at Birth,' considering that the facts justify the belief that early birds were arboreal and nidifugous. C. K. Edmunds discusses 'The Motive Power of Heat.' There is a reprint of Francis Bacon's 'Solomon's House,' and J. G. Lipman writes of 'Nitrogen-fixing Bacteria,' indispensable factors in the production of the world's food. S. C. Cronwright Schreiner describes 'Some Arachnids at Hanover, Cape Colony,' giving many interesting details of their habits; and in 'Zoology in America' T. D. A. Cockerell gives a brief résumé, based on titles in the *Zoological Record* of the scientific work being done here. He concludes that if we are not doing what we might and ought, we are not so seriously behind. In the fourth of his articles on 'Mental and Moral Heredity in Royalty,' Frederick A. Woods considers the rulers of Spain and, lastly George B. Hollister has an article on 'The Size of Alaska.'

MESSRS. BORNTRAEGER, Berlin, announce the publication, beginning with January 1, of a bi-weekly *Biochemische Centralblatt* under the charge of leading German students of biochemistry.

SOCIETIES AND ACADEMIES.

THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

THE fifty-second annual meeting of the American Association for the Advancement of Science, and the first of the Convocation Week meetings, will be held in Washington, D. C., December 27, 1902, to January 3, 1903. The retiring president is Professor Asaph Hall, U.S.N., and the president elect, President Ira Remsen, Johns Hopkins University. The permanent secretary is Dr. L. O. Howard, Cosmos Club, Washington, D. C., and the local secretary, Dr. Marcus Benjamin, Columbian University, Washington, D. C. President Roosevelt is honorary president of the local committee. The preliminary program with information in regard to hotel headquarters, railway rates, etc., will be found in the issue of SCIENCE for November 21. The following scientific societies will meet at Washington in affiliation with the Association:

The American Anthropological Association will hold its first regular meeting during Convocation Week in affiliation with Section H of the A. A. A. S. President, W J McGee; secretary, George A. Dorsey, Field Columbian Museum, Chicago, Ill.

The American Chemical Society will meet on December 29 and 30. President, Ira Remsen; secretary, A. C. Hale, 352A Hancock street, Brooklyn, N. Y.

The American Folk-lore Society will meet in affiliation with Section H of the A. A. A. S. President, George A. Dorsey; vice-presidents, J. Walter Fewkes, James Mooney; secretary, W. W. Newell, Cambridge, Mass.

The American Microscopical Society will probably hold a business meeting on December 29. President, E. A. Birge, Madison, Wis.; secretary, H. B. Ward, University of Nebraska, Lincoln, Nebr.

The American Morphological Society will meet on December 30 and 31. President, H. C. Bumpus; vice-president, G. H. Parker; secretary and treasurer, M. M. Metcalf, Woman's College, Baltimore, Md.

The American Philosophical Association will meet on December 30 and 31 and January 1. Secretary, H. N. Gardiner, Northampton, Mass.

The American Physical Society will meet in affiliation with Section B of the A. A. A. S. President, Albert A. Michelson; secretary, Ernest Merritt, Cornell University, Ithaca, N. Y.

The American Physiological Society will meet on December 30 and 31. President, R. H. Chittenden; secretary, F. S. Lee, Columbia University, New York, N. Y.

The American Psychological Association will meet on December 30 and 31 and January 1. President, E. A. Sanford; secretary and treasurer, Livingston Farrand, Columbia University, New York, N. Y.

The American Society of Naturalists will meet on December 30 and 31. President, J. McK. Cattell; vice-presidents, C. D. Walcott, L. O. Howard, D. P. Penhallow; secretary, R. G. Harrison, Johns Hopkins University, Baltimore, Md.

The Association of American Anatomists will meet on December 30 and 31. President, G. S. Huntington; vice-president, D. S. Lamb; secretary and treasurer, G. Carl Huber, University of Michigan, Ann Arbor, Mich.

The Association of Economic Entomologists will meet on December 26 and 27. President, E. P. Felt; secretary, A. L. Quaintance, College Park, Md.

The Astronomical and Astrophysical Society of America will meet during Convocation Week, in affiliation with Section A of the A. A. A. S. President, Simon Newcomb; secretary, George C. Comstock, University of Wisconsin, Madison, Wis.

The Botanical Society of America will meet on December 31 and January 1. President, B. T. Galloway; secretary, D. T. MacDougal, New York City.

The Botanists of the Central and Western States will meet on December 30. Committee in charge of the meeting, John M. Coulter, University of Chicago; D. M. Mottier, University of Indiana, Bloomington, Ind.; Conway MacMillan, University of Minnesota, Minneapolis, Minn.

The Geological Society of America will meet on December 29, 30 and 31. President, N. H. Winchell; vice-presidents, S. F. Emmons, J. C. Branner; secretary, H. L. Fairchild, University of Rochester, Rochester, N. Y.

The National Geographic Society will hold a meeting during Convocation Week. President, A. Graham Bell; vice-president, W J McGee; secretary, A. J. Henry, U. S. Weather Bureau, Washington, D. C.

The Naturalists of the Central States will meet on December 30 and 31. Chairman, S. A. Forbes; secretary, C. B. Davenport, University of Chicago, Chicago, Ill.

The Society of American Bacteriologists will meet on December 30 and 31. President, H. W. Conn; vice-president, James Carroll; secretary, E. O. Jordan, University of Chicago, Chicago, Ill.; council, W. H. Welch, Theobald Smith, H. L. Russell, Chester, Pa.

The Society for Plant Morphology and Physiology will meet during Convocation Week. President, V. M. Spalding; vice-president, B. D. Halsted; secretary and treasurer, W. F. Ganong, Smith College, Northampton, Mass.

