the elements are taken up in series beginning with hydrogen. Under each element all the more important facts concerning it and its compounds find mention. A great many graphic formulas and equations are here given. The rare elements are also briefly noticed. A very large amount of information together with the latest and newest facts is here brought into small compass. The statements are clear and concise and the book is remarkably free from errors. There are few important omissions. The transition point of mercuric iodide is given, but not that of sulphur nor that of tin. Freezing mixtures are mentioned, but no explanation is given of their action. On the whole, however, this is an excellent text-book, it is planned on new and original lines and it deserves the careful consideration of all teachers of chemistry.

EDWARD H. KEISER.

SCIENTIFIC JOURNALS AND ARTICLES.

The Bulletin of the College of Charleston Museum for January contains the report of the director, Dr. Paul M. Rea, and is an encouraging account of progress, though under difficulties. The museum has important collections and, as Dr. Rea points out, with the funds and assistance necessary to put these in order and make them available to the public, will become an important educational factor.

Bird Lore for January-February has for its most extended article the Sixth Christmas Bird Census, containing records from Maine to Louisiana and British Columbia. There are good illustrated articles on 'An Experience in Tree-top Photography,' by Bert F. Case; 'My Chickadee Family,' by Marion Bole; 'The Dipper in Colorado,' by Evan Lewis, and 'The Little Green Heron,' by Rett E. Olmstead. In the report of the Audubon Societies it is noted that the murderer of Game Warden Bradley was not even indicted. As an offset to this are the resolutions passed by the Millinery Jobbers Association at the Louisville Convention, pledging themselves not to buy song birds, gulls, grebes or herons after January 1, and not to sell after July 1, 1906.

The Zoological Society Bulletin for January contains a well-illustrated article on the 'Pheasant Aviary and its Inmates' which comprise forty species of gallinaceous birds. The 'Founding of a New Bison Herd in the Wichita Forest Reserve' is announced and it is hoped this may lead to the starting of herds in other localities while the bison are yet available. It is stated that the female giraffe received in 1903 has grown one foot and eleven inches and the male two feet and ten inches, the one standing twelve feet high, the other thirteen feet and six inches. Barring accidents, they should before long reach their full height of between sixteen and seventeen feet. There is an article with several good pictures of the smaller cats and, finally, a summary of the larger items of work accomplished during 1905.

SOCIETIES AND ACADEMIES.

AMERICAN PHYSICAL SOCIETY.

THE annual meeting of the Physical Society was held in Fayerweather Hall, Columbia University, New York City, on Friday, December 29, and Saturday, December 30, 1905.

The presidential address of President Barus, on 'Condensation Nuclei,' was delivered on Saturday, December 30, at 11 A.M.

Friday afternoon, December 29, a joint session of the American Physical Society and the American Mathematical Society was held in Havemeyer Hall, at which a paper on the 'Experimental Demonstration of Hydrodynamic Action at a Distance' was presented by Victor Bjerknes.

The following papers were presented:

A. W. EWELL: 'The Electrical Production of Ozone.'

E. RUTHERFORD: 'Some Properties of the Alpha Rays from Radium, II.'

E. RUTHERFORD: 'On the Magnetic and Electric Deviation of the Alpha Rays.'

E. P. ADAMS: 'The Absorption of Alpha Rays in Gases and Vapors.'

H. A. BUMSTEAD: 'The Heating Effect produced by Röntgen Rays in Different Metals and

their Relation to the Question of Changes in the Atom.'

W. J. Humphreys: 'An Attempt to Explain the Cause of the Pressure Shift and the Broadening of Spectrum Lines.'

E. H. Hall: 'Thermoelectric Heterogeneity in Certain Alloys.'

F. L. Tufts: 'The Relative Conductivities imparted to a Flame of Illuminating Gas by the Vapors of the Salts of the Alkali Metals.'

C. B. Thwing: 'On the Specific Electrical Potentials of Metals in a Chemically Inert Atmosphere.'

H. A. Clark: 'The Optical Properties of Carbon.'

H. L. Blackwell: 'Dispersion in Electric Double Refraction.'

Wm. B. Cartmel: 'The Optical Properties of Extremely Thin Films.'

Edgar Buckingham: 'The Thermodynamic Temperature Scale.'

