

size of the leaves has little influence, if they are relatively old, those less than one tenth normal size having taken the disease in a manner characteristic for the host species.

In many cases inoculations have been made with æciospores as well as with uredospores, similar results being obtained upon the same host. In most cases both uredinia and telia were produced. It has been impossible thus far to have all the species authoritatively identified, that being done as fast as the development of the plants will permit. Therefore this list is subject to such changes as further study of the plants may cause. The synonymy of the group is based, for the North American species, on Coville's treatment in "North American Flora," issued by the New York Botanical Garden, and for the species of the rest of the world on Janczewski's "Monographie des Grosseilliers, *Ribes* L." and supplements to that work.

Successful inoculations have been made upon the following species: *Ribes alpestre* Dec., *R. alpinum* L., *R. americanum* Mill., *R. aureum* Pursh, *R. bracteosum* Douglas, *R. carrierei* hybrid, *R. cereum* Douglas, *R. coloradense* Coville, *R. cruentum* Greene, *R. culverwellii* hybrid, *R. curvatum* Small, *R. cynosbati* L., *R. diacantha* Pallas, *R. divaricatum* Douglas, *R. erythrocarpum* Coville & Leiberg, *R. fasciculatum* Seib. & Zucc., *R. fontenayense* hybrid, *R. futurum* hybrid, *R. giraldii* Janczewski, *R. glandulosum* Grauer, *R. glutinosum* Benthams, *R. gordonianum* hybrid, *R. hesperium* McClatchie, *R. hirtellum* Michaux, *R. holosericeum* hybrid, *R. inebrians* Lindley, *R. inerme* Rydberg, *R. irriguum* Douglas, *R. lacustre* (Persoon) Poir., *R. leptanthum* Gray, *R. lobbii*, Gray, *R. menziesii* Pursh, *R. missouriense* Nuttall, *R. montigenum* McClatchie, *R. nevadense* Kellogg, *R. nigrum* L., *R. nigrum* var. *aconitifolium*, *R. odoratum* Wendl., *R. oxyacanthoides* L., *R. petraeum* Wulf., *R. reclinatum* L., *R. rotundifolium* Michaux, *R. sanguineum* Pursh, *R. setosum* Lindley, *R. speciosum* Pursh, *R. succirubrum* hybrid, *R. triste* Pallas, *R. viscosissimum* Pursh, *R. vulgare* Lam.

Successful inoculations have been made on

numerous unidentified *Ribes* from all parts of the United States, including over one hundred collections made by R. K. Beattie in the Northwest and Pacific Coast States. Thus far no species has proved to be entirely resistant to the rust.

The writers acknowledge the aid of the following in carrying on these experiments and thank them for so kindly furthering the work: Mr. R. K. Beattie, Dr. G. R. Lyman, The Arnold Arboretum, The Forest Service and The Office of Horticultural and Pomological Investigations, Bureau of Plant Industry, United States Department of Agriculture.

PERLEY SPAULDING,  
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BUREAU OF PLANT INDUSTRY,  
WASHINGTON, D. C.

## THE AMERICAN PHILOSOPHICAL SOCIETY. II

*Naming American hybrid oaks:* WILLIAM TRELEASE, Sc.D., LL.D., professor of botany, University of Illinois, Urbana.

Thirty-eight known or probable hybrids among the oaks of the United States have been brought together from various and much scattered publications. No cases are believed to exist in which a species of the white oak group (*Leucobalanus*) has intercrossed with a species of the red oak group (*Erythrobalanus*). To the 38 accepted hybrids already recorded, two are added in this paper—*Quercus palaeolithicola* (a cross between *Q. ellipsoidalis* and *Q. velutina*), and *Q. Schuettei* (a cross between *Q. bicolor* and *Q. macrocarpa*). Of the 40 recognized hybrids, 15 have been given binomials by earlier writers: the remaining 25 are here named for the first time, in accordance with international rules of procedure.

*The wild relatives of our cultivated plants and their possible utilization:* W. T. SWINGLE, Ph.D., U. S. Department of Agriculture. (Introduced by Dr. William P. Wilson.)

*An annotated translation of de Schweinitz's two papers on the rusts of North America:* JOSEPH C. ARTHUR, professor emeritus of botany, Purdue University, Lafayette, Indiana, and G. R. BISBY. (Introduced by Professor John M. Coulter.)

