SPECIAL ARTICLES

PERIDERMIUM HARKNESSII AND CRONARTIUM QUERCUUM

INOCULATIONS of *Pinus radiata* with æciospores of *Peridermium harknessii* on *Pinus radiata* made in the spring of 1913 resulted in typical galls during the same year. In the spring of 1915 some of these galls bore æcia of *Peridermium harknessii*. The check plants remained sound.

The mycelium of *Cronartium quercuum* on the evergreen *Quercus agrifolia* overwinters in the old green leaves and in early spring produces sori of uredospores in a circle around the old *Cronartium* spots; the uredinial sori on the young leaves are the results of infection from the sori on the old leaves. If *Peridermium harknessii* connects with *Cronartium quercuum*, we have here a case of facultative heteroecism in both generations.

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A SIMPLE DEMONSTRATION OF THE REDUCED VAPOR PRESSURE OVER A SOLUTION

W AND *S* are two small glass crystallizing dishes. *W* is half filled with water and *S* with a strong solution of some salt. *P* is a piece of

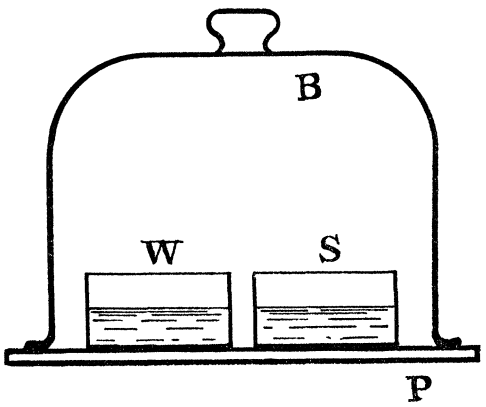

plate glass and *B* is a bell jar. For equilibrium the pressure of the vapor above *S* would have to be less than that above *W*. For this reason the water gradually distills from *W* into *S*.

This result is so obvious that the experiment has no doubt been carried out before. However in a recent brief examination of the literature of the reduction of vapor pressure by solution I have found no reference to it, although Moser[1] clearly indicates the possibility of such an experiment. In his work he used two U tubes, one for the water and one for the solution. One end of each tube was closed, and the open ends were joined—so that with a connection to an air pump these open ends formed a fork. Moser says:

> Das Lumen dieses Gabelrohrs ist eng, ein bis zwei Millimeter, um eine Ueberdestilliren des Dampfes vom Wasser zur Lösung zu erschweren.

In my experiment, which I carried out three years ago, the dishes *W* and *S* were about 5 cm. in diameter and *S* contained a solution of about 1 g. of sodium chloride to each 5 g. of water. Vacuum wax was run around *B* where it rested on *P*, but no attempt was made to reduce the air pressure in *B*. The apparatus stood in a room at ordinary laboratory temperature from January 26 to March 21. At first I set out to examine the rate at which the liquid surfaces changed their levels, but the sides of *B* were not smooth enough to admit of making through them any readings that were worth while. At the start the levels were about the same, and after somewhat less than two months the surface of the solution was 9.0 mm. higher than that of the water.

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SMITH COLLEGE,
January 23, 1915

THE AMERICAN MATHEMATICAL SOCIETY

THE twenty-second annual meeting of the society was held at Columbia University on Monday and Tuesday, December 27–28, 1915. Seventy-two members attended the four sessions. President E. W. Brown occupied the chair, being relieved by Professor Edward Kasner. The following new members were elected: Professor W. E. Edington, University of New Mexico; Professor J. L. Gibson, University of Utah; Dr. W. E. Milne, Bowdoin College; Professor L. J. Reed, University of Maine. Nine ap-

[1] *Wied. An.*, 14, p. 73, 1881.

plications for membership were received for action at the next meeting.

The total membership of the society is now 736, including 72 life members. The total attendance of members at all meetings during the past year was 418; the number of papers read was 197. The number of members attending at least one meeting during the year was 253. At the annual election 204 votes were cast. The treasurer's report shows a balance of $10,470.58, including the life membership fund of $5,560.30. Sales of the Society's publications during the year amounted to $1,832.93. The library now contains about 5,250 volumes.

Sixty members and friends attended the annual dinner of the society on Monday evening.

At the annual election on Tuesday morning the following officers and members of the council were chosen:

Vice-Presidents: E. R. Hedrick and Virgil Snyder.

Secretary: F. N. Cole.

Treasurer: J. H. Tanner.

Librarian: David Eugene Smith.

Committee of Publication: F. N. Cole, Virgil Snyder, and J. W. Young.

Members of the Council to serve until December, 1918: G. A. Bliss, R. D. Carmichael, W. B. Fite, and F. S. Woods.

The following papers were read at this meeting:

J. F. Ritt: "On the derivatives of a function at a point."

J. F. Ritt: "The finite groups of a class of functions of a real variable."

J. E. Rowe: "A new method of deriving the equation of a rational plane curve from its parametric equations."

H. B. Phillips: "Elastic nets."

Arthur Ranum: "The singular points of analytic space curves."

H. M. Sheffer: "The reduction of non-monadic relations to monadic."

H. M. Sheffer: "The elimination of modular existence postulates."

Bessie I. Miller: "A new canonical form of the elliptic integral."

A. R. Schweitzer: "On the use of supernumerary indefinables in the construction of axioms."

Dunham Jackson: "Algebraic properties of self-adjoint systems."

G. D. Birkhoff: "On dynamical systems with two degrees of freedom."

G. D. Birkhoff: "Infinite products of analytic matrices."

Tomlinson Fort: "Linear difference and differential equations."

E. B. Wilson: "Ricci's absolute calculus and its application to the theory of surfaces."

C. L. E. Moore: "Some theorems regarding two-dimensional surfaces in euclidean n-space."

Olive C. Hazlett: "On the fundamental invariants of nilpotent algebras in a small number of units."