C. H. McLeod and H. T. Barnes: 'Differential Temperature Records in Meteorological Work.'

S. R. Cook: 'On the Velocity of Sound in Gases at Low Temperatures and the Ratio of the Specific Heats.'

K. E. Guthe: 'A New Determination of the E.M.F. of the Clark and Cadmium Standard Cells by means of an Absolute Electro-dynamometer.'

G. W. Pierce: 'Experiments on Resonance in Wireless Telegraph Circuits.'

Edgar Buckingham: 'Methods of Soil Hygrometry.'

H. N. Davis: 'Longitudinal Vibrations Analogous to those of a Violin String.'

A. D. Cole: 'On the Use of the Wehmet Interrupter with the Righi Exciter for Electric Waves.' (Read by title.)

E. F. Nichols: 'Notes on the Possible Separation of Electric Charges by Centrifugal Accelerations.' (Read by title.)

Frank Wenner: 'The Adjustment of the d'Arsonval Galvanometer for Ballistic Work.'

W. J. Humphreys: 'The Purpose and the Present Condition of the Mount Weather Research Observatory.'

Lyman J. Briggs: 'An Electrically Controlled Thermostat operable at Room Temperatures.'

Lyman J. Briggs: 'On the Use of Centrifugal Force in Soil Investigations.'

On Saturday morning, tellers being duly appointed, the ballots received in the annual election of officers and members of the council were counted, and the following named were declared elected: *President,* Carl Barus; *vice-president,* Edward L. Nichols; *secretary,* Ernest Merritt; *treasurer,* William Hallock; *members of the council,* R. A. Millikan and A. Trowbridge.

Ernest Merritt,
Secretary.

THE TEXAS ACADEMY OF SCIENCE.

At the formal meeting of the Texas Academy of Science held June 14, 1905, the election of the following officers for the year 1905–6 was announced:

President—Dr. Thos. H. Montgomery, Jr., Austin.

Vice-president—Dr. James E. Thompson, Galveston.

Treasurer—Mr. R. A. Thompson, Austin.

Secretary—Dr. Frederic W. Simonds, Austin.

Librarian—Mr. P. L. Windsor, Austin.

Members of the Council—Hon. A. Lefevre, Victoria; Professor J. C. Nagle, College Station; Dr. Eugene P. Schoch, Austin.

At the regular meeting of the academy held in the chemical lecture room of the University of Texas, October 27, 1905, Dr. Montgomery delivered the annual address of the president. He chose for his subject 'The Esthetic Element in Scientific Thought.'

The point was made that the key-note of the enthusiasm of the scientist, therefore of his wish to work, is the attraction he finds in the formal beauty of the objects of study. This generally arises in early years, and probably continues as long as his enthusiasm lasts, though in maturer years the scientist finds a greater beauty in the interpretation and relations of phenomena. The scientist is distinguished by this love of the formally beautiful, the well-spring of his enthusiasm, and thereby shows a close community with the artist and poet. On the other hand, there is nothing in common between the scientist and the technical expert, for they have entirely different aims; the scientist is to be trained like an artist, not like a technician. From this love of the natural phenomenon arises a reverence for nature, which brings it about that no true scientist can be without a religion. The great naturalists and great poets have all recognized this kinship.

At the regular meeting held in the chemical lecture room of the university, November 24, 1905, Dr. Lindley M. Keasbey addressed the academy upon 'The Science of Economics.' The following brief abstract will show the scope of his remarks:

In the last instance, economics is an elaboration of the weal relation, which is as follows: Demand tends towards utility, utility necessitates utilization, and utilization results in supply. Consequently the science consists of three parts: Economic psychology, economic geography and demography, and economic history.

1. *Economic Psychology.*—Demand tends toward utility because all men seek to satisfy their wants and utility is the quality of satisfying such wants. The first term of weal relation therefore requires an analysis of human wants, resulting in a hedonic classification and a hedonic calculus.

2. *Economic Geography and Demography.*—The qualities of satisfying wants are circumstances of persons and things, hence potential utilities may be said to reside in man's physical and social environments. The study of these environments with a view to determining their potential utilities constitutes the second part of the science: economic geography and demography.

3. *Economic History.*—In striving to satisfy his wants, man is compelled to convert potential utilities into actual utilities. The study of this process of utilization constitutes economic history, the third part of economics, the dynamics of the science, as it were. In short the subject-matter of economic science may be said to be: The system of activities whereby the potential utilities pertaining to persons and things are through utilization converted into actual utilities.

