low. The diseases were present in so large a percentage of the market berries as to make it apparent that they are real economic factors. In a recent trip to the Louisiana strawberry fields (April, 1915), I found the same fungi present upon berries still in the fields. The fungi have been isolated in pure culture and inoculations made. It seems desirable therefore to call attention to them at this time. A complete presentation of their study will be made later.

Strawberry Fruit Rot Due to Patellina Sp.

This rot begins either on green or ripe berries as a microscopic spot which enlarges slowly in green berries and more rapidly in ripe ones. In ripe berries the spot becomes sunken, the area tan colored. The margin is quite definite. The surface is soon studded thickly with sporodochia which vary from globular to patelliform to saucer-shaped, usually with a distinct, often wrinkled sterile margin. In color they vary from hyaline to tan, or when resting on the ripe berry they may take on completely the color of the berry.

The core of the diseased spot is completely occupied by the mycelium, rendering it of spongy tenacious texture. The host cells along a narrow line separating the diseased from the normal area are softened and separated from each other, evidently by enzyme action. It is therefore possible to lift out in its entirety the diseased tissue. The spot in a ripe berry increases in size sufficiently fast to involve the whole of a large berry in about four days. The fungus has been isolated and positive inoculations have been made. It clearly belongs to the genus *Patellina* and appears to be as yet undescribed.

Strawberry Fruit Rot Due to Sphæronemella Sp.

THIS rot occurs with or separate from the one above described. It differs distinctly in character of spot and is much less rapid in its effects. The spot is not definitely bounded nor is there such evidence of enzyme action as described above. The affected berry soon becomes completely covered with the *pycnidia,* which are tan-colored to black, distinctly rostrate and are of such peculiar gelatinous texture that berries affected with this disease can be distinguished by feeling of them.

The causal fungus has been isolated and positive inoculations have been made. It is a *Sphæronemella* apparently quite distinct from *Zythia fragariæ* Laib. and seems to be undescribed.

Each of the above fungi has been found repeatedly on market berries and they are clearly present in sufficient frequency to render them of considerable economic significance.

Strawberry Black Rot Due to Sphæropsis

LAST year both in Louisiana and in the market here, I frequently found berries which showed a very peculiar blackening or a bronzed appearance. Such berries rotted down dry and eventually shrivelled. Examination showed the presence of abundant dark coarse mycelium similar to that of *Sphæropsis malorum* and of pycnidia and spores also, as yet indistinguishable from that fungus. This disease was not nearly so abundant as the two above described and is not of much economic significance.

F. L. STEVENS

URBANA, ILL.,
May 3, 1915

SOCIETIES AND ACADEMIES

THE BOTANICAL SOCIETY OF WASHINGTON

THE 105th regular meeting of the Botanical Society of Washington was held in the Assembly Hall of the Cosmos Club, at 8 P.M., Tuesday, May 4, 1915. Thirty-three members and four guests were present. Dr. George R. Lyman was elected to membership. Dr. Camillo Schneider, general secretary of the Dendrologischen Gesellschaft of Austria-Hungary, was present as a guest of the society. The scientific program was as follows:

The Botany of Western Yunna (China): DR. CAMILLO SCHNEIDER.

Dr. Schneider has just returned from a year's journey in the high mountains of western Yunna. He has carried on in the region of the upper Yangtze investigations in botany, zoology and ethnology. He obtained a great number of colored photographs taken from nature (Lumiere, autochromes) of which he exhibited 25 with the lan-

tern. These showed most interesting plant types of the high mountains near Li Chiang at an elevation of 10,000 to 17,000 feet. Especially striking was a new *Primula*, first discovered a few years ago, with a spiked inflorescence which more resembles an orchid than a *Primula*. It has been named *P. Littoniana*. The buds are of a dark purple, while the open flowers are colored. A very peculiar plant of biological interest is a new Saussurea, which inhabits limestone boulders at about 17,000 feet and has the flowers hidden among the leaves, which are densely hairy and protect them from snow and frost. The virgin forest of the Li Chiang zone consists of *Pinus Massoniana*, various *Piceas*, *Abies Delavaya*, *Tsuga Yunnanensis*, evergreen oaks, many Rhododendrons and numerous other shrubs and herbs. The cryptogamic flora is also very rich. Dr. Schneider has collected over 3,000 different species of phanerogams and ferns.

