

## A PENICILLIUM "DISEASE" OF INK

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The damaged soap wrappers on which the present study is based were sent to us by Mr. R. H. Griffith of the In-Tag Company who has given us permission to publish our findings.

The blemishes consisted of pale reddish-brown spots which had developed in storage on the blue portions of the wrappers of a well known white soap. The spots were regular in outline, of varying size, and occurred only on the blue portion of the wrappers. The reddish areas did not extend through the thickness of the paper but were restricted to the fibers covered by the ink. Cultures from the discolored fibers resulted uniformly in the isolation of a species of *Penicillium* not yet positively identified.

The fungus was cultured on a wide variety of media on all of which growth was very slow. At the end of one month at room temperatures, colonies never exceeded an inch and were usually one-half inch in diameter.

Samples of the dye, ultra-marine blue, and ink used in printing the wrappers were supplied by Mr. Griffith. The dye dispersed in the various media was decolorized by the growth of the fungus. This is in all probability due to the change in the pH of the medium result-

ing from the growth of the fungus. The dye is sensitive to acids and loses its blue color as the pH is lowered. The fungus was cultured in a liquid medium which contained  $\text{KH}_2\text{PO}_4$  0.3g.,  $\text{MgSO}_4$  0.25g.,  $\text{KNO}_3$  2.0g., dextrose 30.0g., and water to make a liter and determinations of the pH were made at various intervals. At the end of two weeks the pH was lowered from 5 to 3.8 and further lowered to 3.2 after four weeks growth.

The ink, smeared over the surface of agar and on strips of filter paper laid over the agar, was changed to a pale reddish-brown color closely matching that on the wrappers when the fungus was cultured beside it. Other fungi present as contaminants in some cultures failed to cause the color change. Attempts to produce the reddish color found on the wrappers on plain filter paper were unsuccessful. That the reaction involved in causing the reddish spots may be more complex than an acid-base reaction is indicated by the fact that the fungus when grown in contact with the dye alone will not produce the reddish color. Some constituent of the ink other than the dye apparently must be present in order to obtain the color found on the affected soap wrappers.