On the evening of December 28 and the morning of December 29 joint meetings of the Texas Academy of Science and the Scientific Society of San Antonio were held in the rooms of the latter organization in the Stevens Building, San Antonio. The program for the evening session included a lecture upon 'Iron-smelting and Steel-making,' illustrated with many steriopticon views, by Mr. Edward C. H. Bantel, of the engineering department of the University of Texas. The speaker's familiarity with the subject from residence and study in the center of the Pennsylvania steel district enabled him to handle it in a most interesting and detailed manner. Mr. Bantel was followed by Captain T. J. Dickson, U.S.A., Chaplain of the Twenty-sixth Infantry, Fort Sam Houston, San Antonio, who presented two papers: 'Fighting Asiatic Cholera' and the 'First Ascent of Mount Isarog,' both of which were illustrated with stereopticon views.

Mount Isarog is a famous volcano in southern Luzon. The speaker, with eight soldiers and five Filipino cargadores, made the first and only ascent in June, 1903. The summit is a sharp, jagged contour, about two miles in diameter. The trees are knotted and dwarfed and evidence the mighty battle they have waged while contending with the storms that raged around the summit. It has the appearance of a deep soup bowl with one side chopped out. It was possible for members of the party to climb out on the limbs of trees and look down a distance that was estimated one mile.

The last number on the program of the evening session was 'Facts furnished by the Study of Radium and Deduction leading to the Present Electron Theory,' by Dr. Eugene P. Schoch, of the school of chemistry, University of Texas. This exercise, which was a demonstration rather than a lecture, attracted much attention, as outside of the university nothing like it had ever before been seen in Texas. In the audience were a number of officers of the regular army stationed at Fort Sam Houston. It is a pleasure to note the interest these gentlemen have taken in science and the promotion of the scientific spirit within the state.

At the morning session, on December 29, Dr. W. L. Bringhurst, of San Antonio, read a paper upon 'Some Recent Experiments in Biology,' dealing chiefly with the results of the interbreeding of different varieties of the domestic fowl.

FREDERIC W. SIMONDS,
Secretary.

THE GEOLOGICAL SOCIETY OF WASHINGTON.

AT the 174th meeting, on January 24, under the head of 'Informal Communications,' Dr. David T. Day bespoke the cooperation of the geologists of the society in furthering the investigation of black sands, and especially of heavy material derived from sluice boxes by

placer miners. In collecting samples it is especially necessary that the amount of gravel represented by the concentrates should be noted.

The following papers were then presented:

Geological Reconnoissance Map of Alaska: Mr. Alfred H. Brooks.

Gypsum Beds and Water Storage in the Pecos Valley of New Mexico: Mr. Willis T. Lee.

An irrigation system has been in operation for eleven years in the Pecos Valley near Carlsbad, N. M. The storage reservoir of the system at McMillan began to lose water by underground leakage soon after its completion, and this loss became progressively more serious until at the present time the reservoir is almost useless. This paper deals with the geological conditions which have resulted in the leakage of the reservoir and possible remedies are being investigated by the reclamation service.

The rock formations are the 'red beds' of the plains which in this region contain strata of gypsum to a depth of 1,500 feet. Rock salt occurs in large amounts near Carlsbad and the distribution of salt springs indicate that it may have formerly extended throughout the Carlsbad region. Sink holes exist wherever the gypsum occurs near the surface in the vicinity of the river. These sinks connect with caverns formed by solution of the gypsum beds and they are numerous enough to warrant the assumption of a general honeycombed condition throughout the gypsiferous formation. Removal of the soluble strata and the falling in of the caverns produced must undoubtedly have permitted a gradual depression of the surface of the ground, and it is suggested that this process has been the effective cause in producing the basins in the valley near Carlsbad. This hypothesis has been applied by Mr. C. A. Fisher, of the United States Geological Survey, to account for the origin of the Roswell Basin north of Carlsbad, where the fractured and insoluble mass of residual strata is reported to be more than 1,000 feet in depth. In the Carlsbad region details have not been worked out, but the insoluble strata are undoubtedly in a fractured condition, allowing free circulation of water under ground. In part, at least, the water which runs into the ground at the McMillan reservoir returns to the surface above Carlsbad. In the case of one large spring below the dam the rate of flow depends upon the height of water in the reservoir, but it is by no means certain that the supply of this spring is entirely leakage from the reservoir.

Glacial Phenomena in the San Juan Mountains: Mr. Ernest Howe.

