occurs at both ends. In Fig. 7 *a* pollen-sacs have completely developed and dehiscence has taken place, leaving disorganized cells and a few pollen-grains within the fibrous

FIGS. 1 *a*, 3 *a*, 7 *a*, and 8 *a*.

layer. It may be added that the flowers showed a further deviation from the normal in having the top of the ovary and the styles glabrous.

J. J. CLARK.

ROYAL BOTANIC GARDENS,
KEW.

ON WELL-MARKED AEROTROPIC GROWTHS OF BACILLUS MEGATHERIUM.—For nearly three years I have had under my observation aerotropic growths of *Bacillus megatherium* which present a remarkable annual periodicity. These growths were first noticed on the removal of some boards forming the front of a large box in which the palm *Demonorops* was growing. On the projecting dead extremities of the roots and the surrounding earth thus exposed, white fungal masses

were found. The growths on the earth were better marked than those on the roots, and varied from small flat, whitish films to patches 8 mm. square and up to 4 mm. in height. The latter were amorphous masses of Bacteria which cultural and microscopical methods showed to be *B. megatherium* in a practically pure condition. The vitality of the growths was well marked during the late winter months, during which I easily obtained typical and rapidly growing cultures on agar-agar and gelatine. The greatest efflorescence was attained towards the end of spring. Later on the growths looked drier and more scanty, their creamy colour becoming dead white, and they did not flourish so readily on culture media. At this stage more spores than bacilli were observed in both growths than in the period of greatest development. The chalky, desiccated appearance, poor reaction to cultural methods, and preponderance of spores were intensified during the summer.

As a site for Bacteria the roots of the palm would not be unusual, but well-marked and diffuse bacterial growths on the surface of the earth are unique and less easy to account for. Although Bacteria are found plentifully in the upper six feet or so of undisturbed soil (not deeper, unless corpses or other sources of pollution exist below),¹ a well-defined positively aerotropic growth, even of aerobes, is not seen. The only exceptions seem to be the Myxobacteriaceae described by Thaxter,² which are found on various animal excrements, and exhibit Myxomycetes-like fructifications. Their nutritive conditions are, therefore, eminently favourable. Whether this may help to account for their specialized fructification is problematical, but there is no doubt that the question of nutrition exerts an important effect on the exuberance to which a bacterial development will extend, and I was inclined to attribute the peculiar efflorescence of *Bacillus megatherium* on the earth to some unusual source of nourishment, which with the favourable temperature of the plant house (average 80° F.) would conduce to free development. The interest of the conclusion that the earth-growth existed saprophytically on the persisting remains of products of the decayed wood in the earth was minimized by later observations. On the open, horizontal surfaces of the boxes and tubs in which other tropical plants were placed, I afterwards noticed several growths of the bacillus. Here the areas were mostly circular in outline. The smaller ones were flat, the larger somewhat raised, particularly towards the centre, and measured up to an inch in diameter. In these situations the existence of a marked supply of food material is not so obvious. I hope to note any gradual change from a flat film to raised growths like those on the earth around *Demonorops* which appear to connect the ordinary free living Bacteria with the more highly specialized fructifications of the Myxobacteriaceae.

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¹ Young : Proc. Roy. Soc. of Edin., xxxvii, Part IV, p. 759.

² Thaxter : Bot. Gaz., xiv, 1892, p. 389 ; xxiii, 1897, p. 395 ; xxxvii, 1904, p. 405.

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