The Society for the Promotion of Agricultural Science will meet during Convocation Week. President, W. H. Jordan; secretary, F. M. Webster, Urbana, Ill.

The Zoologists of the Central and Western States will meet during Convocation Week. President, C. B. Davenport, University of Chicago.

BIOLOGICAL SOCIETY OF WASHINGTON.

THE 360th meeting was held Saturday evening, November 15.

M. B. Lyon exhibited some photographs of bats, one of a specimen of *Lasiurus borealis* with four young attached and one of *Dasypteris intermedius* showing two mammæ on one side. These examples, and others that had been dissected, showed conclusively that the commonly accepted statement that bats usually bore but one young was incorrect.

Charles Louis Pollard spoke on 'Some Aspects of the Flora of Cuba,' illustrating his remarks with lantern slides showing the characteristics of the flora near the coast and at different localities in the interior.

Under the title 'Stages of Vital Motion' Mr. O. F. Cook presented a discussion of evolutionary factors, in which it was held that evolution, or the progressive change in groups of organisms, is not primarily due to segregation, but to the normal accumulation of variations by cross-fertilization. Conditions most favorable to evolutionary progress are found in large and widely distributed natural species, narrow in-breeding and wide cross-breeding tending alike to a decline of reproductive fertility and to the production of abnormally abrupt variations, indicating a so-called catalytic or declining stage of evolution. Between the catalytic stage and the normally progressive or prostholytic stage there is, on the side of in-breeding, the hemilytic or retarded stage marked by relative uniformity, and, on the side of cross-breeding, a dialytic or divergent stage in which the characters of the parents are not permanently combined in the offspring but, as shown by Mendel, tend to separate again on the lines of the evolutionary motion of the parental types. The paper will appear in full later.

F. A. LUCAS.

BOTANICAL SOCIETY OF WASHINGTON.

THE ninth regular meeting of the Botanical Society of Washington was held at the Portner Hotel, October 25, 1902. The principal paper of the evening was by Mr. O. F. Cook, on 'Evolution in Coffee; Mutations Described and a Cause Suggested.'

Coffee, the speaker stated, is the most important crop grown from seed for the seeds. It has been in cultivation about a thousand years, but the selection of varieties has not been practiced; nevertheless, sports or mutations are rather frequent, at least in the coffee

plantations of Guatemala. Where several such varieties from other parts of the world have also been tested, the new sorts offer great diversity in other respects, but agree in being less fertile than the parent stock in actual amount or weight of seeds. It seems reasonable to associate this relative or complete sterility with the fact that coffee has been unintentionally inbred, new regions having usually been stocked from single trees, and it is further noted that reproductive debility is a general characteristic of other inbred domestic plants and of the so-called 'sports' or 'mutations' which appear among them. In other words, it is suggested that both the sterility and the mutations may be due to the same cause, the absence of normal cross-fertilization. This interpretation accords with what has been called a kinetic theory of evolution under which evolution is viewed as a physiological as well as a morphological process.

The tenth regular, and second annual, meeting of the Botanical Society of Washington was held at the Portner Hotel, November 8, 1902, with President A. F. Woods in the chair. No regular program had been prepared, the evening being given over to the election of officers and the consideration of general business. The following officers were elected for the ensuing year: *President,* A. F. Woods; *Vice-president,* Frederick V. Coville; *Recording Secretary,* Charles L. Pollard; *Corresponding Secretary,* Herbert J. Webber; *Treasurer,* Walter H. Evans.

Herbert J. Webber,
Corresponding Secretary.

DISCUSSION AND CORRESPONDENCE.

THE GRAND GULF FORMATION.

To the Editor of Science: I am naturally much interested in the communication of Messrs. Smith and Aldrich in your issue of November 21, and, as in the main it confirms my earlier determinations, yet does not correctly state either my position or that of Dr. Hilgard in more recent publications, I venture to supplement it by some words of explanation.

The original complex included under the name of Grand Gulf by Hilgard in 1860 was heterogeneous, but, in the absence of paleontological data, it could not be in its several parts correlated with other beds of known age. This of course led to various, sometimes conflicting, estimates of its place in the column. Professor Hilgard's last characterization of it (*Am. Journ. Sci.,* 3d ser., XXII., p. 59) is as follows: 'Clearly the Grand Gulf rocks alone represent, on the northern borders of the Gulf, the entire time and space intervening between the Vicksburg epoch of the Eocene and the stratified (Quaternary) drift.' We now call the Vicksburgian 'Oligocene,' so it is hardly fair to represent Dr. Hilgard as referring the Grand Gulf *at present* to the Eocene. Neither have I 'referred it' at different times 'to the Eocene, the Oligocene and the Miocene.' By means of paleontological data which have come in from time to time during the seventeen years I have been at work on our southeastern Tertiary, and to which no one has been more active in contributing than Professor Smith and Mr. Aldrich, I have been enabled to fix the age of *different portions* of the original heterogeneous series, as uppermost Oligocene (transitional) and Chesapeake Miocene, which is fully confirmed by the facts now cited by your correspondents. But there are still considerable portions which have yielded no fossils, and the age of which can only be inferred from their position in relation to other beds of known age. In 1898 ('Fifteenth Annual Report U. S. Geol. Survey,' part II., p. 340 and table) I was obliged to decide on some portion of the original Grand Gulf which should continue to bear the name, after deduction of beds of which the age had been determined, and fixed upon the Oligocene clays containing lignite and fossil palm leaves, the only fossils cited by Hilgard in his original description; and in my table of Tertiary horizons referred to them as 'Typical Grand Gulf.' The beds which Messrs. Smith and Aldrich call 'Grand Gulf' in their communication to Science are not the same, but are the non-fossiliferous upper portion at the other end of Hilgard's Grand Gulf section. I have