museums and advantages offered in the way of lectures and material. Among other things it notes the formal turning over of the Central Section of the Museum Building on Eastern Parkway to the Institute, and the opening of the Ethnological Hall.

Bird Lore for March–April contains articles on 'The Cormorants of Great Lake,' by T. Gilbert Pearson; 'Mark Catesby,' by Witmer Stone; 'The Chimney Swift,' by Guy A. Bailey. There is a list of 'Bird Lore's Advisory Councilors' and the ninth paper on the 'Migration of Warblers,' by W. W. Cooke, a note on 'The Warbler Book' and a sketch of 'The Worm-eating Warbler,' by Frank L. Burns. There are important book reviews and important matter in the section devoted to 'Audubon Societies.' In connection with the 'Educational Leaflet' devoted to the ostrich it would be interesting to know if any of the North African *Struthio camelus* are to be found in captivity. All the eggs for sale are those of the South African species *S. australis.*

The Museums Journal of Great Britain for March is a specially interesting number and opens with an article by John MacLauchlan on 'Government Aid to Country Museums,' which shows what has been done in Great Britain. It is interesting to note in connection with the proposed establishment of a 'Welsh National Library and Museum' that various cities have offered very substantial inducements in order to have the institution located in that particular place. There is a notice of David Murray's three volume work, entitled 'Museums, their History and their Use,' and the balance of the number is given over to notes of many museums, including a notice of the recent appointment of Sir Purdon Clarke to the directorship of the Metropolitan Museum of Art. The very full directory of British museums has advanced as far as Portsmouth.

SOCIETIES AND ACADEMIES.

THE SAN FRANCISCO SECTION OF THE AMERICAN MATHEMATICAL SOCIETY.

THE seventh regular meeting of the San Francisco Section of the American Mathematical Society was held at Stanford University on February 25, 1905. Fourteen members of the society were present. A number of other teachers of mathematics living in or near San Francisco attended both of the sessions. The following papers were read:

PROFESSOR H. F. BLICHFELDT: 'On a theorem due to C. Jordan.'

PROFESSOR H. F. BLICHFELDT: 'On the order of the collineation-groups in five variables.'

PROFESSOR A. W. WHITNEY: 'A theorem in the theory of probabilities, and its application to insurance.'

PROFESSOR R. E. MORITZ: 'A general theorem on local probability.'

PROFESSOR E. J. WILCZYNSKI: 'Projective differential geometry of plane curves.'

DR. W. A. MANNING: 'On the primitive groups of class ten.'

PROFESSOR G. A. MILLER: 'Invariant sub-groups of prime index.'

PROFESSOR IRVING STRINGHAM: 'A geometrical construction for quaternion products.'

PROFESSOR A. O. LEUSCHNER: 'On the general applicability of the short method of determining orbits from three observations.'

PROFESSOR T. J. J. SEE: 'On the physical state of the matter of the earth's interior, with considerations on terrestrial geology, and on the comparative geology of the other planets.'

In the absence of their authors the papers by Professors Moritz and Wilczynski were read by Professors Leuschner and Haskell, respectively. The paper by Dr. Manning was presented by Professor H. C. Moreno. The next meeting of the section will be held at the University of California on September 30, 1905.

G. A. MILLER,
Secretary of the Section.

THE PHILOSOPHICAL SOCIETY OF WASHINGTON.

THE 598th meeting was held March 18, 1905.

Mr. F. B. Littell, of the Naval Observatory, read a paper on the 'Progress of the Eros Solar Parallax Campaign.' He told in detail of the elaborate plans of work, of the numerous astronomers cooperating in it and of the results thus far obtained. Twenty-eight observatories furnished 6,600 visual observations and thirteen furnished photographic plates; of these, 835 have been measured, reduced and

published, those from Paris being the best; 2,100 plates are still unpublished. Each observatory publishes its own work and the combination of the results has been left so far to voluntary workers. One computer deduces from about 300 plates, taken at nine places, a parallax of $8.''7996 \pm .0021$.

