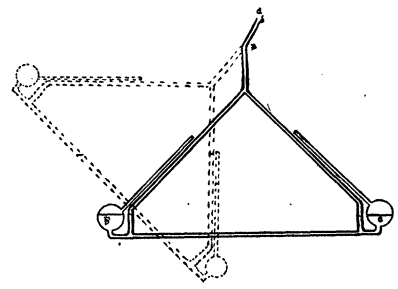
Connection to the system has been found satisfactory in most cases with high-grade vacuum tubing, but connection may also be made with a ground glass joint sealed with mercury.



The advantages of the gauge are that a minimum of mercury is required, less space is taken and perhaps most important there is no exposed surface of mercury.

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SPECIAL ARTICLES

A ROT OF THE SMYRNA FIG IN CALIFORNIA

THE fig was introduced into California with a fair promise of being free from diseases which are so common on other fruits. The promise has faithfully been kept as far as the foliage is concerned, but the fruit is suffering from a number of diseases, the first of which has been early described by N. B. Pierce[1] as "a destructive fermentation of the fruit caused by a yeast," but no further work was done on the trouble.

While the writer, in the fall of 1922, was engaged in preliminary field survey for a study of this fermentation of figs, his attention was drawn by Miss E. H. Phillips, at that time investigating the black smut of figs caused by *Aspergillus niger,* to a particular rot of the fruit of the fig very often found in Calimyrna orchards.[2] The disease has since assumed alarming proportions. The writer has spent the greatest part of his time during the spring, summer and fall of 1923 and 1924 investigating this disease. A preliminary report is considered necessary by the interest aroused in phytopathological circles.

The disease, as far as it is at present known, affects only the fruit of the fig, and while it has been usually confused with souring, it is also known under the names soft rot, pink rot, brown rot, stem end or eye end rot. The symptoms of the disease are not always visible externally, as the disease progresses from the cavity of the fig outwards, the appearance of external symptoms depending on climatic factors and on foci of infection. The external symptoms consist in a more or less extensive watersoaking of the skin accompanied by a more or less bright pink or purple pigment. Such spots may occur principally around the eye or spread on the sides in indefinite areas. The meat and the pulp under such spots are entirely disintegrated, soft and watery, of a yellowish brown color and in many cases of a very offensive putrid odor. The disintegration of the pulp, however, may be found without any external signs whatsoever.

Rotten tissue examined under the microscope is found permeated by a hyaline, frequently branching, septate mycelium of a fungus which can be very easily isolated and which grows luxuriantly on a variety of culture media exhibiting extremely variable cultural characteristics. It fruits abundantly, producing catenulate, short or long, tapering or slightly curved, unicellular conidia on simple or branched conidiophores borne on the sides of the hyphae. The fungus has been tentatively identified as *Oospora verticillioides* Sacc.[3] Numerous inoculation tests have shown that this fungus is the cause of the disease.

A study of the distribution of this disease through the fig belt of California revealed the fact that the fungus is spread throughout the fig-growing sections of California, being found in both the San Joaquin and Sacramento valleys and in Southern California. It was also found that the disease is present only in fruit of the Calimyrna variety, or other caprified figs. The Calimyrna is the chief variety that requires caprification, and this has directed attention to the caprifying insect, *Blastophaga psenes* L. (*Blastophaga grossorum* Grav.). Plates poured from the pulp of the winter crop of Caprifigs (Mamme), showed the presence of the same fungus as well as a red or white bacterium which is also associated with the rot. This bacterium has been tentatively identified as *Bact. prodigiosus,* and while it undoubtedly contributes to the symptoms, it does not produce the disease when inoculated into figs.

An investigation of the flora of caprifigs and edible figs both green and ripe and their succession of crops was then undertaken and the results may be here summarized as follows:

[1] Pierce, N. B., "Investigations of the special agent in California." In Report Sec. Agr. U. S. D. A. 1892: 238. 1893.

[2] The Calimyrna variety is the Lob Indjir Variety of Smyrna grown in California.

[3] Cultures sent to Miss Nellie A. Brown, pathologist, Laboratory of Plant Pathology, U. S. D. A., Washington, D. C., were found producing septate, fusarium-like spores; the fungus has been identified by Dr. Sherbakoff as *Fusarium moniliforme* Sheld.

1. Fruit of parthenocarpic varieties is sterile until the loosening of the scales and the opening of the eye, when they remain sterile unless visited by insects (*Carpophilus hemipterus* L., *Notoxus constrictus* Casey, *Drosophila ampelophaga* Loew., etc.).

