Mycological Notes (9).

Macrophomina Phaseoli (Maubl.) Ashby. The Pycnidial Stage of *Rhizoctonia bataticola* (Taub.) Butler.

J. C. HAIGH, B.Sc., A.R.C.S., A.I.C.T.A.,

Assistant Mycologist.

IN a recent number of the *Tropical Agriculturist* (3) Small recorded the occurrence of a stem blight of beans (*Phaseolus vulgaris*) caused by *Macrophoma phaseoli* (Maubl.) which has recently been renamed *Macrophomina phaseoli* (Maubl.) comb. nov. by Ashby (1) as a result of examination of forms from various parts of the world. This is the first occurrence in Ceylon of a fungus which, as the pycnidial form of *Rhizoctonia bataticola*, may play a considerable part in the incidence of root disease of plants of economic importance.

The pycnidia have been recorded at various times from 1905 onwards in association with stem diseases of jute, gingelly (*Sesamum indicum*), pigeon pea and beans, and in three of these hosts (pigeon pea alone excepted) minute black sclerotia were found in association with the pycnidia. When cultured, both sclerotia and pycnospores develop *Rhizoctonia bataticola* and reinoculation with sclerotia of *Rhizoctonia bataticola* has produced typical stem disease with the development of pycnidia and sclerotia. Pure cultures of *Rhizoctonia bataticola* from hosts on which pycnidia have not been found have been inoculated into jute (2), and have produced pycnidia which have again given *Rhizoctonia bataticola* in culture. There is therefore no doubt that *Macrophomina phaseoli* and *Rhizoctonia bataticola* are forms of the same fungus, but they do not necessarily occur together. The Ceylon list of hosts of *Rhizoctonia bataticola* has now reached 44 genera, but only on beans has *Macrophomina phaseoli* been found in this island. Conversely, *Macrophomina* has been recorded in the pycnidial form only on fruits of *Sesamum*, leaves of *Corchorus* and *Vigna*, and stems of *Cajanus* and bean (1).

One essential for the successful control of a fungus is a knowledge of its mode of spread, and in the case of *Rhizoctonia bataticola* that knowledge is at present lacking. The nature and method of growth of the fungus render it extremely unlikely that it spreads by actual mycelial growth, as does, for example, *Fomes*; the sclerotia are largely deposited in the soil, though they are excellently adapted by their size (50-200 microns or 1/20-1/5 mm. in diameter) for wind-dispersal. There are of course such means of distribution as transference of infected soil and wood by human and animal agency, but these can be regarded as of only secondary importance. There remains only the pycnidial form, *Macrophomina phaseoli*, and it would appear that this is the chief method of distribution of the widely-occurring soil fungus. It is true that *Macrophomina* has been recorded only once in Ceylon, but it is also true that *Rhizoctonia bataticola* was not recorded before 1926 and that it has been found since on every plant of economic importance in the island. Further, since *Rhizoctonia bataticola* is so well established in our soils, it is conceivable that a search among jungle flora will reveal the presence of *Macrophomina phaseoli*. It is the writer's intention to make such a search.

Study of this fungus is rendered more difficult by the fact that the pycnidial form occurs only in nature. When spores from a diseased plant are put into culture, they give rise to the mycelium and sclerotia of *Rhizoctonia bataticola*, and with one exception pycnidia have not been observed in culture. It was the writer's good fortune to observe recently a group of pycnidia in a plate culture of *Rhizoctonia bataticola*. The culture, which was on maize meal, was grown from a single spore of *Macrophomina phaseoli* obtained from beans affected with " ashy stem blight," and was so old as to be drying out at the edges. The pycnidia, some six or eight in number, occurred in a group and were larger and more elongated than those found in nature. The size and shape of the spores, however, agreed exactly with those of *Macrophomina phaseoli*. Hanging-drop cultures of single spores were obtained, germination was watched and drawings were made. The spores were later transferred to nutrient media, and in every case gave rise to pure growths of *Rhizoctonia bataticola*. Pycnidia have not since been observed in the laboratory, although many cultures have been examined, and it is evident that a particular set of conditions, present in this case by accident, is necessary for their production. The search for pycnidia is being continued, and at the same time inoculation experiments with known hosts of *Macrophomina phaseoli* are being carried out. The results of these will be published in due course.

