maximum uplift. Continued with diminishing height to the westward, the northern axis seems to terminate in the Paleozoic rocks which form the low mountains and set cliffs at Cape Lisburne, while the southern axis marks the watershed between the Noatak and Kobuk rivers. The rocks composing the range comprise several metamorphic series of limestones, slates, conglomerates, and some schists, ranging from Upper Silurian to Lower Carboniferous, and all much older than the rocks forming the rolling plateau country on either side of the range.

Along its northern base the range is met by a gently rolling plateau country, 2,000 feet high, composed of Lower and Upper Cretaceous beds. This plateau slopes gently to the north for one hundred miles, where it falls off to the Arctic coastal plain. This coastal plain is underlain by Tertiary beds of Pliocene and Oligocene. In the Cretaceous plateau country the aspect of the topography is softened by the presence of drift, showing glacial action to have extended nearly one hundred miles to the north of the mountains. The Colville, like other of the large rivers of northern Alaska, has by lateral migration so encroached upon its western bank that it now enters the ocean at a point approximately thirty miles west from where it debouched in late Tertiary or early Pleistocene time. Along the coast the margin of the coastal plain is fringed by tidal lagoons and embayments and dotted by lakelets. In the low bluffs and sea cliffs ground ice is in many places exposed. These ice strata rise to a height of twenty feet above sea level and extend inland for unknown distances, while the surface is mantled by a sheet of muck and moss but a foot or two in thickness.

Alfred H. Brooks,
Secretary.

CHEMICAL SOCIETY OF WASHINGTON.

The 133d regular meeting of the Chemical Society of Washington was held March 12. The following program was presented:

Dr. W. F. Hillebrand: 'Common Errors in the Determination of Silica.' This paper was presented by Dr. Hillebrand at the winter meeting of the American Chemical Society, and was published in the April number of the *Journal of the American Chemical Society.*

Dr. E. T. Allen: 'Researches on the Oxides of Tungsten.'

1. When tungstic acid is reduced by stannous chloride at 100° C., or by hydriodic acid in sealed tubes at 200° C., the product is an indigo-blue powder of the composition $W_5O_{14}.H_2O$. This compound is changed to tungstic acid by most oxidizing agents. In hydrochloric acid it is insoluble. Caustic alkalies dissolve it with evolution of hydrogen and formation of alkaline tungstate. So far no salt has been obtained from it. Its formula agrees with that of the blue oxide of molybdenum, $Mo_5O_{14}.6H_2O$, recently studied by Guichard.

2. Concentrated ammonia extracts tungstic acid from the blue oxide, leaving a residue which is purple with a strong bronze luster. Its formula is $W_3O_8.H_2O$. The chemical properties of this body are similar to those of the blue oxide. Thus it is insoluble in hydrochloric acid, soluble in caustic alkalies with evolution of hydrogen, and more readily attacked by oxidizing agents than the blue oxide. It finds an analogue among the oxides of uranium ($U_3O_8.xH_2O$).

3. In composition and color these two oxides are closely related to the tungsten bronzes. Thus we have $W_5O_{14}.M_2O$, where $M_2=K_2$, Na_2, Li_2, or Ba, all *dark blue* in color; and $W_3O_8.M_2O$, where $M_2=Na_2$ or K_2, both having a metallic luster, while $W_3O_8.K_2O$, described by Hallopean as a reddish-violet powder with a copper reflex, recalls $W_3O_8.H_2O$ in a striking way. Direct transformation of these bronzes into the two oxides mentioned in this paper, or *vice versa,* has not been accomplished.

L. S. Munson,
Secretary.

BOSTON SOCIETY OF NATURAL HISTORY.

At the general meeting of the Society held on February 5, 1902, the president made the

formal announcement of the death, on January 15, of the Curator, Alpheus Hyatt. He spoke feelingly of his cordial and courteous personality, his unfailing good-humor and his deep interest in the development of the Society's work. At the close of these remarks, it was unanimously voted to request the Council to make arrangements for a memorial meeting for Alpheus Hyatt.

The paper of the evening was by Mr. George B. Gordon, who spoke of 'Recent Explorations by the Peabody Museum in Guatemala and Honduras.' He gave an account of the first expeditions by white men into this region, and pointed out that General Cortez, in his two years' march from the City of Mexico to Honduras, found the country a wilderness and had great difficulty in obtaining any provisions. A considerable amount of work has been done by the Peabody Museum of Archeology and Ethnology in uncovering and investigating the vast ruins of the Mayas, buried in the depths of the tropical forests of this region. The city of Copan, which has been to a great extent uncovered, appears to be the oldest of these ancient communities. A number of lantern slides was exhibited, illustrating the types of monoliths, altars and temples. Mr. Gordon also gave an account of an exploration of a large limestone cave, in which was found a very deep pit. With some difficulty the explorer was lowered into the pit, and found the floor covered with fragments of human bones. He suggested as a possible explanation of this fact that the cavern was used as a temple by the ancient tribes, and the bones were those of victims sacrificed to the Cave God, by being hurled into this chasm.

