days, virtually all the zygospores have produced four or eight zoospores.

The limits of the period of initial illumination, i, are set on one hand by the process of gamete fusion, which only proceeds in the light (no zygospores are formed unless i exceeds 14–18 hr.), and on the other by the formation of thick-walled 'resting' zygospores (which appear if i exceeds 26–30 hr.). Within these limits, it is found that lower values of i promote earlier germination, producing four zoospores; but the zygotes are smaller, and viability of the zoospores is reduced. Conversely, with increasing values of i (exceeding 22 hours), the proportion of zygotes producing eight zoospores increases from 0 per cent to as high as 95 per cent. For the purposes of tetrad analysis, four zoospores would usually be preferable.

If, during the period of darkness, the zygotes are subjected to higher temperatures (25° or 30° C.), germination is delayed; but otherwise the course of events is similar to that outlined above.

The 'breaking' of dormancy, however, has not been achieved. Zygospores matured in continuous light for three days or longer have so far resisted all attempts to induce regular germination.

Investigations on *Chlamydomonas* are being carried out during tenure of a Sheffield fellowship.

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Effect of Ethyl Alcohol and Carbon Dioxide on the Sporulation of Bakers' Yeast

THE sporulation of a strain of *Saccharomyces cerevisiæ*, carefully maintained true to type as a commercial baking yeast, has varied in 5–50 per cent of the cells under apparently the same conditions; namely, on slants of 'Difco' nutrient agar at *p*H 7·3 incubated for three days at 30° C. Investigation showed that if fermenting liquids happened to be in the same incubator, the ethyl alcohol and carbon dioxide formed by them had an adverse effect on sporulation, and this effect could be reproduced by the vapour from aqueous ethyl alcohol solutions, or by mixtures of carbon dioxide and air. In the case of aqueous alcohol vapour, the reduction in sporulation was accompanied by a marked increase in yeast growth due, presumably, to the utilization of alcohol as a source of carbon. Carbon dioxide and air mixtures, however, caused only a slight increase in yeast growth although sporulation was apparently inhibited.

It is therefore suggested that when spores are required, particularly in yeasts that do not sporulate readily, alcohol vapour and carbon dioxide should be avoided.

It is hoped to publish further details of this work and other facts relative to the sporulation of yeasts at a later date.

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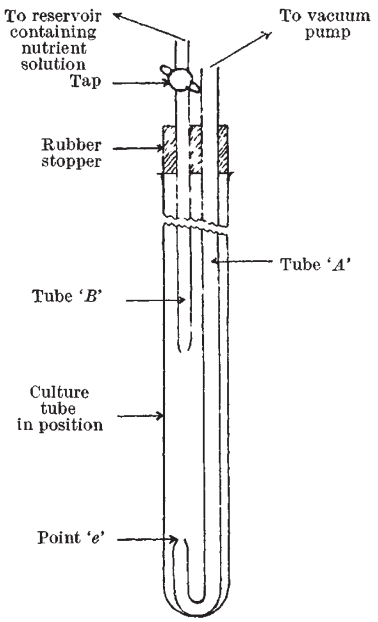
Automatic Measuring Burette

INVESTIGATIONS on plant tissue culture methods in this laboratory have entailed the weekly use of several hundreds of standard culture tubes (150 mm. × 25 mm.) each charged with 10 c.c. of nutrient solution. In view of the large number of tubes in use, need was felt for a rapid and accurate means of charging them with the required volume of liquid. With this in mind the following simple apparatus was designed.

The essential part of the apparatus is a glass tube, A (see diagram), of internal diameter approximately 5 mm., the lower end of which is bent to form a U-tube: the end of the short arm, e, is drawn out to a point. The other end of tube A is connected to a vacuum pump. Tube B is connected to a reservoir containing nutrient solution, flow of which is controlled by a tap or clip. Both tubes are held in position by a rubber stopper, the position of which is so adjusted that, during filling, the lower surface of the U-tube rests on the bottom of the culture vessel. The whole assembly may be conveniently held in a retort-stand clamp.



The working principle of the apparatus is as follows: a culture tube is placed in position and liquid is run in via tube B; the level of the liquid rises until it reaches the top of the short arm e, when any surplus is drawn off via tube A. It is the height of e which predetermines the volume of liquid remaining in the culture tube (assuming a fairly high degree of uniformity in the culture vessels in use).

When calibrating the apparatus, due allowance must be made for the displacement volume of the U-tube. The required volume of liquid is first accurately measured out into the culture tube with a pipette; the U-tube assembly is then lowered into the liquid, the level of which is noted; finally, the short arm of the U-tube is cut to such a length that, when re-immersed, point e coincides with the surface of the liquid.