The most illustrious botanist of the first half of the last century to give attention to fungous plants was L. D. von Schweinitz, of Salem, N. C., and later of Bethlehem, Pa. He became a member of the American Philosophical Society just one hundred years ago, and some time later published in the *Transactions* of the society the earliest list of "North American Fungi." This attempt at a comprehensive list for the whole country was not again made until the present time, but now the work is in progress, divided among a number of men. The rusts are being listed by Professor J. C. Arthur, LL.D., of Purdue University, Lafayette, Ind. He now presents to the society an estimate of von Schweinitz's notable achievement with this group of fungous plants. Of the four thousand species of fungi on Schweinitz's list 135 were rusts, a class of parasitic fungi of the greatest economic importance. All of Schweinitz's collection, now deposited at the Philadelphia Academy of Sciences, has been critically examined and identified, and a record made of the present knowledge relating to each form. Dr. Arthur pays a high tribute to the remarkable showing made by Schweinitz, to his great accuracy and industry, and to the eminent services which he rendered to American botany.

*Ecology and physiology of the red mangrove:* H. H. BOWMAN, fellow in botany, University of Pennsylvania. (Introduced by Professor Harshberger.)

The mangroves have been noted by the ancient Greeks in early classic literature. Nearchus, the admiral of Alexander the Great, mentioned them as being observed on Alexander's expedition into Asia. They were found by the Greeks growing along the shores of the Persian Gulf and the Red Sea. Theophrastus, the pupil of Aristotle, wrote concerning them as well as Pliny, and many medieval and later travelers and explorers. An examination has been made of the microscopic structure of the various tissues of these trees from material collected in the Gulf of Mexico, along the lower Florida Keys. Particular attention has been paid to the presence of intercellular stone cells and to the occurrence of tannin cells. The physiological relations of transpiration and absorption of these plants growing in sea water and all dilutions of it, as well as fresh water, have been studied, and the law deduced that the rate of transpiration varies directly with the concentration of the medium. Biochemically, it has been shown that there is a definite relation between the amounts of sugar and tannin in the hypocotyls at different stages of growth of the plants. Ecolog-

ical factors show their effect on various tissues, particularly those of the leaves, *e. g.*, the variation in leaf thickness and structure in off-shore, in-shore, salt-water and fresh-water plants. Geologically, the mangroves are of importance in building up land and increasing the area of dry land on islands and continents in the tropics. Under economic considerations it may be stated that the tannin contained in the tissues is used for tanning leather. The wood is the source of an excellent charcoal, but chiefly the plants have been used in keeping up embankments along the seashores and in building dams and dykes. The distribution of these trees along the Florida peninsula and keys is plotted in a series of maps.

Reception from eight to eleven o'clock at the hall of the Historical Society of Pennsylvania, when George Ellery Hale, Ph.D., Sc.D., LL.D., F.R.S., director of the Solar Observatory of the Carnegie Institution of Washington, at Mt. Wilson, Calif., gave an illustrated lecture on "The work of the Mt. Wilson Observatory."

#### APRIL 14

William B. Scott, Sc.D., LL.D., Vice-president, in the chair

*Biochemical studies of the pitcher liquid of *Nepenthes*:* JOSEPH S. HEPBURN, M.S., Ph.D. (Introduced by Professor Harry F. Keller.)

*The National Research Council and its opportunities in the field of chemistry:* MARSTON T. BOGERT, Ph.B., LL.D., professor of organic chemistry, Columbia University.

*The South American Indian in his relation to geographic environment:* WILLIAM CURTIS FARABEE, A.M., Ph.D., curator of American Section of Museum, University of Pennsylvania. (Introduced by Mr. Henry G. Bryant.)

*Interrelations of the fossil fuels:* J. J. STEVENSON, Ph.D., LL.D., emeritus professor of geology, New York University.

This paper deals with the Cretaceous coals, which are vastly more important in the United States than in all the rest of the world. After description of stratigraphical and chemical conditions observed in the typical areas, an effort is made to present the characteristic features in such fashion that the relations to peat and the Tertiary coals may be made clear.

*The distribution of land and water on the earth:* HARRY FIELDING REID, Ph.D., professor of dynamic geology and geography, Johns Hopkins University.

