were more toxic in fresh water than in certain strengths of salt water, and this *even to fresh-water fishes.* One obvious interpretation is that these poisons were merely neutralized chemically by the ingredients of the sea-water, outside of the body of the fish, but this explanation is rendered improbable by a variety of considerations which can not be discussed within the limits of the present article.

The employment of pure NaCl, instead of sea-water, in these last experiments, would not probably have affected the outcome, if we may judge by recent work of Loeb, in which he found that the poisonous effect of zinc sulphate upon *Fundulus* eggs was neutralized by the former salt.

Loeb's assertion that "salts alone have such antagonistic effects" certainly does not apply to adult fishes. I need only call attention to the fact that cane-sugar solutions of certain strengths were found by me to very clearly defer the fatal action of the copper salts, both upon *Fundulus heteroclitus* and upon certain fresh-water species. It had first been ascertained that cane sugar did not, in any concentration, take the place of sea salts or of sodium chloride in prolonging indefinitely the life of *Fundulus.* Whether or not these facts can be brought into harmony with Loeb's "tanning" hypothesis, I do not pretend to know.

And now, while I am unearthing some of these long-buried records of the past, I can not refrain from repeating one of my articles of faith therein expressed:

> The writer is not in the least in sympathy with the tendency, so often manifested, to explain the most complex of natural phenomena by a few simple chemical or physical formulæ. If the principles which I have invoked [referring to certain tentative hypotheses] operate at all in the way in which I have supposed, they operate in conjunction with other principles so obscure and complex that a complete solution of these problems is certainly very far distant.

FRANCIS B. SUMNER
U. S. BUREAU OF FISHERIES,
WASHINGTON, D. C.,
November 28, 1911

SOCIETIES AND ACADEMIES

THE BOTANICAL SOCIETY OF WASHINGTON

THE 74th regular meeting of the society was held at the Cosmos Club, Tuesday, October 10, 1911, at eight o'clock P.M. In the absence of the regular officers, Dr. Albert Mann presided. Twenty-five members were present.

The following papers were read:

The Wilting Coefficient for Different Plants and its Indirect Determination: Dr. L. J. BRIGGS and Dr. H. L. SHANTZ. (Presented by Dr. Shantz.)

The Forest of Arden, a Dream: H. C. SKEELS.

The Forest of Arden is a 300-acre tract of native woodland, three miles east of Joliet, Ill., in the valley of Hickory Creek, and forms a part of the 2,000-acre estate, Harlow-Arden, of Mr. H. N. Higinbotham, of Chicago. The creek is dammed in three places, with locks through the two upper dams, giving a mile and a half of boating. Five miles of gravel drives have been laid out, the purpose being to display the landscape beauties of mixed meadows and woods to the best advantage. Along these drives, beginning with the ferns and following the accepted sequence of plant families to the composites, there has been planted a botanic garden of 2,000 species, room being left for as many more.

Each species is located by its place in the sequence, and by a map, cross-sectioned to square 100 feet on each side, accompanied by an index giving the plant names and the number of the square on which each will be found. There are no formal beds and no labels, but the species are there, to be seen by those interested.

The eleventh annual business meeting of the society was held on Tuesday, October 24, 1911. Officers were elected as follows: *President,* W. A. Orton; *Vice-president,* A. S. Hitchcock; *Recording Secretary,* Edw. C. Johnson; *Corresponding Secretary,* W. W. Stockberger; *Treasurer,* F. L. Lewton. The executive committee reported an active membership of 104, there having been nineteen accessions during the year.

The 75th regular meeting of the society, held November 14, 1911, in conjunction with the Washington Academy of Sciences, was devoted to a lecture by Dr. W. L. Johannsen, of Copenhagen. The subject of the lecture was "Heterozygosis in Pure Lines of Beans and Barley."

The 76th regular meeting was held at the Cos-

mos Club, Tuesday, December 5, 1911, at eight o'clock. President W. A. Orton presided. Thirty-three members were present.