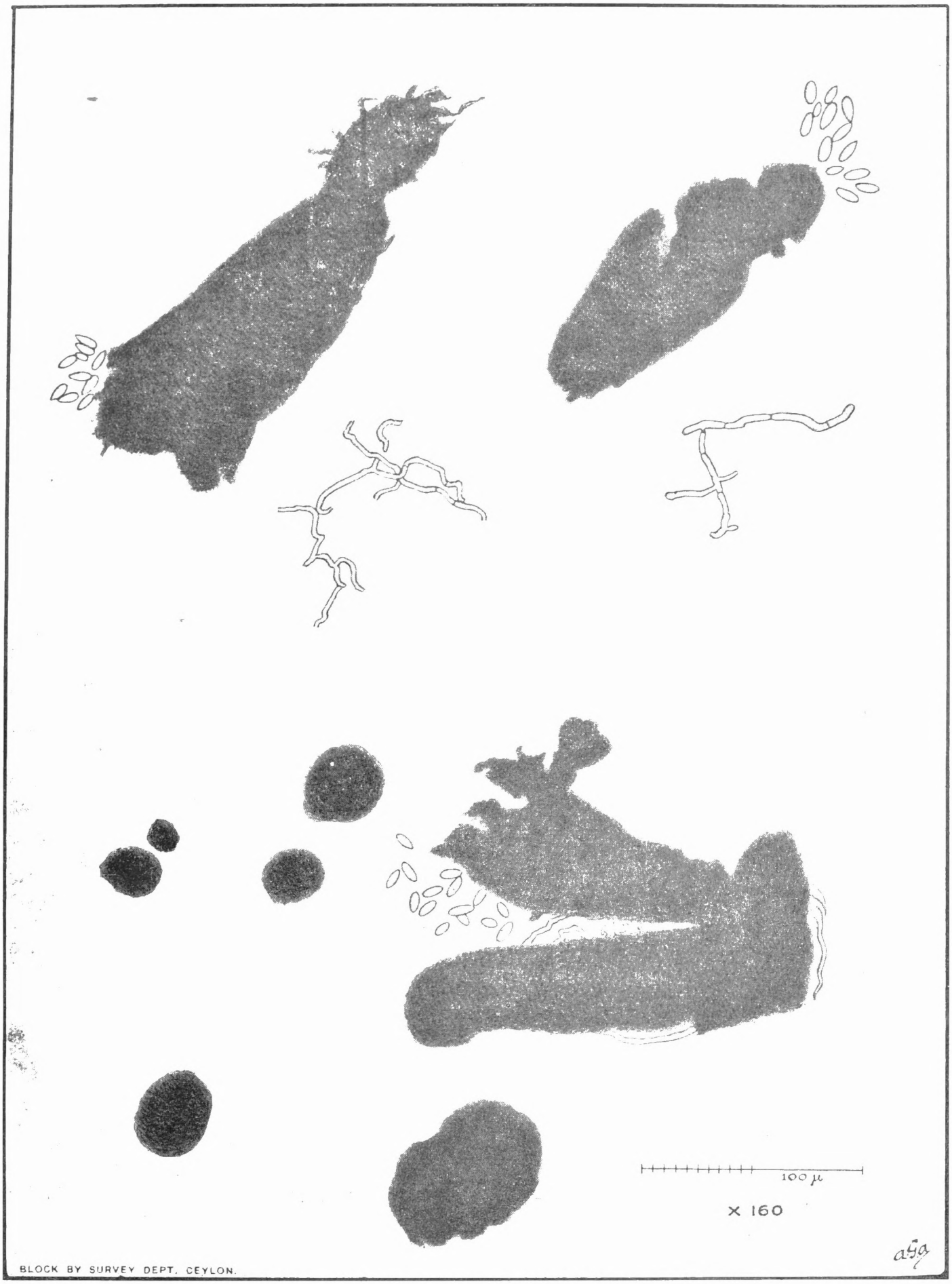

PLATE I.