Mr. J. E. Burbank then spoke on the 'Records of Earthquake Disturbances on Magnetographs of the Coast and Geodetic Survey.' Such records occasionally show disturbances markedly different from any usual magnetic disturbance; thus in the last few years some forty of them have been noted at Baldwin, Kansas. The speaker had attempted to compare all such disturbances found on records from half a dozen observatories with one another and with simultaneous records of seismographs. In spite of marked differences in time and duration there is so large a number of coincidences in time as to justify the belief that they have a common cause in an earthquake wave, although the speaker is not prepared to present any theory of the phenomena.

Charles K. Wead,
Secretary.

THE TORREY BOTANICAL CLUB.

Minutes of a meeting held March 14, 1905, at the American Museum of Natural History.

The first paper on the scientific program was by Dr. N. L. Britton, and was entitled 'A Botanical Cruise in the Bahamas.'

The speaker had just returned from several weeks' exploration in the Bahamas and gave a general account of the trip. The numerous islands—there are over 2,700 islands, keys and projecting rocks—are all of the same general type in that they consist of coral limestone. The group is so scattered that there is considerable variation in temperature and rainfall.

A remarkable feature of the islands is the abundant and almost impenetrable thickets growing directly out of the rock; in fact there is very little soil except that known as 'red land,' which occurs in the bottom of sinkholes and locally in swales, and the 'white land' formed from the crumbled rock either disintegrated in place or accumulated as sand dunes. These two formations represent practically all the tillable land of the islands.

Owing to the porous nature of the material there are no known permanent fresh-water streams, although there are a number of salt-water creeks of considerable size. Occasionally there are fresh-water ponds and marshes, mostly of small size. These very local ponds and marshes furnish many of the botanical novelties. Salt-water ponds which rise and fall with the tide are abundant and sometimes of large size.

The Bahamas are very recent geologically, the Bahaman uplift being placed not earlier than the late Tertiary, so that they offer excellent opportunities for the study of plant migration and evolution.

The flora is of southern derivation, a large number of the known indigenous species being common to the near-by and older islands of Cuba and Hayti, while many other species are closely related to plants from these islands. The chief agents in the introduction and distribution of the plant population are migratory birds, supplemented by winds and ocean currents. Notwithstanding the geologically short period that the Bahamas have been above the sea, they have witnessed the evolution of numerous species, there being many endemic species known and many more which will be made known as the result of the recent explorations. Many of these, it is believed, will prove to be examples of rapid evolution (mutation).

Dr. Britton's observations were followed by remarks on 'Collecting Algæ in the Bahamas' by Dr. Marshall A. Howe. The shores of the islands were said to offer a considerable variety of physical conditions and to have a marine flora which is on the whole varied and rich, though apparently less so than that of the Florida Keys. The shore lines are usually rocky, but there are often stretches of white sand which are nearly destitute of algæ. The tide rises and falls ordinarily from one to four feet, but the withering effect of the sunshine is such that few species are found in the strictly littoral zone except under shelving rocks or where the shore is subject to an almost continuous spraying from the waves. A

deeply shaded shelf under a remarkable rock overhang on the Cave Cays of the Exuma Chain furnished some of the most interesting algæ obtained on the recent expedition. The so-called creeks constitute good collecting grounds, especially if well exposed to tidal currents, and the roots of the red mangrove, which commonly borders such, always harbor algæ of interest, particularly when standing in water that is three feet or more deep at low tide. Nearly all the larger islands have brackish ponds which have a peculiar flora varying in character with the salinity of the water. Hundreds of square miles in the Bahaman region are occupied by the 'banks,' on which the water is very shallow, mostly from five to twenty feet deep; these banks often consist of clean white sand with little visible organic life, yet in many places are found, more or less abundantly, representatives of such genera as *Penicillus, Rhipocephalus* and *Udotea,* growing directly out of the sand, and *Microdictyon, Gymnosorus, Wurdemannia, Laurencia, Chondria, Herposiphonia* and others, attached to sponges, corals, sea-fans, etc. In the winter and spring months, at least, very little is found washed ashore except species of *Sargassum* and their epiphytes.

The speaker remarked upon the desirability of extensive dredging operations in order to complete our knowledge of the marine flora of the Bahaman archipelago. A few characteristic specimens of Bahaman marine algæ were exhibited. Special attention was directed to four species of *Penicillus,* viz., *P. capitatus, dumetosus, Lamourouxii* and the recently described *Penicillus pyriformis.*

Rhipocephalus Phœnix and *oblongus* and various species of *Udotea, Avrainvillea* and *Halimeda* were also discussed.