Edward Kircher: "Some properties of finite algebras."

M. Fréchet: "On Pierpont's definition of integrals."

Edward Kasner: "Infinite groups of conformal representations."

Joseph Lipka: "Isogonal, natural, and isothermal families of curves on a surface."

L. L. Silverman: "On the consistency and equivalence of certain generalized definitions of a limit of a function of a continuous variable."

L. P. Eisenhart: "Ruled surfaces generated by the motion of an invariable curve."

L. P. Eisenhart: "Transformations of surfaces Ω (second paper)."

G. M. Green: "On rectilinear congruences and nets of curves on a surface."

W. F. Osgood: "The infinite region."

John Eiesland: "On sphere-flat geometry."

J. L. Coolidge: "The meaning of Plücker's numbers for a real curve."

W. M. Smith: "Characterization of the trajectories described by a particle moving under central force varying inversely as the nth power of its distance from the center of force."

H. H. Mitchell: "On the generalized Jacobi-Kummer cyclotomic function."

H. H. Mitchell: "On the congruence $cx^{\lambda} + 1 \equiv dy^{\lambda}$."

R. D. Beetle: "Sets of properties characteristic of the arithmetic and geometric means."

R. L. Moore: "On the foundations of geometry."

W. C. Graustein: "The correspondence of space curves by the transformation of Combescure and by a transformation thereby suggested."

R. E. Gleason: "On Dirichlet's principle."

W. E. Milne: "On the degree of convergence of Birkhoff's series."

G. C. Evans: "A generalization of Bôcher's analysis of harmonic functions."

J. W. Alexander, II.: "On the factoring of plane Cremona transformations."

L. B. Robinson: "On elimination between several polynomials in several variables."

The Chicago Section of the society held its winter meeting at Columbus, Ohio, in affiliation with the American Association for the Advancement of Science. The next meeting of the society will be held at Columbia University on February 26.

F. N. COLE,
Secretary

SOCIETIES AND ACADEMIES

THE BIOLOGICAL SOCIETY OF WASHINGTON

THE 545th meeting of the society was held in the Assembly Hall of the Cosmos Club, Saturday, November 20, 1915, called to order by President Bartsch, with 50 persons present.

On recommendation of the council Leo D. Miner, E. O. Wooten, A. M. Groves, all of Washington, D. C., were elected to active membership.

Under the heading Brief Notes, Mr. Radcliffe called attention to recent efforts of the Bureau of Fisheries in rearing shad in ponds. Young fish thus raised attained twice the size of those of the same age in their natural environment. Specimens of both kinds were exhibited.

The first paper of the regular program was by Frederick Knab, "The Dispersal of Some Species of Flies." Mr. Knab said: "The species of Diptera that have been spread beyond their natural habitats through the agency of man are for the most part such as thrive under conditions created by man, many of them having even become his inseparable associates. They are mostly scavengers whose larvæ thrive in spoiled foodstuffs, sewage and excrement of man or domestic animals. The majority of the flies of such habits occurring in North America are unintentional introductions from Europe. It is certain that many other species of flies must have been carried across the ocean repeatedly and yet failed to establish themselves. It is only those species which upon their arrival find conditions suitable for propagation immediately at hand that can be expected to gain a foothold, and most of these will be scavengers. A few striking examples of the wide dissemination of such species by man were given.

"A notable case is the very wide distribution of *Eristalis tenax,* the drone fly, within very recent times. Its natural habitat was Europe, northern Africa and the temperate portions of Asia. It appears to have been first noted in the United States about 1870 and in the course of a decade had spread over the whole country and become abundant everywhere. Osten Sacken already pointed out that its sudden spread was only possible 'when the necessary conditions for its existence (drains, cesspools, sewers, etc.) had been gradually introduced by civilization across the immense plains which separate the Pacific from the Atlantic Ocean.' Most remarkable is that this fly made its appearance in New Zealand in 1888, where the following year it was abundant in both islands. In America and elsewhere *Eristalis tenax* has not invaded the tropics. In North America it ranges southward on the Mexican tableland to Mexico City and even to Orizaba at the edge of the tropical belt. But in the temperate southern portion of South America it has become established with the recent more general settling up of that region. It was first noted at Buenos Aires about 1895 and is now abundant and generally distributed to the Chilean coast. It has become introduced in Cape Colony and the Hawaiian Islands, the records for the latter going back to 1892. It is also established in southern Australia and appears to have been common about Sydney as early as 1892.

"A second species, *Eristalis arbustorum,* has recently become introduced into the United States from Europe. Like the other, it is a sewage breeder. It was first noticed about New York City in 1906 and has already spread westward through Ohio.

"Another recent importation from Europe is the ortalid fly, *Chrysomyza demandata.* This species breeds particularly in horse manure. It was first found in Philadelphia in 1897 and is now distributed over the whole United States.

"Less known are the species which have become cosmopolitan within the tropics, but do not invade the colder portions of the temperate zone. *Volucella obesa* is a large green syrphid fly of scavenger habits. Its original habitat was tropical America, but now it is generally distributed through the tropics of the Eastern Hemisphere, occurring even on remote islands, like Hawaii and Guam.

"A minute fly of the family Borboridæ, *Leptocera punctipennis* Wied. (*Borborus venalicius* O. S.) is similarly distributed. Osten Sacken, who knew of its occurrence in Africa and Cuba, suggested that it may have been brought to America by slave ships. This theory appears plausible, as it has since been determined that this fly breeds particularly in human feces deposited in the open. During the Spanish-American war it appeared in numbers at Miami, Florida, about the military camp, and where, no doubt, the conditions just indicated