In addition to the drift that has long been recognized in the San Juan Mountains, certain detritus has been observed at various places that is evidently older, but in regard to the origin of which information has hitherto been lacking. Quite recently evidence has been found in the Uncompahgre Valley which suggests that certain of these deposits may be of glacial origin.

The events of the later stage of glaciation are recorded in a slight but characteristic modification of the topography, and in an abundance of drift in the form of moraines and outwash gravels, oxidized but little, and upon which subsequent erosion has had slight effect. Post-glacial erosion has been insignificant in the higher mountains, and it is believed that glacial conditions continued to exist until comparatively recent times.

The older detritus occurs farther from the mountains than the more recent material and rests upon the remnants of an old topography that was deeply dissected prior to the last stage of glaciation. The form of the deposits suggests that they have undergone much modification, and the materials composing them have been more or less decomposed by atmospheric agents. The evident greater age of this detritus is in strong contrast to that of the drift deposited by the last glacial ice. The large size of individual boulders, the heterogeneous character of the material and the distance from its source suggest transportation and deposition by glaciers as an explanation of the origin of these deposits.

Stratified deposits of water-worn gravels, closely related to the older drift in age and position, extend far out from the mountains

and are regarded as outwash deposits incident to the earlier glaciation. Between these highest gravels and the valley train of the last stage of glaciation several intermediate gravel-covered terraces occur that are believed to have been developed during the period of interglacial erosion which accomplished the dissection of the old surfaces upon which the early drift was deposited.

ARTHUR C. SPENCER,
Secretary.

THE TORREY BOTANICAL CLUB.

A MEETING of the club was held on January 9, at the American Museum of Natural History, with President Rusby in the chair. Sixteen persons were present.

The annual reports of the treasurer, secretary, corresponding secretary, editor and the editor of *Torreya* were then read and placed on file. The committee on phanerogams, and the committee on cryptogams reported progress.

The following officers were elected for the ensuing year:

President—Dr. H. H. Rusby.

Vice-Presidents—Dr. Edward S. Burgess, Professor L. M. Underwood.

Recording Secretary—Dr. C. Stuart Gager.

Corresponding Secretary—Dr. John K. Small.

Editor—Dr. John Hendley Barnhart.

Treasurer—Dr. Carlton C. Curtis.

Associate Editors—Dr. Alex. W. Evans, Dr. Tracey E. Hazen, Dr. Marshall A. Howe, Dr. D. T. MacDougal, Dr. W. A. Murrill, Dr. Herbert M. Richards, Anna Murray Vail.

A request from Mrs. E. G. Britton for a grant of $100 from the Herrman fund to be used in illustrating new species of mosses from the southern states and the West Indies was read and the application approved by the club.

C. STUART GAGER,
Secretary.

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

THE 162d meeting was held in the chemical lecture room, on Tuesday, January 23, 7:30 P.M. Under the topic 'Tropical Notes,' Professor W. C. Coker described in a most interesting way a recent botanical trip to southern Florida and Cuba. Numerous specimens of plants were exhibited. The program was concluded by Professor Archibald Henderson, who discussed 'A Group of Cross Ratios.'

A. S. WHEELER,
Recording Secretary.

DISCUSSION AND CORRESPONDENCE.

ECOLOGICAL ADAPTATION AND ECOLOGICAL SELECTION.

IT seems that in the recent discussion of evolution there is too much importance attached to variation. It is not so certain that variation itself, or the elucidation of the question how certain species came to have certain characters, is the most important question in the origin of species. The segregation of species may be only an ecological process in which the matter of structural variation is of secondary importance. In fact the Darwinian theory does not require the supposition that the origin of a new species begins with a change of structure, so that to insist upon the importance of ecological selection is only to emphasize a factor already recognized by Darwin. By limiting the development of species to the assumption of structural characters the theory of natural selection is made to appear at an unfair disadvantage. Species are characterized by non-competitive habits rather than by adaptive structures. Indeed, I hold that the origin of a new species begins with a change of place or habits and that the characters by which species are distinguished, as well as adaptive structures, follow as a consequence.

In the 'Origin of Species' there are several passages in which a change of habits is specified as a condition of selection. "For as all of the inhabitants of each country are struggling together with nicely balanced forces, extremely slight modifications in the *structure or habits* of one species would often give it an advantage over others" (p. 64). "The more diversified the descendants from any one species become in *structure, constitution and habits,* by so much the more will they be en-