the vexing uncertainties of microtome methods, with which we are all too familiar.

3. *The great saving of time* in arriving at results, because of the elimination of the processes involved in imbedding and sectioning the material.

It may here be stated that a preliminary examination of the pollen mother-cells and of cells secured by needle dissection is greatly aided by the use of a concentrated solution of chloralhydrate, 8 parts of chloralhydrate to 5 of distilled water. This is far better for general use than phenol, eau-de-Javelle and similar clarifying reagents. It will enable the worker to tell at once if the cells under observation are in that particular stage of karyokinesis that it is desired to secure, as the spindles and chromosomes are rendered sufficiently visible to determine the mitotic stage. The regular treatment above described can then be carried out.

The writer would be thankful to hear from any members of the society who, upon investigating the foregoing suggestions, have adverse criticisms to offer or suggestions of improvement to make.[1]

ALBERT MANN
OFFICE OF AGRICULTURAL TECHNOLOGY,
U. S. DEPARTMENT OF AGRICULTURE,
WASHINGTON, D. C.,
December 15, 1911

RESULTS OF PURE CULTURE STUDIES ON PHYLLOSTICTA PIRINA SACC.[1]

IN the summer of 1911 a study of *Phyllosticta* in connection with the frog-eye leaf spot of apples was begun at the Virginia Experiment Station under the direction of Dr. H. S. Reed. Four distinctly different types of *Ph. pirina* were isolated from leaves collected at Blacksburg, Va., by the poured plate method. The different types are possibly elementary species in the De Vriesian sense of the term or pure lines according to Johannsen's use of the term, but will be called strains in this preliminary report.

Microscopically there is much similarity in these strains, except in Nos. 1 and 4 where chlamydospores are produced. The conidia of all four are identical in all characters and the mycelium of only one can be told from the others. The conidia are one-celled, elliptical, hyaline, sometimes with two oil drops. When grown on the same medium no difference in size is noted. On apple leaf agar these spores measure on the average 2.2 × 4.8 microns. The manner of pycnidia and conidia production is the same with all strains.

The macroscopic characters are quite different and any strain may be easily recognized in pure culture. For the sake of convenience these strains have been numbered 1, 2, 3 and 4. So far they have been grown on only three media, viz., apple leaf agar, apple fruit agar and synthetic agar made according to the following formula:

NH_4NO_3	10.0 g.
K_2HPO_4	5.0 g.
$MgSO_3$	2.5 g.
Cane sugar	50.0 g.
Agar agar	20.0 g.
H_2O	1,000 c.c.

Descriptions of test-tube cultures of these four strains of *Ph. pirina* on the three media used and some microscopic features follow:

STRAIN NO. 1

Apple Leaf Agar.—Growth diffuse; mycelium brownish in mass; aerial hyphæ short, snow white, sparse except at top and sides of slant or sometimes in patches on surface of culture; pycnidia small, very dark brown to

[1] Before presenting the above paper I tried to find if a description of this method had been previously published, but could find no trace of it. Since the meeting of the association I find that Professor E. H. Campbell describes a similar process in *Bull. Torrey Bot. Club*, Vol. 17, p. 117. As, however, Professor Campbell's article does not agree in technic with my own, and as it is also evident that this desirable process is not widely used, I think it desirable to publish the paper together with this reference.

[1] Paper No. 17 from Laboratory of Plant Pathology, Virginia Agricultural Experiment Station.

black, erumpent, produced at random mostly near line of streak.

Apple Fruit Agar.—Growth very abundant; aerial mycelium growing in very dense, greenish gray patches in center and whitish around edges of culture; pycnidia black, small, abundant, produced mostly along line of streak.

Synthetic Agar.—Growth very thick and somewhat stromatic along middle; greenish-black and white on surface, usually with the white in the central part of the culture with a greenish-black band around it. Surface becoming black all over with age.

Microscopic Features.—Conidia, mycelium, pycnidia typical. Large numbers of one-celled, black chlamydospores produced on mycelium by simple swelling and thickening of certain cells. These chlamydospores have germinated after six months' drying in the laboratory and produced typical colonies of the fungus again. These spores are thick-walled and resistant and no doubt aid in tiding the fungus over unfavorable conditions.

STRAIN NO. 2

Apple Leaf Agar.—Growth diffuse; mycelium very light brown in mass; aerial mycelium practically none; pycnidia extremely abundant, produced usually over the whole surface of the culture with a distinct concentric ring formation even in tube cultures. Sometimes the pycnidia are produced so thick and close along the line of streak that they form a well-marked black line. Conidia ooze out in distinctly pink masses. This character alone serves to distinguish No. 2 from the others. This strain is a very prolific spore producer.

Apple Fruit Agar.—Diffuse; numerous pycnidia mostly in a wide strip along line of streak with a few scattered ones at base of slant. Aerial hyphæ short, gray all over the surface of culture. Spore masses pink.

Synthetic Agar.—Diffuse; pink; with long, fluffy, pinkish-white aerial mycelium covering surface of culture and growing up on sides of tube. In some of the tubes this aerial mycelium has a bright-green cast at apex and base of culture. Pink pycnidia very abundant all over the surface and some even produced up on the sides of the tube above the agar. A decided tendency to concentric rings is noted.

