gone on evolving in parallel or divergent series. H. A. PILSBRY.

SCIENTIFIC JOURNALS AND ARTICLES.

The American Naturalist for January contains the fourth of the series of papers on 'Adaptations to Aquatic, Arboreal, Fossorial and Cursorial Habits in Mammals,' the present being devoted to 'Cursorial Adaptations,' by Richard S. Lull. R. W. Shufeldt has a lengthy paper 'On the Osteology and Systematic Position of the Pygopodes,' giving at the end a comparison of the differential characters of the loons and grebes which are considered as forming two superfamilies. The affinities of these groups to the extinct *Hesperornis* are said to be practically certain, but this conclusion should be received with caution. T. A. Jaggar, Jr., renders a translation of the account of 'The Eruption of Mount Pelée, 1851,' from the French of Le Prieur, Peyraud and Rufz which is of considerable interest. The balance of the number is devoted to reviews and notes.

The Popular Science Monthly for April begins with an account of 'Recent Discoveries in Radiation and their Significance,' by R. A. Millikan, briefly summarizing our present knowledge of the subject and suggesting that certain elements, at least, are transmutable into others. 'The Evolution of the Human Form' is discussed by Charles Morris, who reaches the conclusion (somewhat open to question) that if there are beings on the other planets that answer to man they must follow his physical configuration. Solon I. Bailey describes 'The Arequipa Station of the Harvard Observatory' and Edward F. Williams presents his second paper on 'The Royal Prussian Academy of Science and the Fine Arts, Berlin.' Carl Duisberg considers 'The Influence of Liebig on the Development of Chemical Industries,' believing that while this is now great his indirect influence will be still greater in the future. J. Madison Taylor has the third article on 'The Conservation of Energy in Those of Advancing Years,' a general plea being for rational exercise and diet and not dependence on drugs. 'The Caucasian in Brazil' is considered by Thomas C. Dawson, who believes that he can hold his own in the tropics and adduces figures to show the greater fertility of the white race. Finally, Guy L. Hunner treats of 'The Air of the Luray Caverns.' The number contains the index to Vol. LXIV.

THE April number of the *Transactions of the American Mathematical Society* contains the following papers:

G. A. BLISS: 'An Existence Theorem for a Differential Equation of the Second Order, with an Application to the Calculus of Variations.'

L. E. DICKSON: 'Determination of all the Subgroups of the Known Simple Group of order 25920.'

C. N. HASKINS: 'On the Invariants of Quadratic Differential Forms, II.'

E. D. ROE, JR.: 'On the Coefficients in the Product of an Alternant and a Symmetric Function.'

F. N. COLE: 'The Groups of Order $p^3q\beta$.'

MAX MASON: 'Green's Theorem and Green's Functions for Certain Systems of Differential Equations.'

E. J. WILCZYNSKI: 'Studies in the General Theory of Ruled Surfaces.'

SOCIETIES AND ACADEMIES.

THE BIOLOGICAL SOCIETY OF WASHINGTON.

THE 384th regular meeting of the society was held Saturday evening, March 19, 1904. Dr. C. E. Waters exhibited numerous specimens of common ferns in which the fronds were only partially fertile. The entire series demonstrated a complete gradation from the sterile to the fertile fronds. Dr. B. W. Evermann exhibited a series of seventy-three engravers' proofs of colored plates of Hawaiian fishes. All were drawn and colored from living fish, chiefly by A. H. Baldwin and C. B. Hudson. The live specimens were placed in an aquarium as soon as caught and the artist began work on them immediately or within a very short time. The result is an accurate reproduction of the actual life colors of the animals. The plates will be published in the near future by the U. S. Fish Commission.

Mr. W. P. Hay read a paper on the 'Life History and Economic Importance of the Blue Crab, *Callinectes sapidus*,' illustrating his remarks with lantern slide views. The more important life functions and habits of

the animal were described at some length. The process of casting the shell was detailed and several of the stages shown by photographs. Attention was called to the fact that the two forms of the female which have been described in this species are two conditions of the same individuals. One, with the narrow abdomen, is the original condition of the female, while the other, the form with the broad abdomen, is the condition assumed after union with a male preparatory to egg laying. It appears that eggs are not produced in water much less strongly salt than that of the open ocean. Consequently, egg-bearing females are seldom found in such bodies of water as Chesapeake and Delaware Bays, although crabs may be found in copulation there throughout the summer. The females probably die soon after spawning.

