type" as described for the genera Hiptage, Banisteria, Stigmatophyllum, Malpighia and Bunchosia. The mature embryo-sacs are sixteen nucleate with four groups of three nuclei with no definite organisation into the egg and synergids; and four nuclei fuse in the centre to form the secondary nucleus. The plants do not set seeds here.

The embryo-sac of *Malpighia glauca* develops after the "Allium-type" (Scilla-type) as described by Stenar for *Galphimia gracilis*. The primary archesporial cell after cutting off parietal cells functions at the megaspore-mother cell. Multiple archesporium has not been observed. The mother cell by the heterotypic division gives rise to two approximately equal cells (Fig. 8). The chalazal enlarges and the micropylar degenerates. The nucleus of the chalazal cell divides to give rise to a two-nucleate embryo-sac which ultimately develops into an eight-nucleate one (Figs. 10 & 11). Of the four nuclei in the micropylar end, three organise themselves into the egg-apparatus and the fourth fuses with a nucleus of the chalazal end and forms the secondary nucleus. The antipodals are fairly large and degenerate by the time the fusion of the polars is complete.

Further work on the development of the embryos is in progress and the details will appear elsewhere as a separate paper.

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Growth of *Pythium hyphalosticton* Sideris in Synthetic Nutrient Liquid Media

Robbins and Kavanagh[1] reported that *Pythium hyphalosticton* and *Pythium aphanidermatum* (Eds.) Fitz., (*P. Butleri*) failed to grow uniformly in their medium C consisting of 5·0 gm. of $MgSo_4 \cdot 7H_2O$, 15·0 gm. of KH_2PO_4, 5·0 gm. of asparagine, 0·5 gm. of NH_4NO_3, 50·0 gm. of dextrose and 1 c.c. of mineral supplements per litre of redistilled water, either with or without the addition of vitamin B_1. This medium had a pH of 4·3. They write (p. 231), "We are uncertain whether the failure of these organisms to develop was due to unsatisfactory material used in the inoculation, to the unfavourable character of the basic medium (hydrion concentration, solute concentration), or to lack of growth substances other than vitamin B_1".

The culture of *Pythium hyphalosticton* Sideris, which is with the author, was obtained from Centraalbureau voor Schimmelcultures, Baarn (Holland). Several nutrient liquid media (10 c.c. in pyrex tubes) were tried. The asparagine was taken up in redistilled water and precipitated with alcohol. This process was repeated thrice. Stock cultures were maintained on oatmeal agar and potato dextrose agar. A bit of mycelium was used as inoculum, care being taken to avoid including any of the agar of the stock cultures with the inoculum, and each tube, after inoculation, was gently shaken the next day to allow the inoculum to sink down in the nutrient solution. The standard incubation was at 25° C. for seven days. At the end of this period cultures were examined microscopically. All experiments were performed in triplicate and all experiments were repeated. Guaranteed reagents of Merck & Co., were used. The hydrion concentrations were determined after autoclaving.

I Series:

Solution A: It contained 0.5 gm. each of K_2HPO_4, $MgCl_2 \cdot 6H_2O$, K_2SO_4, 2·0 mg. of NH_4NO_3 and 5·0 gm. of dextrose per litre of distilled water.

This solution was inoculated with *Phytophthora erythroseptica* Pethybridge,[2] *Phycomyces Blackesleeanus* Burgeff (+ strain), *Phytophthora fagopyri* Takimoto and *Mucor Ramannianus* Möller,[3] but there was no growth of these in any case, indicating that the medium was free from thiamin, pyrimidine and thiazole.

Solution B: It contained 0·1 gm. each of K_2HPO_4, $MgCl_2 \cdot 6H_2O$, K_2SO_4, 0·8 gm. of NH_4NO_3 and 1·0 gm. of dextrose per litre of distilled water.

The pH of solutions A and B was 6·8.

The author finds that *Pythium hyphalosticton* grows well in solution A and also in a dilute solution, i.e., B and is transferable in them.

In view of the fact that the fungus grows in the nutrient solution free from vitamin B_1 the author thinks that it is one of those fungi, which do not require any organic growth supplement from extraneous sources but manufacture their own growth-promoting substance or substances from the elementary materials of the nutrient medium. There are indications that thiamin or its intermediates synthesized by the fungus are given off by the mycelium into the medium. These results, which require further verifications, will be published in a subsequent note.

Pythium hyphalosticton resembles *Pythium aphanidermatum*[4,5] and many other fungi in its ability to grow in a suitable synthetic liquid solution, which lacks any organic growth supplement.

II Series:

Solution C: This was medium C used by Robbins and Kavanagh. Its composition is given in the beginning of this note. Its pH was 4·3.

Solution D: This was made by diluting solution C five times (*i.e.*, 100 c.c. of solution C + 400 c.c. of redistilled water). Its pH was 4·5.

Solution E: This was prepared by diluting solution C ten times. Its pH was 4·75.

Solution F: This was prepared by adding sufficient quantity of K_2HPO_4 to solution C to make its reaction pH 5·3.

Solution G: This was prepared by diluting solution F five times. Its pH was 5·5.

Solution H: This was prepared by diluting solution F ten times. Its pH was about 5·6.

In solution C the organism did not grow at all, while in solution F it made no appreciable growth. In solutions D, E, G and H there was very good growth of the fungus, the colonies of which rose up to about 5 cm. in height in tubes and formed thick mycelial felts on the surface of the nutrient liquids, and in these it was transferable.

It has already been demonstrated that the fungus can grow in suitable synthetic solution without any organic growth supplement from an extraneous source. Therefore, its inability to grow in solutions C and F cannot be due to lack of some growth supplement, or to lack of some nutrient ingredients since it grows in them when they are diluted five or ten times. The experiments demonstrate that the concentration of solutions C and F interferes with the growth.

Robbins and Kavanagh have obtained similar results with *Pythium aphanidermatum*, which is also capable of unlimited growth when the solutions, used by them, are diluted.

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January 26, 1939.

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Insecticidal Plants

With reference to the note on "Insecticidal Plants" appearing in *Current Science*,[1] we write to say that work in this direction and more especially with Derris, *Derris ferruginea*, Pyrethrum, *Chrysanthemum Cinærariefolium* and *Tephrosia* spp., is in progress at our Institute