At the meeting of February 19, Professor W. O. Crosby presented a careful and detailed treatise on the 'Origin of Eskers.' He pointed out that the deposits classed as eskers have doubtless been formed under various conditions, and that a stationary ice-margin was highly favorable, if not essential, to such formations. The evidence of existing ice areas and glaciers seems to shed little light on the problem. The theories of esker formation were considered in detail, and the defects of the subglacial theory of origin were pointed out. A superglacial origin was considered to be much more probable. The material for such superglacial deposits could easily have been derived from englacial detritus, which, as is known, is constantly working up toward the surface of the ice, as the ice-sheet moves onward. This detritus would be acted upon by superficial streams. The ice-floor of a superficial stream is lowered by base-leveling, and by the melting away of the ice from below. The channel thus continues to aggrade, while at the same time the deposits consequent on aggradation are being let down, so that the final grade is that of the ground below. In further support of this theory, the speaker cited the general absence of any correlation of the meanders of eskers to the present topography, a fact which is almost inexplicable by the subglacial theory of formation. The material of these deposits, too, could hardly be so great as it is, if the subglacial theory be accepted, for a subglacial stream could have gained little from englacial drift, and not largely either from the ground moraine. In conclusion, Professor Crosby considered the eskers and sand plains of Newtonville and Auburndale, especially in their bearing on the two main theories of esker formation.

An account of an 'Entomological Collecting Trip in the Highlands of Bolivia,' from the advance sheets of a forthcoming work by Mr. A. G. Weeks, Jr., was read. A graphic description of the topography and general features of this almost unexplored region was given and several finely executed colored plates were shown, illustrating hitherto unfigured Lepidoptera.

GLOVER M. ALLEN,
Secretary.

THE ACADEMY OF SCIENCE OF ST. LOUIS.

AT the meeting of the Academy of Science of St. Louis on the evening of March 17, Dr. E. R. Buckley, State Geologist of Missouri, addressed the Academy on the work being done by the State Bureau of Geology and Mines, giving a brief review of the work done by the Bureau in the past, since its creation in 1839, and an outline of the plans for the future.

At the meeting on April 7, Dr. A. S. Langsdorf, of Washington University, delivered an address on Electric Waves, the explanations being illustrated by experiments, including some of the phenomena of self-induction, absorption, reflection and resonance.

Dr. H. von Schrenk exhibited a sample of the impregnated wooden paving blocks used on some of the streets of London and Paris.

One person was elected to active membership.

WILLIAM TRELEASE,
Recording Secretary.

DISCUSSION AND CORRESPONDENCE.

SECTION D, MECHANICAL SCIENCE AND ENGINEERING OF THE AMERICAN ASSOCIATION.

THE next meeting of the American Association occurs at Pittsburg, June 28–July 3, of this year.

The various Carnegie and Westinghouse industries and a host of others in and about Pittsburg make this locality probably the most interesting in engineering lines in America. Admission to some of these plants is, under ordinary circumstances, difficult to secure. But strong local committees of influential men will do all that can be done to give visitors entrance wherever desired on the important occasion of the coming meeting. Local conditions, therefore, should make Section D, devoted to 'Mechanical Science and Engineering,' the most prominent of the Association.

It will have the active cooperation of the Engineers' Society of Western Pennsylvania —a powerful organization of 404 members. Prominent investigators in various parts of the country have already signified their intention to participate.

The order for the week will be short, crisp, pithy papers for the morning sessions and carefully planned educational excursions under competent local leadership for the afternoons.

This notice is sent out to engineers everywhere and a cordial invitation is extended to them to send to the secretary as soon as convenient titles and abstracts for the morning programs.

The American Association opens at Pittsburg on Saturday, June 28. On Thursday, Friday and Saturday of the same week the Society for the Promotion of Engineering Education will also meet in the same city. A rare series of meetings is in store, therefore, for those who attend, and it is hoped that very many engineers will put Pittsburg on their summer schedule. Please remember to send titles and abstracts very soon to the secretary.

J. J. FLATHER, *Chairman,*
C. A. WALDO, *Secretary.*

LAFAYETTE, INDIANA.

SECTION A, MATHEMATICS AND ASTRONOMY.

Members of the Association who will have papers to present before Section A at the Pittsburg meeting, June 28–July 3 next, are requested to send the titles of such papers as soon as possible to the Secretary of the Section.

EDWIN S. CRAWLEY.
UNIVERSITY OF PENNSYLVANIA.

CENTRAL CONTROL OF THE EXPERIMENTAL STATIONS.

THE article on the above subject by H. F. Roberts, in a late issue of SCIENCE, urges a point of view in some respects plausible, but not, I think, in accord with the best interests of either the scientific or the practical aspects of the station work; unless it be from the standpoint of the trite saying that the best government would be that of a wise and benevolent despot. And surely, if it is bad for the West to have stations established ten or seventy miles apart, it is worse for the East, where the stations, *e. g.*, of the New England states, and of Delaware, Maryland and New Jersey, are located so closely together within a remarkably uniform climatic region, while similar distances on the Pacific slope will often involve the most startling climatic contrasts. By parity of reasoning, the central authority called for ought to abolish and redistribute a dozen of these stations of the Atlantic coast region; and logically, the abolition of 'Little Rhody' and similarly small states, which are exceeded in area by many single counties in the West, should follow in due course, the political preponderance given them at present being clearly unfair.

Robert's fundamental idea, that stations should be located so as to represent climatic