Under the title 'Natural Selection in Kinetic Evolution' O. F. Cook maintained that natural selection has a definite evolutionary function, not to be disregarded as under the theory of evolution by mutation. Selection is not, however, the direct cause of evolution; it is able to produce adaptations or accentuate particular characters by deflecting the normal evolutionary motion of species, which proceeds whether selection is operative or not. Selection represents, as it were, an obstruction in the evolutionary highway; the species is able to turn aside because it is normally in motion, not because the environment is able to initiate evolutionary changes in stationary organisms.*

Wilfred H. Osgood,
Secretary.

THE ANTHROPOLOGICAL SOCIETY OF WASHINGTON.

The 357th meeting was held March 8, 1904.

An interesting letter from Mr. C. H. Robinson, of Philadelphia, on certain ruins in Arizona, was read. Professor A. E. Jenks, of the Philippine Government, reports that he has secured living groups of the four principal peoples of the islands for exhibition at St. Louis. A letter from Dr. Daniel Folkmar detailing anthropological investigations carried on by him in the Philippines was read. Dr. Ales Hrdlicka announced the finding of cremated bones from Rockingham County and Scott County, Virginia, in the collection turned over from the Army Medical Museum to the National Museum.

The bill prepared by a committee of the society for the preservation of ancient ruins, and a resolution endorsing the same, were read. After a discussion by Dr. H. M. Baum and Mr. McGuire, the resolution was favorably acted on.

The general secretary exhibited a number of fire syringes from Burma, Siam and the Malay Archipelago, and demonstrated the efficiency of the apparatus for producing a spark. The range of the fire syringe was discussed, and it was suggested that the invention may have originated from the use of the popgun, or other air-compressing device. The paper was discussed by Mr. Safford and Dr. Hrdlicka.

Mr. W. E. Safford read a paper entitled 'Notes on the Language of the Aborigines of Guam.' The Chamorro-Spanish book on the Christian doctrine, written by an Augustinian friar, formed the basis of Mr. Safford's studies. The primitive words are of Malay origin, and not one per cent. are Philippine. The Guam language has affinities with the Papuan, as shown by the suffixed possessive particles. Mr. Safford discussed the spread of numerals, and says that complete data on this subject will go far to solve the problem of the origin of the Malayo-Polynesian and Papuan language. He called attention to the fact that the same system of numeration is spread from Formosa and the Malay Archipelago to Madagascar, and across the Pacific to Hawaii, New Zealand and Easter Island. A series of papers by Mr. Safford, embracing the grammar of the Guam vernacular, is appearing in the *American Anthropologist*. The paper was discussed by Dr. Lamb, Dr. Baum, Mr. Hallock and the secretary.

Mr. J. N. B. Hewitt read a paper entitled 'The Clan Among the North American Indians.' Mr. Hewitt said that among the Iroquois and most other tribes descent is on the female line. The clan is formed from

* For full discussion see *The Popular Science Monthly*, LXIV., pp. 445–456, March, 1904.

the coalescence of 'brood families or oachiras.' He detailed the rights and privileges of the oachiras and those of the clan which are more extended. Clan names are of some attribute of an animal rather than the name of the animal. In this connection Mr. Hewitt said that game animals were believed to be in duty bound to sustain man. The phratry was described as made up of several clans forming a unit for the celebration of festivals and ceremonies. The names of the Seneca clans with their meanings were given. The Iroquois League was organized like the clans by the rank or age of each unit giving a right to a certain place around the council fire. A very interesting branch of Mr. Hewitt's subject was the description of the method of transaction of business in council, when the matter under discussion was 'thrown across the fire' from side to side by the representatives of the different tribes. This valuable paper will appear in a forthcoming number of the *American Anthropologist*.

WALTER HOUGH,
General Secretary.

THE NEW YORK ACADEMY OF SCIENCES.

SECTION OF GEOLOGY AND MINERALOGY.

