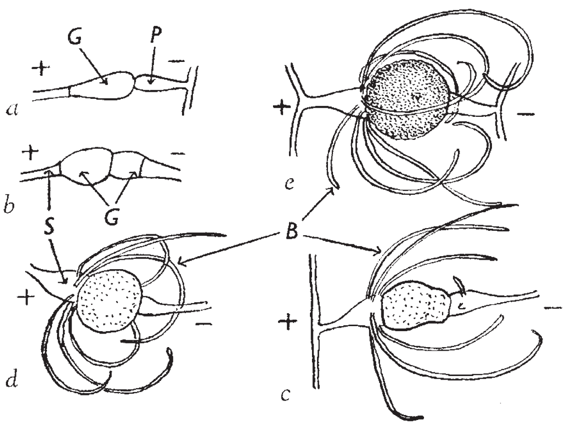

Fig. 1*a*–*e*. Stages in development of zygospores of a heterogamous pair of strains of *Absidia glauca*. + and − indicate parent mycelium of 'plus' and 'minus' strains respectively. *P*, Progametangium; *G*, gametangium; *S*, suspensor cell; *B*, bristles

College of Science and Technology, London, was first observed by me in the autumn of 1932. At that time the strains, when mated on a suitable medium, produced numerous zygospores of typical form, in other words, the gametangia were equal in size and both suspensors bore the characteristic curved bristles. By 1945 the number of bristles produced by the suspensor cells of the 'minus' strain was much fewer than the number produced by the 'plus' strain. At the time of writing the 'minus' strain produces only small gametangia, the suspensors of which bear few (Fig. 1 *c*) or no bristles (Fig. 1 *a*, *b*, *d*, *e*). The zygospores, which are still formed freely, resemble those of the homothallic *Absidia spinosa*. The conjugating progametangia are unequal in size from an early stage of development (Fig. 1 *a*). Unfortunately no camera lucida drawings of these strains in the original isogamous condition are available. It is clear, however, that a change from an isogamous condition to a heterogamous one has occurred.

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Movement of Spores of *Pithomyces chartarum* on Leaves of Rye-grass

Pithomyces chartarum (Berk and Curt.) M. B. Ellis, the fungus associated with the disease known in New Zealand as 'facial eczema'[1], sporulates abundantly under suitable environmental conditions on litter in the pastures. The spores are found in large numbers on green leaves during periods when pastures are toxic to grazing animals. In this situation they may be ingested with the forage.

It has been assumed that the spores, after release from the litter, are carried to the leafage by air currents and animal movement or by water-splash. Another method of spore dispersal, which can be readily demonstrated, is suggested. It had been observed by one of us (W. E. C.) that the spore masses of the fungus, which are difficult to wet with water, would run up a continuous water film on a clean glass column. This is a surface tension effect. It has been found that when spore masses produced on grass litter are placed at the bases of perennial rye-grass shoots, which after rain support a continuous film of water on the glossy abaxial surface, the spores travel up the leaf for a distance of 2–5 mm. It is not easy to produce this continuous film of moisture on the abaxial surface of rye-grass leaves by immersing in or spraying with distilled water. Further movement upward of spores results when drops of water applied to the tips of the leaves run down the abaxial surface. When the leaves dry the spores remain in position and further drops of water applied to the leaf tips do not dislodge them.

So far as we have been able to ascertain, spores do not migrate in this manner on the abaxial leaf surface of rye-grass. This is apparently because the ribbed and dull abaxial surface will not support a continuous film of moisture. This method of spore movement is being investigated more fully on other pasture species.

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[1] Thornton, R. H., and Percival, J. C., *Nature*, 183, 63 (1959).

Phosphorus Fixation in Mangrove Swamp Muds

It is generally accepted that much of the beneficial effect of phosphate applied to soils is due to fixation of aluminium. During a recent examination of mud from a mangrove swamp in Sierra Leone it was found that despite a high (5 per cent) dilute acid-extractable aluminium content, there was practically no aluminium-bound phosphorus. This was true even in cases where added calcium phosphate had been immobilized in the mud. This finding has led to a detailed investigation into the phosphorus relationships existing in the mud.

The distribution of phosphorus in the mud is shown in Table 1, from which it can be seen that 87 per cent of the total phosphorus is in organic combination and that the remainder is almost entirely in association with iron and calcium. The swamp muds are comparatively unweathered; thus, the absence of occluded forms of phosphorus is not surprising.

Table 1. Distribution of Phosphorus in a Mangrove Swamp Mud *

	p.p.m. phosphorus (oven-dry basis)
Water-soluble phosphorus	2
Aluminium phosphate	6
Iron phosphate	29
Calcium phosphate	25
Reductant iron phosphate	nil
Occluded aluminium phosphate	6
Organic phosphorus	485

* Measured by the method of Chang and Jackson (ref. 1)

The results of incubation experiments have shown that inorganic phosphorus mineralized from the organic fraction appears in association with iron and to a lesser extent with calcium, but never as aluminium phosphate. The only time aluminium phosphate increased in concentration was when the mud was incubated aerobically in the presence of calcium carbonate.

The fixation of inorganic phosphorus by the fresh and dried mud is shown in Fig. 1 and is an extremely rapid process. Equilibrium was almost attained within 30 min. and considerable fixation had occurred within 5 min. The difference in amount of phosphorus fixed in 30 min. and 30 days was negligible.