Mrs. Britton, who accompanied the expedition, spoke more particularly of the flora of the island of New Providence, where she spent the time collecting while the other members of the party were cruising. Several exceedingly fine photographs of the local scenery were exhibited.

EDWARD W. BERRY,
Secretary.

THE CHEMICAL SOCIETY OF WASHINGTON.

THE 156th regular meeting was held February 9, 1905, in the chemical lecture hall of the George Washington University. Professor W. R. Whitney, of the research laboratory of the General Electric Company, delivered an experimental lecture upon the subject, 'Colloids.'

THE 157th regular meeting was held March 9, 1905, in the assembly hall of the Cosmos Club.

The first paper on the program was delivered by Mr. W. L. Dubois, and entitled 'Notes on Sulphur Determination.'

For the determination of sulphur in foods and feces a modification of Newmann's method, consisting of burning the sample with sodium peroxid and sodium carbonate, has been substituted for Osborne's method in the Bureau of Chemistry. The new method possesses these advantages: (1) combustion is more satisfactory, cases of incomplete burning being rare; (2) many more samples can be handled, owing to greater ease of manipulation; (3) economy of sodium peroxid.

The most satisfactory lamp tried at the Bureau of Chemistry is Barthel's alcohol burner, which may be adjusted from a very low flame to a powerful blast.

The second paper was entitled 'The Grignard Reaction,' and was presented by Dr. C. E. Waters.

This is one of the most valuable methods of organic synthesis that has been devised recently. An organic halide, RX, dissolved in ether, is allowed to act upon magnesium turnings, which dissolve, forming a clear solution of RMgX. This solution gives addition-products with aldehydes, ketones, esters, ketone- and hydroxy-acids, with sulphur, selenium, oxygen, carbon dioxide and oxychloride, cyanogen, oxides of nitrogen, and other classes of compounds. When these addition-products are treated with water or dilute acids a number of different classes of products are obtained. By this method we can get primary, secondary and tertiary alcohols, ketones, hydroxy-acids, thio- and seleno-compounds, hydroxylamine derivatives, etc. With metallic

halides there are formed organometallic compounds.

A special meeting of the Chemical Society of Washington was held Wednesday, March 29, 1905, in the chemical lecture hall of the George Washington University. At this meeting an illustrated lecture upon 'The Chemistry of Electrochemistry' was delivered by Professor W. D. Bancroft, of Cornell University.

A. Seidell,
Secretary.

THE AMERICAN CHEMICAL SOCIETY.
CORNELL SECTION.

At the November meeting of the Cornell Section of the American Chemical Society, Mr. E. S. Shepherd spoke on 'The Importance of Physical Chemistry in the Study of the Strength of Metals.' After a brief introduction, the speaker traced the development of the pyrometric study of alloys and pointed out how inexplicable were the results obtained. The subject of metallography was discussed and it was shown how neither metallography nor pyrometry could, unaided, solve the problem of the constitution of alloys. It was then shown that physical chemistry furnished a simple explanation of all the facts observed. The equilibrium diagrams for iron-carbon, copper-tin and copper-zinc were discussed. The theory of hardening steel and tempering was briefly explained. By means of the tensile strength curves the speaker showed what a great change in the physical properties of the bronzes can be induced by suitable heat treatment. Quoting results obtained by Shepherd and Upton working on a grant to W. D. Bancroft from the Carnegie Institution, it was shown that certain bronzes could have their tensile strength doubled by heat treatment. Thus a bronze containing 81 per cent. of copper would show a strength of 73,000 pounds per square inch if quenched from above 500° C. and only about 30,000 pounds per square inch when annealed. It was shown how the elongation of the 97 per cent. copper bronze was 30 per cent. for a quenched bronze and only 3 per cent. for the annealed. From these and the similar changes in iron and steel the speaker pointed out the very great need for equilibrium diagrams as a basis for further investigations of the mechanical properties of metals. The speaker mentioned the great value of metallography, pointed out its limitations and was of the opinion that it was only one of the several essential methods of investigation.