A REGULAR meeting of the section was held at the American Museum of Natural History, Monday evening, March 21, with the vice-president, Professor James F. Kemp, in the chair. Two papers were upon the program for reading. The first of these was by Mr. H. H. Wotherspoon, Jr., upon 'The Recent Advances in the Utilization of Peat and Lignite.'

The author said in part that the question as to the derivation of the fuel supply of the world is becoming more and more important. For years Europeans have been striving to devise a fuel to take the place of wood and coal. Recent advances in the price of coal in the United States have directed attention in this country along the same lines. In Europe, and particularly in Germany, many factories have been established for the compression of lignite, or brown coal, and peat into briquettes.

The principal deposits of lignite are near Berlin and Cologne. The larger of these is south and east of Berlin and is known as the Lausitz district. About 280 factories for the manufacture of briquetted fuel, with a total of 680 presses, have been established in these two regions, and their output in 1902 was approximately 12,438,000 metric tons. The briquettes are about 7 inches long, 2½ inches wide and 1½ inches thick, with rounded corners. Their wholesale price in the larger German cities is between $2.10 and $2.25 per metric ton.

Excellent briquettes have been made from the lignite of Alabama, but the experiments with the lignites of North Dakota have been less successful. The calorific value of the German briquettes is from 7,500 to 9,000 B.T.U.'s. True peat and other bog matter is becoming of importance in the manufacture of briquetted fuel. The process of manufacture which has been employed in Canada has depended upon heat for the expulsion of the major part of the contained moisture. This has been an unsatisfactory method, because the temperature (280° F.) necessarily employed has weakened the natural cementing qualities of the bog material.

The German method which has been very successful is to break up rapidly and thoroughly the cellular structure of the partly decomposed vegetable matter. This sets free the water from the plant fiber without injuring the cementing material. In the process part of the moisture is squeezed out of the mass, and the remainder evaporates rapidly on exposure to the air. The briquettes are ready to use in about two weeks after leaving the machine. Their calorific value is greater than that of the briquettes made from lignite.

The briquettes made from American bog matter seem to be as good as the European. The percentage of ash is high, but the ash is very free in character. This characteristic, together with the absence of sulphur, makes the fuel work well under boilers. Wherever transportation charges bring the cost of coal up to seven or eight dollars a ton, it is advisable for Americans to investigate the matter of utilizing neighboring bogs as a source of fuel supply.

Mr. Wotherspoon's paper was illustrated by a series of briquettes manufactured from European and American lignites and peats. He also exhibited a machine by means of which he manufactured in the presence of the section briquettes from peat which originated in Danbury, Conn. The paper was actively discussed, and many questions bearing upon the economic features brought forward by the author were asked.

The second paper of the evening was by Dr. Charles P. Berkey, of Columbia University, and was entitled 'A Geological Reconnoissance of the Uintah Reservation, southeastern Utah.' The author said in abstract:

Observations made in connection with other lines of work last summer have shown an erosion unconformity in the Carboniferous strata of the western Uintahs. It is marked on the south side of the range by an unevenness in the floor and a development of a conglomerate the pebbles of which are of the preceding formation. The break comes just above the chief limestone member of the series.

The junction between the great basal quartzite of the United States and the overlying strata is marked by a fault in this region with sufficient throw to bring two quartzite beds together on the higher plateaus and be easily overlooked. This makes it impossible to confirm Powell's unconformity at the top of the quartzite as described by him in the eastern Uintahs.

The discovery, however, of the Carboniferous erosion interval a little higher in the series throws additional doubt upon the assumed Carboniferous age of the great quartzite member. Allowing the breaking to cut out a part of the 'Wasatch' limestone and the 'Weber' quartzite, as developed in the Wasatch uplift, the lithologic succession is satisfied better by assuming Cambrian age for the lowest member in the Uintahs.

There is no other break to the close of the Cretaceous. A progressive unconformity, which increases in value against the flanks of the range, marks the development of Tertiary sediments in the Duchesne Valley. A conglomerate formed in progressive overlap from the stream valleys to the higher mountain tops of the flanks, has peculiar characters near the limestone belt, on account of which King called it 'Wyoming' conglomerate. These characters are too local to give it the assumed stratigraphic importance, while the flanking conglomerates are really of great range.