The Genus Endothia: DR. N. E. STEVENS.

To be published in full elsewhere.

Endothia Pigments: DR. LON A. HAWKINS.

To be published in full elsewhere.

Identification of the Teonanacatl, or "Sacred Mushroom" of the Aztecs, with the Narcotic Cactus, Lophophora Williamsii, and an Account of its Ceremonial Use in Ancient and Modern Times: MR. W. E. SAFFORD.

The early Spanish writers describe certain feasts of the Aztecs in which a narcotic called by them *teonanacatl*, or "sacred mushrom" was used as an intoxicant. Bernardino Sahagun, writing before 1569, states that it was the Chichimeca Indians of the north who first discovered the properties and made use of these "evil mushrooms which intoxicate like wine." Hernandez distinguishes them from other mushrooms (*nanacame*, plural of *nanacatl*) which are used as food, by the distinguishing adjective *teyhuinti*, inebriating, "*quoniam inebrare solent.*" The belief survives that the drug thus used was a mushroom; according to Rémi Siméon, the *teonanacatl* is "une espèce de petit champignon qui a mauvais gout, enivre et cause des halluciations."[1] Investigations of the author have proved that the drug in question is not a fungus but a small fleshy spineless cactus endemic on both sides of the Rio Grande in the vicinity of Laredo, Texas, and in the state of Coahuila, ranging southward to the states of Zacatecas, San Luis Potosi, and Querétaro, a region inhabited in ancient times by the tribes called Chichimecas. The drug is prepared in two principal forms: (1) discoid, in which the head of the plant is cut off transversely, and when dried bears a close resemblance to a mushroom; (2) in longitudinal pieces or irregular fragments, in which the entire plant, including the tap root, is sliced longitudinally into strips, like a radish or parsnip, bearing no resemblance whatever to a mushroom, and designated by early writers as *peyotl*, and also as *raiz diabolica*, or "devil's root."

[1] "Dict. de la langue Nahuatl," p. 436, 1885.

The first to call attention to the ceremonial or religious use of this drug by the Indians of today was Mr. James Mooney, of the Bureau of American Ethnology, in a paper read before the Anthropological Society of Washington, November 3, 1891. Since the time of Mr. Mooney's observations the use of the drug has spread widely among the Indians of the United States, by whom it is commonly called "mescal button" or "peyote."

Efforts have been made to prevent the Indians from using it, chiefly because it is believed by some of those interested in the Christianizing of the Indians that it has a tendency to make them revert to their primitive condition and to their heathen beliefs. Action was taken in the courts to prosecute a certain Indian for furnishing this drug to the Indians of the Menominee Reservation of Wisconsin on March 15, 1914. It developed that the drug was received by parcel post from the vicinity of Laredo, Texas. In a paper before the Lake Mohonk Conference in October, 1914, affidavits of certain Indians of the Omaha and Winnebago tribes of the Nebraska reservation were read. The evidence showed that there is a religious organization among the Indians called the "Sacred Peyote Society," the ceremonial meetings of which are remarkably like those of the ancient Mexicans in which the "sacred mushroom" was eaten; and the physiological effects, as described by those partaking of the drug, were identical with those attributed by the early writers to the *teonanacatl*. The chemical properties of the drug have been studied in Germany and the United States, especially by Lewin, of Berlin, Heffter, of Leipsic, and the late Ervin E. Ewell, of the Bureau of Chemistry, U. S. Department of Agriculture; and the physiological effects by Drs. D. W. Prentiss and Francis P. Morgan, of Washington, D. C.; but it is not possible to give the detailed results of these investigations in the scope of the present paper.

As far as the author knows, this is the first

time the identity of the "sacred mushroom" or "flesh of the gods" with the narcotic cactus known botanically as *Lophophora Williamsii* has been pointed out. That the drug was mistaken for a mushroom by the Aztecs and early Spaniards is not surprising when one bears in mind that the potato (*Solanum tuberosum*) on its introduction into Europe was popularly regarded as a kind of truffle, a fact which is recorded by its German name *Kartoffel*, or *Tartuffel*.