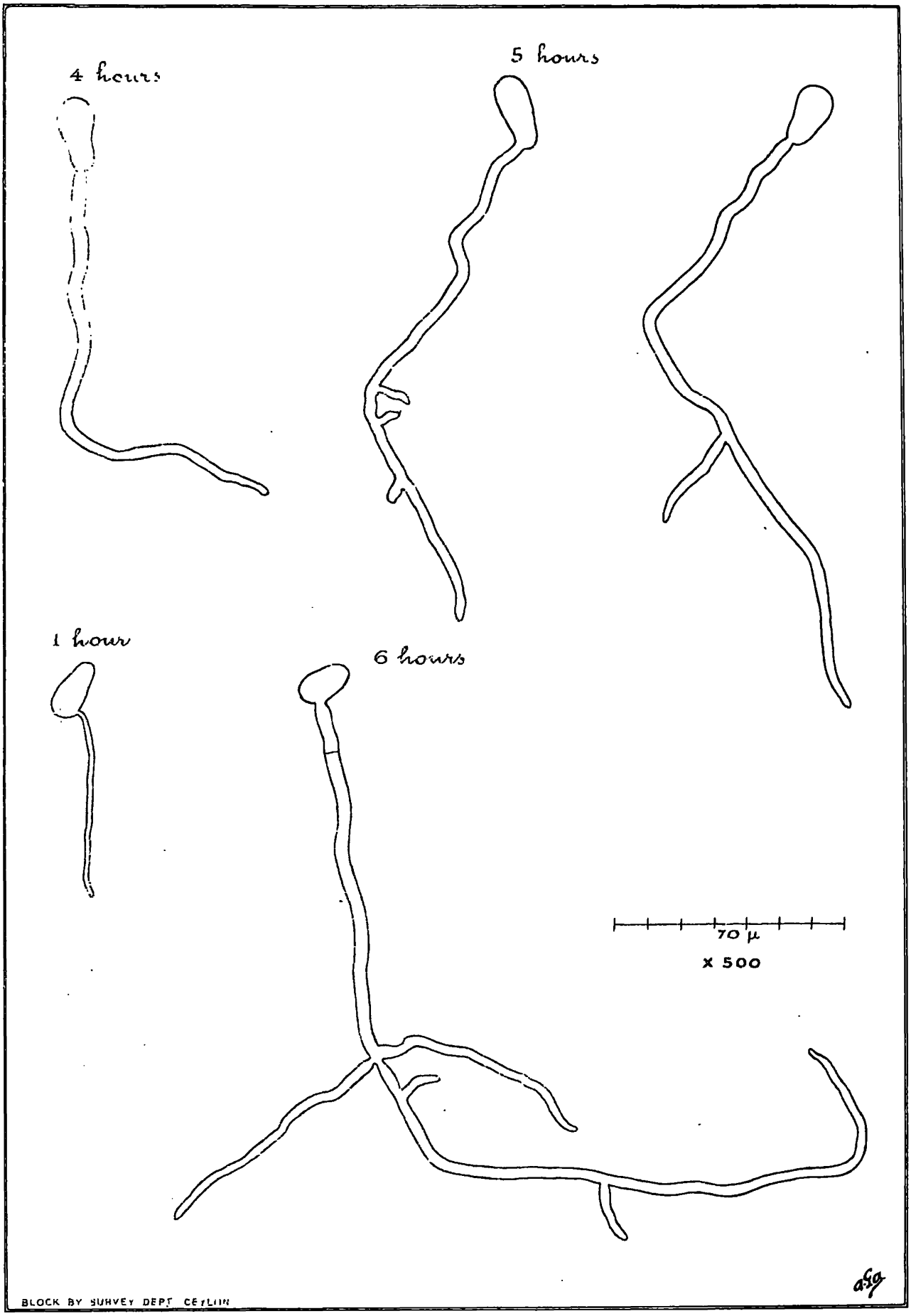
4 hours
5 hours
1 hour
6 hours
70 μ
x 500
BLOCK BY SURVEY DEPT CEYLON

PLATE II.

Plates 1 and 2 are drawings of the cultural pycnidia of *Macrophomina phaseoli* and of the germination of the pycnospores respectively. It will be noticed that the pycnidia figured in Plate 1 show distinct traces of a stromatic origin. This would suggest that they should be referred to the genus *Dothiorella*, which differs from *Macrophomina* only in that its pycnidia occur on a stroma, whereas they are free in the latter genus. As differences found only on culture media are not reliable, however, and as the nomenclature of the family to which *Macrophomina* belongs is undergoing revision, it has been decided to leave the matter until further observations can be made.

References.

1. Ashby.—*Macrophomina phaseoli* (Maubl.) comb. nov., the pycnidial stage of *Rhizoctonia bataticola* (Taub.) Butler. Trans. Brit. Myc. Soc. XII., p. 141, 1927.
2. Briton-Jones.—*Rhizoctonia bataticola* (Taub.) Butler. Tropical Agriculture, IV., 8, p. 147, 1927.
3. Small.—Mycological Notes (6). Tropical Agriculturist, July, 1927, p. 10.