new species, all from the Philippine Islands, and also by his treatment of *Spiranthes,* in which he distinguishes thirteen species for all of North America north of Mexico. That this promises a reduction in the number of catalogued species in North America is suggested by the fact that in the last edition of Gray's 'Manual' (covering only the northern United States east of the 100th meridian) there are six species; in Britton's 'Manual' (covering but little more territory) eight; and in Small's 'Flora of the Southeastern United States,' sixteen.

In regard to nomenclature the author says, 'the first specific name of each species under the correct generic interpretation, wherever this could be determined with reasonable surety, or employed without leading to complications, has been revived.' While this is probably too lax an application of the law of priority, the carefulness of the author in verifying every citation and in studying herbarium material will enable every orchid student to make any corrections that might be necessary under a stricter construction. Taken all in all this work is one which must be very highly commended, and which all botanists who are interested in orchids must look upon as a welcome addition to botanical literature.

CHARLES E. BESSEY.

THE UNIVERSITY OF NEBRASKA.

SCIENTIFIC JOURNALS AND ARTICLES.

The American Naturalist for April has but two articles, an annotated list of 'Birds of the Isle of Pines,' by Outram Bangs and W. R. Zappey, and 'Studies on the Plant Cell—V.,' by Bradley Moore Davis, dealing with cell unions and nuclear fissions in plants.

The Zoological Bulletin for April tells of 'Further Improvements at the Aquarium' and of 'Photography at the Aquarium,' this being illustrated by many reproductions of photographs of fishes, that of the large spotted moray being particularly good.

The Museums Journal of Great Britain has articles on 'The Relationship existing between Statue and Pedestal in Classical and Renaissance Times,' 'Educational Museums as Schools' and 'The Management of National Museums.' In the 'General Notes' is noticed the gift to the British Museum of a collection of 10,000 specimens of eggs of Palæarctic birds, and to the United States of the collections of etchings and paintings by Whistler, presented by Charles L. Freer, of Detroit. As the United States is the only great nation without a picture gallery it will be interesting to see what disposition will be made of this collection. The sale of a mounted specimen of great auk to an American museum is recorded, the price being £450, or about $2,200. This is the highest price ever paid for a specimen of the great auk.

The Popular Science Monthly for May contains:

E. RUTHERFORD: 'Present Problems of Radioactivity.'

FRANK WALDO: 'The Harvard Medical School.'

A. D. MEAD: 'Alpheus Spring Packard.'

WM. E. RITTER: 'The Organization of Scientific Research.'

T. H. MORGAN: 'The Origin of Species through Selection contrasted with their Origin through the Appearance of Definite Varieties.'

EDWARD S. HOLDEN: 'Galileo,' continued from the February number.

CHARLES E. BESSEY: 'Life in a Seaside Summer School.'

The Museum News for April contains a number of short articles referring to exhibits recently added to the collections of the Museums of the Brooklyn Institute.

SOCIETIES AND ACADEMIES.

THE BIOLOGICAL SOCIETY OF WASHINGTON.

THE 401st regular meeting of the Biological Society of Washington was held April 8, 1905, with President Knowlton in the chair and 43 persons present.

The first paper of the evening was by Professor W. P. Hay, on 'A Class of Arthropoda New to the District of Columbia.'

The paper began with a brief description of a new species of *Macrobiotus,* a genus of *Tardigrada,* discovered in December, 1904, in an aquarium at Howard University. Attention was called to the fact that this is the first

record for the genus and class for the District of Columbia and the third for North America. This was followed by remarks on the structure of the tardigrades, their distribution and classification.

Although these animals have been shifted about from place to place until they now are regarded by most as Arthropoda, rather more closely related to the Arachnida than any other group, it was pointed out that such a disposition of them is incorrect. Except in number of appendages they show no resemblance to the Arachnida, nor can they be approximated to any other arthropodan group unless it be the Onychophora. Their relationship with the latter, even, is very distant, and in spite of the small number of species the Tardigrada should stand by themselves as a distinct class. It even may be necessary to place them alone in a distinct phylum as the supposed presence of segmented appendages in the genus *Lydella,* and the general possession of what are regarded as Malpighian glands only entitles them to a position among the Arthropoda.

In the second paper Mr. Wilfred H. Osgood discussed the characters and relationships of an 'Extinct Ruminant related to the Musk-Ox.' A specimen of a nearly perfect skull found in the Klondike gravels near Dawson, Yukon Territory, appears to represent an animal somewhat similar to the recent musk-ox (*Ovibos*) but generically distinct from it. It is evidently congeneric with *Ovibos cavifrons* of Leidy. The specimen, however, is much more complete than the remains studied by Leidy and presents many characters hitherto unsuspected. The animal was apparently larger than *Ovibos;* the general contour of the head was very different; and the horns, though directed downward, were more slender at the base and more divergent at the tips. The teeth were very large, even larger than those of the American bison (*Bison bison*), and were in fact more similar to those of the bison than to those of the musk-ox or the sheep. None of the characters suggest any connection with the sheep, but some of them might be taken to indicate relation to the bison, oxen, etc. There are, however, reasons for supposing that the present musk-ox has descended from an ancestor farther removed than either the oxen or the sheep.