In closing, the speaker discussed the work of Beiltry on the surface flow, and hard and soft states of metals. The lecture was illustrated by a large number of lantern slides.

W. S. Lenk,
Secretary.

THE ONONDAGA ACADEMY OF SCIENCE.

At its regular meeting, February 17, the academy elected the following officers:

President—Professor T. C. Hopkins.
Vice-President—J. D. Wilson.
Recording Secretary—Philip F. Schneider.
Corresponding Secretary—J. E. Kirkwood.
Treasurer—Mrs. L. W. Roberts.
Councilors—A. M. Reese and E. N. Pattee.

Professor W. M. Smallwood presented the following facts concerning a tumor in the kidney of a frog:

During the past semester in one of the elementary courses in the university while dissecting the frog it was noticed that the kidneys of one were abnormally large and irregular in shape. They were at once fixed in Carnoy's fluid and subsequently studied with some care. The kidneys were about four times as large as the normal kidneys and showed no evidence of the presence of the adrenal in its normal position. A study of the cytology revealed the presence of a tumor resulting from the abnormal growth of the adrenal tissue. A comparison of these conditions with available human adrenal tumors showed a very striking agreement not only in the general arrangement of tumor tissue to the kidney tissue, but also in the finer details of structure. This agreement is so striking as to leave no doubt but that the pathological conditions in the frog are to be characterized as an adrenal tumor. It is interesting to note that similar results obtain in such widely different animals as the frog

and man. A full report will appear soon in one of the current journals.

AT the meeting on the evening of the seventeenth of March Mr. E. D. Congdon addressed the meeting on 'Some Zoological Impressions of the Bermudas.' Mr. Congdon's abstract of his report follows:

In company with some thirty other students of biology, I had the pleasure of spending part of the summer of 1903 at the Bermuda Biological Station. We were under the supervision of Dr. E. L. Mark, of the Harvard department of zoology, and Dr. Bristol, of New York University. We were comfortably lodged at Hotel Frascati on the outlet of Harrington Sound, midway in the southern shore of the island. No spot could have been found more accessible to the good collecting grounds of the beach, the reefs and the sound. The steam launch and the carryalls supplied transportation to the places chosen for each day's exploration. The trips were so planned as to include all of the diverse collecting grounds of the islands. Those who were investigating particular subjects were aided in every way to find the material they required.

Time was about equally divided between the reefs and the beach. The whiteness of the coral sand and the clearness and warmth of the water made the search easy and altogether agreeable. Among other interesting forms, *Balanoglossus* occurs in restricted localities along the beach. The dredge brought up from the bottom of Harrington inlet a goodly amount of *Amphioxus*. Mollusca are well represented in species and individuals and include four classes. An *Aplysius*, a tectibranch devoid of shell, could be found by scores in sheltered coves. Sometimes when disturbed they emit a violet fluid which may well serve as a protection, as it diffuses through the water. An exciting encounter with an *Octopus vulgaris* occurs to mind. It resented the advances of a too inquisitive biologist by jerking an oar from his hand. It finally escaped by its power to imitate the exact shade of any brown or gray rock upon which it comes to rest. The grouper, a common Bermuda fish, shows a similar ability to adapt its color to that of its surroundings through a considerable range of colors.

The Cœlenterata are the most characteristic group of animals along shore. The Bermuda anemone, *Actinia mesembryanthemum*, attracts collectors by its large size and the beauty of its variable coloring. In restricted localities where there is considerable tidal current the hydroids *Eudendrium ramosum* and *Pennaria tiarella* are abundant. A small and beautiful *Eudendrium* previously unrecorded was found in a single cove on the south shore. Including the forms which come in on the drifting *Sargassum*, at least eighteen species occur. The beaches of coral sand are dotted with corals of the genera *Isophyllia*, *Mœandra* and others.

The life of the coral reefs is abundant and beautiful. One would not suspect that Bermuda is the northernmost of coral islands. The Gorgonia, Porites, Millepora, Oculina, together with ascidia, sponges and algæ furnish bright and contrasted colors. Movement is given to the coral gardens by the reef fishes with their predominantly blue, black and yellow coloring.

