influences shown by the spores on germination. Not only will they germinate and live for some time in water, and under almost anaërobic conditions, but he found them germinating in 26.5 per cent. solutions of common salt; 30 per cent. solutions were too much for them, however. He states also that the vapours of cedar-oil, iodoform, naphthalin, camphor, and patchouli do not prevent germination; though those of clove-oil, ether, alcohol, chloroform, and acetic acid prevent it. The maximum for alcohol was somewhere between 4.2 and 6.2 per cent. In acetic acid they germinated in twenty-four days in solutions of 1:256, but failed to do so in solutions of 1:64, whereas in HCl they germinated in two days in 1:4 solutions.

As regards temperatures, it is well known how resistant the spores are. A striking instance of the hardships the mycelium can undergo is given by Woronin¹: he found *Penicillium* vegetating on the melting snow, where the temperature at night fell below 0° C.

Bourquelot² found invertase, maltase, trehalase, emulsin, inulase, diastase, and trypsin in the allied *Aspergillus*, and pointed out how suggestive this is in explaining the ubiquity of this mould. Probably *Penicillium* is equally rich in capacity for enzyme-production.

Miyoshi³ showed that *Penicillium* can bore through cellulose

mycelium at the growing-points of the flower shoots, and in such sections the mycelium, at first intercellular, could readily be found becoming intracellular and of much greater diameter. Branches became very numerous, and in the hyphae and branches spores were formed. Towards the central parts spore-clusters were too dense for examination, but nearer the epidermis the branching and arrangement of the sporogenous hyphae could more easily be made out; and the teasing of the lateral flowers of each notch of the rachis was often more successful than if the central—and *only* flower of the ordinary ear—were taken. Sections were mounted in water, and some in 1 per cent. KOH, and it is but fair to say that such treatment has failed to show any septation of the hyphae as a preliminary to spore-formation. Material for microtome-sections was prepared as follows:—The leaves of a barley-shoot were stripped down so as to expose the apparently highest node, and the part an inch or two above this was cut off; then by a series of successively lower horizontal cuts the youngest leaves were removed until in the space they enclosed the tips of the awns or ear were seen; then a cut was made through the node, and the removed ear was placed in Flemming's or Rath's solution for fixing, the ear thus being, for a very few seconds only, between plant and reagent.

If a smutted ear be removed and kept floating on water, its spores continue to develop, and in several cases they matured first in the awn. It was by no means uncommon, on teasing out young fruits from such an ear, to find that the spores had germinated.

I have not yet made similar observations for *Tilletia* as my bunted wheat was less forward than my smutted barley, but I am satisfied that by this method of working class material for illustrating Bunt and Smut may easily be obtained.

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STRUCTURE OF THE YEAST-CELL.—A study of the cells of *Saccharomyces Cerevisiae* has led me to the following conclusions, part of which merely confirm former researches: (1) A relatively large nuclear body exists in each adult cell. (2) Young cells contain no such body; a little later the old nuclear body divides, and one of its two daughters wanders through the narrow connecting-channel into the young cell. (3) After the division is complete, the two cells are still kept together by a mucilaginous neck-shaped pedicel, which

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