Microscopic Features.—Conidia, mycelium, pycnidia typical. No chlamydospores.

STRAIN NO. 3

Apple Leaf Agar.—Diffuse; mycelium dark brown in mass; aerial hyphæ gray, matted together, rather abundant over most of the surface. Pycnidia abundant, very small, black, erumpent, quite evenly distributed over the surface of the culture with some tendency to concentricity of arrangement. Agar turning quite black throughout.

Apple Fruit Agar.—Very diffuse but shallow. Surface covered all over with a dense growth of long, greenish-gray aerial mycelium. By holding to light the numerous black pycnidia can be seen through the aerial mycelium arranged in concentric rings.

Synthetic Agar.—Growth abundant; surface covered with a pink mycelial mass; aerial hyphæ very short, pink. Pycnidia inconspicuous.

Microscopic Features.—Same as No. 2.

STRAIN NO. 4

Apple Leaf Agar.—Diffuse; mycelium in mass very dark; aerial mycelium abundant, gray, quite dense. Pycnidia minute, black, abundant, evenly distributed, inconspicuous. Distinct concentric rings have been noticed, due to difference in color of different zones of the mycelium.

Apple Fruit Agar.—A very dense growth of short, greenish-gray aerial mycelium forming a mat over surface. Pycnidia very abundant, minute, inconspicuous, black, evenly distributed.

Synthetic Agar.—Dense stroma-like mass, greenish-yellow on surface. In some tubes the green is very pronounced around the edges, while yellow predominates in the center. Pycnidia inconspicuous.

Microscopic Features.—Mycelium rather larger than in other strains and noticeably

darker, with a few one- to several-celled, dark brown to black chlamydospores.

The above descriptions will serve to distinguish these strains readily. Details of morphology and results of more culture work will be reported later. Since these four strains were so easily obtained last summer it is very likely that more strains may be isolated by extending the work and the field. This difference in strains of *Ph. pirina* may account for the fact that investigators disagree as to the parasitism of *Phyllosticta*. They may have worked with different strains, some of which may be parasitic, while others are purely saprophytic or, at most, facultative parasites. Inoculation experiments to throw further light on this phase of the subject are now under way and results will be reported in a later publication.

C. H. CRABILL

BLACKSBURG, VA.,
May 1, 1912

THE NORTH CAROLINA ACADEMY OF SCIENCE

THE eleventh annual meeting of the North Carolina Academy of Science was held at the University of North Carolina, Chapel Hill, on Friday and Saturday, April 26 and 27, 1912.

The meeting of the executive committee, held early in the afternoon of the first day, was followed by a general meeting for the reading of papers. At the night session the academy was welcomed to Chapel Hill by President Venable, of the university, and then President H. V. Wilson, of the academy, delivered his presidential address, "Zoology in America before the Present Period." Next Professor A. H. Patterson gave a demonstration of luminous electric waves. Then by invitation Dr. Thos. W. Pritchard read a paper, "Wood Distillation," descriptive of the fitting up and working of a plant at Wilmington, N. C., for the utilization of waste pine wood. At the same hour Dr. W. S. Rankin, secretary of the state board of health, delivered a lecture on hygiene and sanitation before the student body of the university in Gerrard Hall.

Adjournment was then had to the hospitable home of Dr. Isaac H. Manning, where a smoker was given the members of the academy by the local members.

On Saturday morning at 9 A.M. the academy convened in annual business meeting. Reports were made by the secretary-treasurer and by the several stated committees. Five new members were elected. These with the 85 members on the roll on January 1 give a total membership of 90. The report of the secretary-treasurer showed that in membership, in interest shown in its work and in its finances, the academy has never been in better condition.

The following officers were elected for the ensuing year:

President—C. S. Brimley, Raleigh.

Vice-president—John F. Lanneau, Wake Forest College, Wake Forest.

Secretary-treasurer—E. W. Gudger, State Normal College, Greensboro.

Additional Members of Executive Committee—Julian Blanchard, Trinity College, Durham; S. C. Clapp, State Department of Agriculture, Raleigh; John A. Ferrell, State Board of Health, Raleigh.

At 9:30 the academy and the North Carolina Section of the American Chemical Society held a joint meeting, at which Dr. J. E. Mills, of Columbia, S. C., presented a report on "Molecular Attraction and Gravitation." Following this the reading of papers on the program of the academy was resumed.

The total attendance was 31 out of a membership of 90. In addition to the special papers already noted, there were 29 numbers on the program. Of these four were read by title, the other 25 were given in order when called for. Two things characterized the meeting. First the number of papers dealing with hygiene, sanitation and public health; and second the discussion which followed the presentation of nearly every paper.

In addition to the presidential address and other papers previously noted, the following were presented:

Notes on the Distribution of the More Common Bivalves of Beaufort, N. C.: HENRY D. ALLER, Director U. S. Fisheries Laboratory, Beaufort, N. C.

Of the approximately 90 species of bivalves found in the vicinity of the U. S. Fisheries Laboratory at Beaufort, N. C., 39 are considered in this paper. Since those found sparingly and those dredged in deeper water offshore, or those represented by valves cast up on the beach, are not available for scientific purposes, only the more common forms are dealt with. It is the purpose