A series of small round half submerged islands occurring along the south shore are of organic origin. Their substructure is of coral sandstone and is honeycombed by the waves. Their surfaces have been encrusted by the tubes of Serpulæ, which in the course of growth have given the islands their characteristically round form. The waves of the open Atlantic pouring into their cavities render fitting their local name, 'the boilers.' Though difficult of access in the quietest sea, they well repay the attention of the collector.

Thirty miles south of Bermuda lie banks described but not explored by the *Challenger* expedition. Two days of intense interest were spent fishing and dredging over this virgin territory. Fish were so abundant as to rob their capture of half its zest. The typical blue coloring of the surface fish fauna was noticeable. The red snapper and a few other fishes suggested the coloring of the zone of rose red algæ.

The dredge brought up among algæ, echinoderms and hydroids two specimens of the

spotted moray. Perhaps the most interesting things which came from the surface of the banks were a number of calcareous spheres three or four inches in diameter. They were composed of thin concentric layers and were apparently of organic origin. Further than this no explanation of their origin was forthcoming.

Alfred Russel Wallace has pointed out how typical the Bermudan terrestrial fauna is of an oceanic island. Only three indigenous vertebrates are present otherwise than birds. It is significant that the only mammal is winged, a bat. He expresses surprise at the small number of insects described. Since the publication of his book the list has been swelled to over three hundred. That a considerable proportion are not indigenous is evident from the fact that twenty species were found en route for Bermuda on one ship sailing from New York. The gulf stream flowing within one hundred miles to the west of Bermuda, the drift of the surface water from the south and west, and the West India hurricanes were no doubt the important agents in bringing animal life from the North American continent.

J. E. Kirkwood,
Corresponding Secretary.

THE ELISHA MITCHELL SCIENTIFIC SOCIETY OF THE UNIVERSITY OF NORTH CAROLINA.

The 159th meeting of the society was held in the chemical lecture room, Tuesday, 7:30 P.M., March 14, 1905. The following papers were presented:

Professor A. S. Wheeler: 'Normal Paper.'

Professor W. C. Coker: 'The Mutation Theory.'

Professor J. E. Mills: 'Chemical Affinity: A Method for Distinguishing Chemical Energy from Simultaneous Physical Energy Changes.'

Alvin S. Wheeler,

DISCUSSION AND CORRESPONDENCE.

NATURAL MOUNDS.

In Dr. Brauner's interesting article on 'Natural Mounds' in Science for March 31, he mentions the fact, in connection with the distribution of these mounds in the Mississippi Valley, that they follow up the valley of the Arkansas and of the Neosho rivers across Indian Territory into southeastern Kansas. These mounds are exceedingly abundant in southwest Missouri also. They are a characteristic feature of the landscape in Lawrence County, Mo. (second tier of counties from Kansas and from Arkansas), where the writer lived for many years. They are abundant both in the timber and on the prairies, but are more noticeable on the prairies because of the fact that on them the prairie grasses give place to taller forms of vegetation. Before the lands were put in cultivation these mounds were from one to three feet high, and usually twenty to thirty feet in diameter. On newly reclaimed land crops grow much more luxuriantly on the mounds than elsewhere. Corn is usually the first crop planted on new lands in that section, and it is usual for corn on mounds to grow nearly twice as tall as on surrounding areas the first year. This difference in growth gradually disappears as cultivation continues.

These mounds have probably originated from different causes in different regions. In southwest Missouri their origin is probably due to the following cause: The soil of the region has been formed from the decay of the great sub-carboniferous limestones. Where these strata are exposed in cliffs there may occasionally be found concretions of flint several feet in diameter. The flint is broken into rather small fragments, which fall apart more or less when the surrounding limestone disintegrates into soil. The flint resists disintegration far greater than the limestone. These masses of flint fragments later become prominent as mounds by the more rapid denudation of the surrounding soil containing comparatively little flint. This theory is strengthened by the fact that the material forming the mounds to a depth of several feet consists very largely of small flint stones.

W. J. Spillman.
U. S. Department of Agriculture.

SPECIAL ARTICLES.

AN ALTERNATIVE INTERPRETATION OF THE ORIGIN OF GYNANDROMORPHOUS INSECTS.

The occasional occurrence in the groups of ants, bees, wasps and butterflies of individuals