the present study fragments were used for testing immediately after cutting. After staining, the micronucleus or part of the macronucleus could easily be detected if present in the fragment used, since the micronucleus in this species (especially in the two races used in the present investigation) is large and conspicuous. Apparently each clone of *P. bursaria* retains permanently its characteristic mating type.[2] This permanence of mating type affords uniform and constant material for study. In this species the animals show a tendency to creep slowly over the bottom of the container, a behavior which facilitates cutting with a glass needle to such an extent that large numbers of fragments may be obtained.

Two races of *P. bursaria* (*Gr14* and McD_3) belonging to two different mating types were used in the present investigation. Each of the two races has a single, large, deeply staining micronucleus. After a definite mating reaction had been observed, the fragments were fixed and stained to determine whether the micronucleus or part of the macronucleus was present.

Enucleate fragments of either mating type were found to give the normal mating reaction with whole animals of the other mating type. Mating reaction between enucleate fragments and whole animals seems to be identical with that between whole animals. Control experiments showed that fragments never agglutinate with whole animals of the same mating type.

The mating reaction also occurs between two enucleate fragments belonging to two different mating types. Control experiments showed that the mating reaction never occurs between enucleate fragments of the same mating type. Thus the cytoplasm alone (in the absence of the nuclei) exhibits the reactivity and diversity of mating type. Of course this reactivity may be due to the retention of influence of the nuclei which have just been removed.

Further investigations are projected, and the findings here noted will be presented in detail later.

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

A METHOD OF SUBSTITUTING PINE SAPWOOD FOR MALT AGAR IN CULTURING TEST FUNGI

THE method described in this article is the result of experiments made in an effort to substitute pine sapwood for malt agar medium in testing the toxicity of preservatives in wood. The results obtained by the use of Ponderosa pine sapwood as a medium for growing the wood-rotting and sap-staining fungi used in the method were so consistently favorable and the reduction in time as well as the low-cost of materials proved so encouraging that it was believed of interest to present the method to other workers for trial and comment.

The containers used are half-gallon, square, wide-mouth Kerr jars, fitted with metal, self-sealing screw caps. Two pieces of Ponderosa pine sapwood, $\frac{1}{4}$ inch thick, $2\frac{3}{4}$ inches wide and $6\frac{7}{8}$ inches long, are placed on a grooved piece of pine sapwood in such a manner as to form a V-shaped trough when the jar is placed on its side. The grooved piece is $\frac{5}{8}$ inch thick, $1\frac{3}{8}$ inches wide and $6\frac{7}{8}$ inches long, with the groove about $\frac{7}{8}$ inch wide and $\frac{1}{4}$ inch deep (see Fig. 1). At the bottom of the V is placed a length of glass tubing $6\frac{3}{4}$ inches long and about $\frac{3}{8}$ inch in outside diameter. The pine test pieces, $\frac{1}{4} \times 1\frac{1}{2} \times 2$ inches in size, rest with the $\frac{1}{4} \times 1\frac{1}{2}$ inch edge on the glass tubing, to prevent contact between the two rows of test pieces.

The wood pieces and the glass tube are placed in position in the jar and sufficient water added (about 100 cc) to equal the weight of the three wood pieces. A pad of cotton is placed in the metal cap, which is loosely screwed to the jar. The jar and contents can then be sterilized. After sterilizing and cooling the jars and contents, the test fungus inoculum can be placed at various points over the surfaces of the two

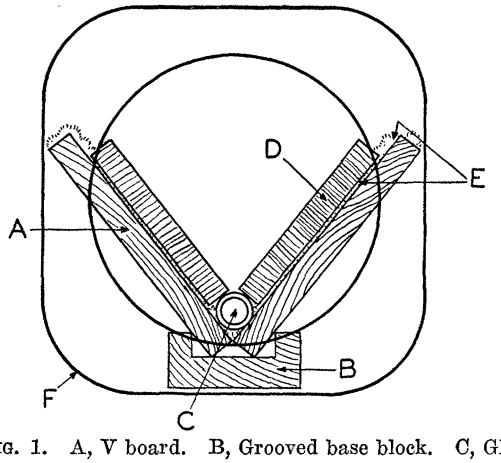

FIG. 1. A, V board. B, Grooved base block. C, Glass tubing. D, Test block. E, Fungus mat. F, Square half-gallon fruit jar.

V boards. Three to six individual inocula to each board serve to cover it with a vigorous growth in from 10 to 15 days. The decay-producing fungus *Lenzites trabea* and the various stain fungi isolated from window sash thrive on this medium. When thicker V boards are used, care must be taken to prevent too high a moisture content in the wood.

[2] See H. S. Jennings, *Genetics*, 24: 202–233, 1939.

After the required growth has been reached, the test pieces are moistened by adding a known amount of sterile water to each one by means of a sterilized pipette. The pieces are then placed in position over the glass tube with one of the $1\frac{1}{2} \times 2$ inch faces in contact with the fungus mat. From 8 to 10 test pieces can be placed in a jar at one time. With care in preventing contamination of the cultures, they can be used over again as soon as the vigor of the fungus is renewed on the V boards.

The method provides a much greater capacity for test pieces than does the Kolle flask and the jars are easily prepared and cleaned. The preparation and sterilization of agar media is eliminated with considerable saving in cost. By growing on their natural substrate, wood, the test fungi maintain their vigor and can be used over again in the cultural jars so long as they remain contamination free and show vigorous growth. The moisture requirements are easily met, as the cultures grow older, by adding sterilized water to the wood medium or to the bottom of the jar.

For preliminary tests of new toxicants in wood, for testing sections cut from treated millwork or other wood products to determine the effectiveness of the preservative treatment, and for testing the relative resistance of various species of wood to decay, this method has proved of real value.

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FILING PHOTOGRAPHIC COPIES OF ARTICLES

IN view of the recent article by Harold P. Brown and James A. Austin in SCIENCE, December 15, 1939, a few notes on the methods developed by this library during the past year for filing photographic copies of original literature articles may be of interest.

Our library is the main library devoted largely to industrial chemical research for a medium size corporation. In building up photographic files, our policy has been to get photostat copies of articles under five pages and film copies of the longer ones. In the files, we have found that it is more convenient to interfile the films and photostats as a skeleton journal file—alphabetically by journal and then chronologically. This is expansible to almost any degree and eliminates extensive cataloguing, since *Chemical Abstracts* serves as a useful index. In the future, the abstract in *Chemical Abstracts* will be stamped "Filed" in the margin to show that a copy of the article is available in our library.

We have found, as did Brown and Austin, that the majority of technical articles are comparatively short, and the following scheme was devised for film strips: Correspondence size manila folders were lined with lengthwise stitched (and backstitched one half inch to eliminate ripping) pockets of good quality rag paper, 5 pockets to each side of the folder, or 10 pockets in all—giving an average storage capacity for each folder of the equivalent of 110 pages of magazine or book material when 35 mm film is used. Since the use of paper for the pockets eliminates the necessity of separate labels; identification may be made directly on each pocket. If articles need to be cut to fit the folder length, identification (if not already on each strip of film as order blank duplication) is marked with India ink on the leader strip, as well as on the pocket.

An illuminated hand viewer is almost a necessity in identifying film strips which are ready for filing or for rapid location of data in tables, when only one or two figures are wanted. Also we have found that a small movable table for the reading machine simplifies the problem of use. It is ordinarily kept near the desk of the bibliographer where it can be used for reading or placed directly behind the typewriter to copy data.

ELMA T. EVANS
R. MAX GOEPP, JR.

ATLAS POWDER COMPANY

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