PERLEY SPAULDING,
Corresponding Secretary

THE BIOLOGICAL SOCIETY OF WASHINGTON

THE 542d meeting of the society was held in the Assembly Hall of the Cosmos Club, Saturday, May 15, 1915, called to order at 8 P.M. by President Bartsch, with 43 persons present.

On recommendation of the Council, Francis N. Balch, Boston, Mass., and Ernest P. Walker, Wrangell, Alaska, were elected to active membership.

Under heading exhibition of specimens, Dr. L. O. Howard showed lantern slides from photographs of the moth, *Ceratomia amyntor*, bringing out its protective coloration while at rest on bark.

The first paper of the regular program was by C. H. T. Townsend, "Two Years' Investigation in Peru of Verruga and its Insect Transmission." Dr. Townsend said:

The four stages of verruga are defined as *incubative, fever, quiescent* and *eruptive*. The most important symptom of the fever stage is the presence of bacilliform bodies (*Bartonia bacilliformis* Strong *et al.*) in the erythrocytes. The histology of the eruptive papules is not yet sufficiently defined for positive diagnosis in the absence of the clinical history, but its chief feature is a marked proliferation of angioblasts.

Verrugas Canyon is the best known and probably one of the strongest endemic foci of the disease. Extended investigations were carried on there both day and night at all seasons of the year. The result was an ecological demonstration of *Phlebotomus verrucarum* Townsend as the vector of the disease. This demonstration is built on the unique etiological conditions already known. Verruga can be acquired only by direct inoculation into the blood, is only contracted at night, is confined to very restricted areas within which it is almost universally contracted at any time of year by nonimmunes who remain from seven to ten consecutive nights. These conditions necessitate a bloodsucking vector which is abundant, active only at night but throughout the year, and whose distribution is coterminous with the infected areas. The above *Phlebotomus* is the only bloodsucker which meets these requirements.

Clinical verification of the vector was obtained from the history of numerous cases of verruga observed by Dr. Townsend. Transmissional demonstration in laboratory animals lacked completeness only by reason of the impossibility of positively diagnosing verruga eruptive tissue, papules having been produced in the animals by injections of the crushed *Phlebotomus*.

A biting experiment in man was carried through, resulting in what appeared to be a light infection. This was the case of McGuire, who exhibited all the symptoms but with a paucity of the bacilliform bodies in the erythrocytes. Papules appeared sparingly after the subject had been discharged. Dr. Townsend's assistant, Mr. Nicholson, accidentally received many *Phlebotomus* bites, thereby furnishing a clean experiment with two checks. The checks were Dr. Townsend and his assistant, Mr. Rust, both of whom were subjected to exactly the same conditions as Mr. Nicholson except that they did not receive the bites. They did not contract the disease, while Mr. Nicholson showed a well-marked case with both the bacilliform bodies in the erythrocytes and the characteristic eruption.

Lizards were suggested as a possible reservoir of verruga, from the fact that they were the only vertebrates aside from man, domestic or wild, at Verrugas Canyon, whose blood showed bacilliform bodies. The lizards inhabit the numerous loose rock walls which everywhere in the Andean region take the place of fences, and these are the favorite diurnal hiding places of the *Phlebotomus* swarms. Injection of the lizard blood into guinea-pigs resulted in similar bodies in the erythrocytes of the injected animal.

The unity of verruga was insisted on, in opposition to the thesis of Dr. R. P. Strong and his associates. The entire Peruvian medical fraternity concur in this view. The facts given in support of it appear to be irreconcilable with the opposite view.

Prophylactic measures were outlined; and the remarkably perfect climatic conditions of the verruga zones, unequaled for sanatoria, were dwelt on.

The paper will be published in full in the *American Journal of Tropical Diseases and Preventive Medicine*.

Dr. Townsend's paper was illustrated by lantern

slides made from photographs of *Bartonia bacilliformis,* of clinical cases, of the micro-pathology, of the *Phlebotomus,* and of Verrugas Canyon, etc. It was discussed by Admiral G. W. Baird and medical inspector H. E. Ames.