The following papers were read: :

Thrips as Pollinators of Beets: Harry B. Shaw.

Thrips tabaci were observed to be numerous on seed beets in Utah. They were always abundant on flowering racemes, as many as 190 being collected from one small branched raceme. They were not observed to interfere with seed production. On the contrary, it appeared more probable that they acted as agents of pollination. An examination showed them to bear numerous pollen grains scattered about their bodies, as many as 140 beet pollen grains being counted on one adult thrips. An experiment, started August 7 and 8, 1911, under carefully arranged isolation conditions on emasculated beet flowers, resulted in 17.2 per cent. of the flowers to which thrips had been introduced being fertilized and producing seed. All the controls remained sterile. The conclusions are that thrips are probably important beet pollinators; that they may act similarly with other plants; that their absence or too small number may account for the non-fertilization of flowers in some localities and seasons; that they may fertilize flowers under supposedly isolated conditions and may even cross plants not regarded as capable of being crossed by insects, *e. g.*, barley; and that they may also spread fungus spores and bacteria.

Forest Types: Raphael Zon.

A study of Idaho forest types revealed three main factors: (1) yellow pine-Douglas fir, (2) cedar-hemlock, both climax types, and (3) pine-larch, a transitory type. The first formation is both a pioneer and climax type; the second is a climax type preceded by the transition type, the order of succession being first the larch (*Larix occidentalis*), then the white pine (*Pinus monticola*), and lastly the cedar (*Thuja plicata*), hemlock (*Tsuga heterophylla*), and white fir (*Abies concolor*).

Phytochemical Studies on Cyanogen: Dr. C. L. Alsberg and O. F. Black (by invitation).

W. W. Stockberger,
Corresponding Secretary

THE TORREY BOTANICAL CLUB

The meeting of October 10, 1911, was held at the American Museum of Natural History at 8:15 P.M., President Rusby presiding. Forty persons were present.

The minutes of the meetings of May 8 and May 31 were read and approved. Professor R. A. Harper, Columbia University; Dr. C. W. Ballard, 115 W. 68th Street; F. D. Fromme, Columbia University; A. B. Stout, New York Botanical Garden, and Miss C. Rabinowitz, New York City, were then proposed for membership.

The report of the secretary on the method of changing the day of a regular meeting was accepted. Dr. E. B. Southwick, chairman of the field committee, reported progress. A similar report was offered by Dr. Rusby, acting for the committee to revise the constitution.

Professor R. A. Harper, Dr. C. W. Ballard, F. D. Fromme, A. B. Stout and Miss C. Rabinowitz were elected to membership.

The scientific program consisted of a lecture on "Some Edible and Poisonous Mushrooms," by Dr. W. A. Murrill. The lecture was illustrated with lantern slides which had been made from photographs of specimens recently collected in the vicinity of New York City and colored while the specimens were in a fresh condition, thus enabling the artists to reproduce the natural coloration of the specimens photographed. The speaker stated that the exceptionally large number of recent deaths due to poisonous species of mushrooms was no doubt attributable to the abundant crops of *Amanita phalloides* and *Amanita muscaria* which have followed the copious rainfall of this season. Slides showing the poisonous species in several stages of growth were exhibited and the special marks of identification were pointed out. Following these were shown slides of some of the edible mushrooms easily confused with the poisonous varieties. The two most characteristic features of the poisonous mushroom are the "death cup" or volvas and the "ring" or annulus. The careless mushroom hunter may pull up a specimen, leaving the volva still buried in the earth, or the annulus, which is a more or less fragile structure, may have already disappeared, and serious consequences result from the oversight.

Dr. Murrill wished to emphasize the fact that there were no rules or tests that could be applied with certainty. It is necessary that one gathering mushrooms for eating purposes should confine his operations to such species as he knows intimately in all their various forms.

The lecture was discussed by Dr. H. H. Rusby, Dr. Thomas, E. B. Southwick and E. C. Edwards.

B. O. Dodge,
Secretary