2. Fruit of caprified varieties is sterile previous to caprification. Fruit of caprifigs is sterile until caprified.

3. A definite flora, as mentioned previously, has been persistently found in caprified edible figs and caprifigs, irrespective of the kind of the crop (Mamme, Profichi, Mammone.).

4. The spores of the fungus have been obtained from Blastophaga caught under sterile conditions as they were issuing from caprifigs.

A microscopic examination of the wings and other appendages of Blastophaga showed the spores of the fungus lodged in considerable numbers among the spines of the wings, where they germinated under proper conditions. The question then arose as to where the fungus vegetates and where it grows from the time it is introduced into the fig cavity until the signs of the rot begin. Cultural and microscopical examinations of individual gall flowers taken from caprifigs show that the spores of the fungus germinate readily and grow on the stigma and the style of the flowers and on the body of the dead insect until the new generation of Blastophaga is ready to emerge. At that time there are enough spores in the cavity and these adhere to the bodies of the female insects which carry them into the cavity of the edible figs. As a rule, a number of spores are carried on the body of the Blastophaga and are deposited by it on the stigma of the flowers as the insect wanders among them in a vain attempt to oviposit. The spores germinate there and grow slowly on the stigma until the fig begins to ripen and soften. The fungus is then able to invade the tissues rapidly, producing the symptoms described previously. In some cases, when the spores of the fungus are carried on the wings, a dry rot is produced on the eye end of the fig, because usually the wings of the Blastophaga are caught among the scales of the eye. A similar rot results when a number of insects are lodged among these scales in instances of overcaprification, because under these circumstances the fungus is able to grow on the bodies of the Blastophaga until the fig tissues are invaded.

This investigation is a part of the general study of fig diseases carried on in this laboratory under the direction of Professor R. E. Smith.

PANOS D. CALDIS

UNIVERSITY OF CALIFORNIA
LABORATORY OF PLANT PATHOLOGY

THE ROYAL SOCIETY OF CANADA

SECTION V—BIOLOGICAL SCIENCES

THE annual meeting of the Royal Society of Canada was held in Ottawa on May 18, 19, 20 and 21. The following papers were presented in Section V:

Presidential Address

Proteolysis and the structure of proteins: ANDREW HUNTER.

Zoological

Marine wood borers in British Columbia waters: C. MCLEAN FRASER.

The histology of the "colon" and its contained spiral valve of the Pacific dogfish (Squalus sucklii) with an investigation of the phylogeny of intestinal valves: A. R. FEE (presented by C. McLean Fraser).

Observations on the spruce budworm, Cacoecia fumiferana Clem: ARTHUR GIBSON.

The Ephemeroptera of Covey Hill, Quebec: J. MCDUNNOUGH (presented by Arthur Gibson).

Revision of the American species of the Tachinid Genus Peleteria (Diptera): C. H. CURRAN (presented by Arthur Gibson).

A preliminary revision of some Charopsinae, a subfamily of Ichneumonoidea of Ichneumon flies: HENRY L. VIERECK (presented by Arthur Gibson).

Losses in trout fry after distribution in streams: A. P. KNIGHT and H. C. WHITE (presented by A. P. Knight).

A preliminary study of the respiratory exchange in Grylloblatta campodeiformis E. Walker: NORMA FORD (presented by E. Walker).

Northern Cyclopidae and Canthocaptidae: ARTHUR WILLEY.

A new gill-parasite of pike-perches in northern lakes: JEAN T. HENDERSON (presented by Arthur Willey).

Medical

The action of Collip's parathyroid extract on blood and cerebrospinal fluid calcium: A. T. CAMERON and V. H. K. MOOREHOUSE.

Note on the action of parathyroid extracts on Guanidine: F. D. WHITE and A. T. CAMERON.

A note on tetany in thyroid-fed rats and the supposed antagonism between thymus and parathyroid: A. T. CAMERON and J. CARMICHAEL.

The excretion of water and of gas by frogs submerged in water: A. T. CAMERON and D. ROY MCCULLAGH.

The cranio-facial axis of Huxley: JOHN CAMERON.

Skin susceptibility to toxic filtrates of S. Haemolyticus in convalescents, actively immunized and normal individuals: D. T. FRASER and A. H. GRAHAM (presented by J. G. Fitzgerald).

Some factors concerned in the preparation of diphtheria toxoid: P. J. MOLONEY and C. B. WELD (presented by J. G. Fitzgerald).

The Ramon test. Diphtheria toxin—antitoxin—flocculation: P. J. MOLONEY and C. B. WELD (presented by J. G. Fitzgerald).

Some chemical properties of diphtheria toxoid: P. J.