The second paper of the regular program was by W. Dwight Pierce, "The Uses of Weevils and Weevil Products in Food and Medicine." Mr. Pierce described in particular the trehala manna of Syria which is the cocoon of the large weevil known as *Larinus nidificans.* These cocoons are used by the natives as a food similar to tapioca and are also commonly sold in drug stores for use in making a decoction said to be efficacious against bronchial catarrh. The cocoons are made by an abdominal excretion of the larva and contain a large percentage of sugar known as trehalose as well as a carbohydrate, a little gum, and a small amount of inorganic mineral matter.

Specimens of the trehala manna and of the weevil were exhibited.

The third communication was by L. O. Howard, "Some Observations on Mosquitoes and House Flies." Dr. Howard spoke of the work which is being done in New Jersey against mosquitoes, describing the organization of county inspectors which was effected at Atlantic City in February at an "antimosquito convention." He showed a series of lantern slides illustrating the very effective work done by the Essex County Commission in the vicinity of Newark, N. J. He then spoke of work done by Mr. Hutchinson of the Bureau of Entomology in regard to trapping the maggots of the house fly, illustrating his remarks with lantern slides showing a large out-door maggot trap in use during the summer of 1914 under Mr. Hutchinson's direction at College Park, Md. The illustrations in question appear in U. S. Department of Agriculture Bulletin No. 200.

The last communication was by A. L. Quaintance, "Remarks on Some Little-known Insect Depredators."

Mr. Quaintance called attention to certain species of insects which have but recently come into prominence as of economic importance and to other species which, although long known to entomologists as occasional pests, have recently attracted attention in view of local outbreaks. A species of Jassidæ, *Typhlocyba obliqua,* is at the present time seriously destructive to apples in portions of the Ozark mountain region and in Kansas. These insects occurred in countless numbers in some orchards, infesting the lower surface of the leaves, causing the foliage to drop with subsequent injury to the fruit crop and the trees. A Tineid insect of the genus *Marmara* was reported to have caused a good deal of injury to certain apple orchards in Albemarle County, Virginia. The caterpillar makes long, serpentine mines under the skin of the apple, resulting in blemishes. The keeping quality of the fruit is also lessened. The common walking stick, *Diapheromera femorata,* while often the cause of more or less local defoliation in forests, occasionally becomes a serious pest in orchards, especially in orchards adjacent to woodlands. These walking sticks have recently been complained of on account of important injuries to apple and peach orchards in Virginia and West Virginia. *Rhabdopterus picipes,* a Chrysomelid beetle, has recently been discovered as damaging cranberries. The insect is a near relative of the grape root worm, *Fidia viticida,* and the larvæ work on the roots of cranberry, feeding principally on the fibrous roots, but also stripping the bark from the older roots. Investigations of the insect by Mr. H. B. Scammell indicate that it is restricted in cranberry bogs to the higher and sandier soils. *Nezara hilaris,* one of the stink bugs, and long known to feed on vegetation of various sorts, has recently become very abundant and destructive to peaches in the Marblehead district in northern Ohio. These plant bugs in feeding insert their beaks in the developing fruit, causing the peaches to become knotty and misshapen as they grow, and many of which fall from the trees. *Parandra brunnea,* better known as the chestnut telephone borer, following investigations by Mr. Snyder, has been determined by Mr. Fred. E. Brooks to be very generally present in the heartwood of old apple trees and as a result of its work the trees are often so weakened that they are easily broken or blown over by winds. Various species of Cecidomyidæ are known to be serious crop pests, as the sorghum midge, the pear midge, etc. A new midge pest, *Contarina johnsoni,* has during recent years come into prominence on account of its injuries to grapes in the Chautauqua and Erie grape belts. The adults oviposit in the blossom buds which may contain from 10–70 maggots, though the average number is much less. Many blossoms are thus destroyed, resulting in very ragged and imperfect bunches of grapes.

This paper was illustrated by lantern slides showing the insects and their work from photographs prepared mostly by Mr. J. H. Paine.

At 10.15 the society adjourned until October.

M. W. Lyon, Jr.,
Recording Secretary