Edmund Otis Hovey,
Secretary.

THE AMERICAN CHEMICAL SOCIETY.
NEW YORK SECTION.

At the meeting held March 11 at the Chemists' Club, 108 West 55th Street, the program was as follows:

Derivatives of Ortho-Methoxy-Benzylidene Acetophenone: F. J. Pond and J. V. R. Evans.

The authors describe the preparation of o-methoxy-benzylidene acetophenone and of its di- and tri-bromides. The action of methyl and ethyl alcohols and of sodium alcoholate upon the two bromides is compared with the action of the same reagents upon the bromine derivatives of p-methoxy-benzylidene acetophenone. In the latter case, the alcoholate removes one atom of bromine with substitution of the methoxy- or ethoxy- group, while with the bromides of the ortho- derivatives no such change is noted; this marked difference in the reaction of the two classes of compounds is ascribed to the influence of the position of the phenolic ether group in the para- and ortho-compounds.

The action of sodium alcoholate converts the dibromide into alpha-oxy-o-methoxy-benzylidene acetophenone, while the same treatment of the tribromide gives rise to two isomeric substances, alpha-oxy-o-methoxy-brom-benzylidene acetophenone and o-methoxy-brom-benzoyl benzoyl methane (a 1, 3-diketone), Various derivatives of each compound are described.

Nitrosulphuric Acid and Its Action on Organic Compounds; Part II.: C. W. Volney.

Dr. Volney presented the results of experimental work on hydrolysis of nitric acid by sulphuric acid and formation of nitric anhydride, the existence of combinations between the anhydrides of sulphuric and nitric acids

having been shown in Part I. of this paper (read November, 1903).

The effect of mixtures of nitric and sulphuric acids on organic compounds was then discussed and compared with the reactions obtained by the use of mixtures of nitric acid and anhydrous phosphoric acid under similar conditions. The conclusion reached was that nitrosulphuric acid or the 'mixed acids' of commerce are not merely mixtures, but contain the product of hydrolytic reactions of sulphuric acid in excess on nitric acid, thus explaining their reaction on organic compounds and production of nitro-substitutions, especially of nitro-cellulose.

The Chemistry of Rubber Colors: M. TOCH.

Mr. Toch pointed out that many of the ordinary pigments are not applicable to the coloring of rubber goods, either because the color would be changed by the heating and the reagents used in vulcanizing and finishing rubber, or because of some objectionable effect of the pigment upon the rubber mass. Oleic acid, used as a vehicle for aniline colors, is very deleterious. Stearic acid may be used for the same purpose and is less objectionable.

The following were mentioned as being among the most important of the mineral pigments used: Zinc oxide, zinc sulphide, barium sulphate, vermilion (less used than formerly), iron oxide pigments prepared from the sulphate, antimony sulphide, zinc chromate, 'chrome green,' sesquioxide of chromium and ultramarine.

Notes on the Analysis of Type Metal: E. H. MILLER and M. A. LAMME.

Dr. Miller referred briefly to some of the difficulties experienced in the analysis of type metal alloys, which are explained by the failure to obtain the tin completely in the stannic condition, and recommended that Clarke's separation be followed by the electrolytic deposition of tin as given by Herz, *Ztschr. für Anorganische Chemie,* 37, 1 (1903).

H. C. SHERMAN,
Secretary.

NORTHEASTERN SECTION.

THE fifty-first regular meeting of the section was held Wednesday evening, March 16, in Huntington Hall, Massachusetts Institute of Technology, Boston, with President W. H. Walker in the chair. About 1,000 members and invited guests were present.

Professor E. Rutherford, of McGill University, Montreal, gave an address on 'Radioactivity,' in which he reviewed the history of the discovery of the property of certain forms of matter of giving off radiations, and described the properties of such radiations, as Röntgen rays, X-rays, the alpha, beta, and gamma rays of radium, etc.

The theory of the continuous breaking down of the molecule of a high to one of a low molecular weight was adduced to explain the phenomena of the emanations and the enormous amount of energy manifested. The subject was thoroughly illustrated by experiments, among which was the transference of the condensed emanation of radium from one tube to another cooled with liquid air.