That the extinct form bears an ancestral relation to the recent musk-ox, there can be little doubt. Interesting in this connection is the fact that some of the characters in the adult fossil form are found in the recent form only before it has reached maturity.

The third paper was by Dr. Barton W. Evermann, on the 'Trout of the Kern River Region.' This paper was illustrated by water-colors, proofs (in color) and lantern slides. Dr. Evermann said:

The Kern River flows nearly due south through a deep canyon with abrupt walls several hundred feet high. The tributary streams from the east as well as from the west flow across the high mountain plateau in a relatively gentle course, then drop in one or more considerable falls from the high plateau to the floor of the Kern canyon. These falls are at present usually so great as to form impassable barriers to the ascent of fish, and as a result many of the streams are wholly without fish of any kind. But in others, as Volcano Creek, Soda Creek, Coyote Creek and others, trout found their way and subsequently the falls became greater and the trout became isolated. In this way, although originally peopled from Kern River, each of many of these smaller streams came to have in it a colony of trout wholly segregated from all other trout and in time the trout of each of these streams became differentiated and now can be readily distinguished from those of other streams. Among those which are best differentiated are those of Volcano Creek, South Fork of Kern and Soda Creek. These must be regarded as three distinct species, only one of which has as yet been named.

E. L. Morris,
Recording Secretary.

THE CLEMSON COLLEGE SCIENCE CLUB.

The fifty-second regular meeting was held on February 17, at 8 P.M. Professor T. G. Poats presented a paper on 'Radium and Radioactive Substances' which was extensively illustrated by lantern slides, exhibition

of the minerals which are the sources of radio-active substances, and by the spinthariscope.

The research paper by Professor C. E. Chambliss, 'Notes on the Rhinoceros Beetle,' was read by title.

The fifty-third regular meeting was held on March 24, at 8 P.M. Professor S. W. Reaves presented a paper on 'The Problem of the Duplication of the Cube.' Dr. F. H. H. Calhoun gave a report upon 'The Origin of the Mont Pelée Mud Flow.' A careful examination of the dust comprising this flow showed that it had been formed by the grinding of crystal-bearing rocks at temperatures below the melting point. Volcanic dust usually consists of small isotropic glass particles with or without a small per cent. of crystalline material. The particles in the flow from Mont Pelée were crystalline, broken, and some of the quartz crystals showed the wavy extinction due to strain. This of course may have been developed in the original rock mass instead of at the time of the formation of the dust itself. The following minerals were recognized in the dust: quartz, feldspar, hornblende, mica, an opaque iron mineral, and a pyroxene. The crystals were so shattered and strained that accurate determination was impossible.

Informal communications were presented on 'the tantalum lamp,' 'life and work of Professor A. S. Packard,' and 'the engineering problems involved in the raising of the Maine' by Professors W. M. Riggs, Haven Metcalf and P. T. Brodie, respectively.

HAVEN METCALF,
Secretary.

DISCUSSION AND CORRESPONDENCE.

SUGGESTIONS TOWARD A PHYTO-GEOGRAPHIC NOMENCLATURE.

THE terms formation and association are, perhaps, now used by most plant ecologists and geographers with something like scientific exactness. The word *formation* suggests the idea of an area of vegetation of a character marked enough to be essentially different from contiguous areas, the prominent forms of vegetation in this area having the same general aspect and adaptations corresponding with distinct physiographic positions. Such formations do not show an even mixture of plants, because such plants are collected into definite groups, or societies dependent somewhat upon the general conditions of the environment, but more especially because of the influence of historic or edaphic factors. Such assemblages of plants are called properly *associations*. The members of the association are looked upon as *vegetation forms*. The term *facies* is also a phytogeograpic concept, happily used with scientific accuracy. But the term *zone* is used somewhat loosely for very different ideas. The word is used in a latitudinal or climatic sense, and we speak of temperate and tropic zones. It is used for the areas at different elevations on the mountain side, hillside or bluff face. Again it is used to denote the arrangement of marine algæ on the sea coast, or for the concentric growth of aquatic plants about the lagoon of a pond or lake.

Humboldt (1805) applied the word zone to the vegetation, the distribution of which was determined by latitude. Schouw (1823) followed Humboldt and Bonpland in the use of the word in the latitudinal sense, and Kabsch (1855) also. It seems then that the word should be used in the restricted sense of a particular portion of the earth's surface determined by referring its position to the parallels of latitude. The concept of bands of vegetation on the mountain side, hillside or bluff face with respect to the altitudinal distribution of plants is best preserved by the use of the word *belt,* and we would speak of forest belt, subalpine belt, alpine belt, and where necessary this application could be extended to zonation on a bluff face. This usage is suggested, notwithstanding the importance of emphasizing the identity of zonation due to climate and that due to altitude, because for practical reasons the two ideas must be kept distinct. The writer wishes to suggest for the concentric bands of vegetation at times so clearly marked in lakes or pond, the term *circumarea,* for in mathematics, circumarea is the area of a circumscribed circle. We might then speak of a water-lily circumarea, a cat-tail circumarea, a shrubby