*Uplifted and dissected atolls in Fiji* (illustrated):

WILLIAM MORRIS DAVIS, Ph.D., emeritus professor of geology, Harvard University.

In the southeastern part of the Fiji group a number of atolls uplifted several hundred feet above sea level, are now in various stages of dissection. In no case do they reveal a truncated volcanic platform; hence they discredit those theories of atoll formation which explain atolls or upgrowths of moderate thickness around the border of former volcanic islands that were reduced to submarine platforms by manual abrasion.

*The slides on the Panama Canal:* GEORGE W. GOETHALS, LL.D., Maj.-Gen. U. S. A., late chief engineer, Panama Canal.

*Application of polarized light to study of ores and metals:* FREDERICK E. WRIGHT, Ph.D., of Geophysical Laboratory of Carnegie Institution of Washington.

In this paper the principles underlying the application of polarized light to the study of ores and metals are outlined. The possibilities and also the limitations of the different methods, new or old, now available, are indicated and the adaptation of these methods to metallographic and mineralographic work with the microscope is considered briefly.

*Astrapotheria:* WILLIAM B. SCOTT, Sc.D., LL.D., professor of geology, Princeton University.

*Diatryma, a gigantic Eocene Bird:* WILLIAM DILLER MATTHEW, A.M., Ph.D., curator of vertebrate paleontology, American Museum of Natural History, New York. (Introduced by Professor W. B. Scott.)

The skeleton of a gigantic extinct bird was found last summer in the Bighorn basin of Wyoming by an expedition from the American Museum of Natural History. It is of Lower Eocene age, a contemporary of the little four-toed horse whose fossil remains are found in the same region. The bird was about as large as the extinct moas of New Zealand, much bulkier than any living bird, although not so tall as an ostrich. It stood nearly seven feet high. The head was enormous, eighteen inches long with huge compressed beak like the extinct *Phororhachos* of Patagonia, but unlike any living bird. The neck too was very massive and rather short, and it was quite unable to fly, the wings about as large as in the cassowary. Although it resembled the modern ostrich group in some ways, it was not related to them and only remotely related to any other known birds, the nearest perhaps being the *Seriema* of South

America. A few fragments of this gigantic bird were found by the late Professor Cope over forty years ago, and named *Diatryma*, but it remained practically unknown until the discovery of this nearly complete skeleton. A description of this specimen by W. D. Matthew and Walter Granger, with photographs and a reconstruction, is now in press for the *Bulletin* of the American Museum.

## AFTERNOON SESSION

William W. Keen, M.D., LL.D., President, in the chair

*Presentation of a portrait of I. Minis Hays, M.D., dean of the Wistar Association:* JOSEPH G. ROSENGARTEN, LL.D., on behalf of the Wistar Association, on the Centennial Anniversary of its organization and in the twenty-first year of Dr. Hays's Secretaryship of the Society.

Symposium on Aeronautics—

*Dynamical aspects:* ARTHUR GORDON WEBSTER, Ph.D., LL.D., member of Naval Advisory Board.

*Physical aspects:* BRIGADIER-GENERAL GEORGE O. SQUIER, Ph.D., chief of Signal Corps, U. S. Army. (Introduced by Dr. Keen.)

*Mechanical aspects:* WILLIAM FREDERICK DURAND, Ph.D., chairman of National Advisory Committee for Aeronautics. (Introduced by Dr. Walcott.)

*Aerology in aid of aeronautics:* W. R. BLAIR, Ph.D., assistant, United States Weather Bureau. Discussion—

*Mathematical aspects:* EDWIN BIDWELL WILSON, Ph.D., professor of mathematics, Massachusetts Institute of Technology. (Introduced by Dr. E. W. Brown.)

*Engineering aspects:* JEROME C. HUNSAKER, Eng.D., assistant naval constructor, U. S. Navy. (Introduced by Dr. Bauer.)

On Saturday evening the usual banquet was held at the Bellevue-Stratford, about sixty-five members and guests being present.

The following toasts were responded to:

“The memory of Franklin,” by President Hibben, of Princeton.

“Our sister societies,” by Wm. H. Welch, M.D., of Johns Hopkins.

“Our universities,” by Professor T. F. Crane, of Cornell.

“The American Philosophical Society,” by Mr. John Cadwalader, of Philadelphia.

ARTHUR W. GOODSPEED,  
Secretary