ARTHUR M. COMEY,
Secretary.

THE ONONDAGO ACADEMY OF SCIENCES.

THE February meeting of the academy was held on the nineteenth, at the College of Medicine, Syracuse University.

Mr. I. U. Doust and Mr. W. H. McClelland were elected to membership.

Dr. E. H. Kraus, as a reelected president, delivered an inaugural address, of which the following is an abstract:

Some Interesting Mineral Occurrences in the Salina Epoch: E. H. KRAUS.

Crystals which proved to be hematite were discovered in sewer excavations in the city of Syracuse during the spring of 1903, and in the summer of the same year celestite was found in the vicinity of Jamesville; the latter mineral up to that time had not been known to occur in that locality.

The crystals of hematite usually occur in the cracks and crevices of the red shale and are from one sixteenth inch to one half inch in length. They occur in scales and plates in which the basal pinacoid is much larger than any of the other faces of the crystal. The hematite, as usual, occurs associated with small quartz crystals.

The mineral celestite does not occur in veins or cavities, but disseminated through the rock, the manner of dissemination differing somewhat in different sections; in some places the crystals were not nearly so perfect as in others, often collected in small circular spots. The crystals have the usual combinations of faces found in celestite as well as the specific gravity and optical properties of this mineral.

While the mineral was originally found near Jamesville it has more recently been found elsewhere and, the author believes, is of general occurrence in the limestones of the Salina. In places where rocks containing the celestite were exposed to the weather, the mineral was dissolved, leaving cavities which by their distinct outlines indicate the character of the material which they had contained. In some localities the crystals were large and their impressions simulate the marks of chisel blades of about three fourths of an inch in width, occasionally single but often crossing one another.

In the rocks where this mineral occurs in circular particles, leaching gives rise to an appearance as if the stone were worm-eaten, and bearing a striking resemblance to the 'vermicular limestone.' The 'vermicular limestones' have given geologists much trouble as to a satisfactory explanation of their formation. That sodium chloride was the original occupant of these cavities seems doubtful. But celestite is soluble in water containing small quantities of sodium, calcium or magnesium-chloride. Analyses of the brines from the different salt-producing sections of the state easily proves the presence of these chlorides. With these facts in mind and knowing that the dissemination of celestite through the rock is not unlike that which would be necessary to form cavities as found in the vermicular and that when such a rock has been leached, the appearance of the resulting rock is like that of the vermicular, the conclusion seems unavoidable that these many cavities now empty in the vermicular must have once contained a mineral of the character of celestite and that by the action of the agencies mentioned above the same was dissolved, leaving nothing but the so-called cells to show its former presence.

J. E. Kirkwood,
Corresponding Secretary.

THE SCIENCE CLUB OF THE UNIVERSITY OF WISCONSIN.

The fifth meeting of the club for 1903–4 was held February 23, in the physical lecture room of Science Hall. The club had for its guest the local section of the American Electrochemical Society, this being the first meeting of the local section. The papers were presented by members of the section. The first paper, by C. F. Burgess, on 'Electrolytic Iron,' was illustrated by specimens and products of pure iron recently obtained by him by electrolysis. One specimen of extremely pure material weighted twenty-one pounds.

The second paper, by Oliver W. Brown, on 'The Electric Furnace,' was a general description of the recent advances made in electric furnace work.

The third paper, by V. Lenher, on the 'Solubility of Gold,' was illustrated by experiments and dealt with some recent work of the author.

Victor Lenher,
Secretary.

DISCUSSION AND CORRESPONDENCE.

CONVOCATION WEEK.

To the Editor of Science: Having attended a majority of the meetings of the American Association for the Advancement of Science during the past fifteen years I may, perhaps, be considered competent to contribute some impressions in regard to recent tendencies and the future development of the association which they apparently indicate.

It has always seemed to me that in any attempt to solve a problem such as that of the future policy of the association the proper course to pursue is to study the causes which have led up to existing conditions and from these to try and anticipate what the inevitable outcome is to be. Discussion of personal likes or dislikes is profitless if these are manifestly at variance with the general course of