and drought acting on the leaves is the same as in terrestrial plants; there is a distinct elongation of all the cells in a direction at right angles to the surface; the cuticle is better developed, and the leaf as a whole is thicker and smaller.

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ON THE RESISTING VITALITY OF THE SPORES OF BACILLUS MEGATERIUM TO THE CONDITION OF DRYNESS. During the autumn of 1885 and spring of 1886 I was engaged with bacterial studies in the laboratory of my friend Professor M. Hartog of Queen's College, Cork. He had brought from Strasburg the dry spores of a cover-glass culture of *B. Megaterium*, prepared by Professor De Bary in his laboratory on August 1884. From this, in the early spring of 1886, we succeeded in raising pure cultures with nutrient gelatine, and we afterwards kept the *Bacillus* under observation in good condition for several months. The usual method of cultivation practised by us was that of the hanging-drop, on cover-glasses, inoculated from gelatine-colonies, and then inverted on a damp filter-paper-cell which was placed on an ordinary slip, and kept at the temperature desired in a damp chamber; we found the *Bacillus* to develop favourably in a solution of filtered milk and water with a little added glucose; or in a 50 % glucose solution with a trace of Liebig's extract. Many of our cultures so prepared were carefully dried off and distributed among the botanical and pathological laboratories of Great Britain and Ireland.

On March 1886 I prepared a special culture of *B. Megaterium* for public observation at a conversazione held in the Art Schools at Cork. A young pure cover-glass culture was chosen and transferred to a cell of millboard saturated with paraffin-wax, the edges of the cover-glass being luted on with warm paraffin-wax, with the object of keeping the cell air-tight. The cultivation was on view for three successive evenings, and appeared quite pure: the *Bacillus* showed characteristic motion, which lasted nearly two days, when it settled down, and gradual spore-formation became visible: on the third evening the spores were mature, and the thin film of liquid hanging on the cover-glass appeared to have in greater part evaporated.

I carefully preserved this cultivation among my other slides, and had occasion to examine it several times at long intervals, till November 1890, when, having offered to demonstrate a lecture on decompo-

sition for my friend Professor Letts of Queen's College, Belfast, it occurred to me to try and revive the spores of my old culture of *B. Megaterium* which had then been torpid for nearly five years. I had not sufficient time to attempt isolation with a gelatine-plate, so inoculated direct from the spores on the old cover-glass, after first soaking them for a short time in a drop of sterilised water. I used an ordinary platinum needle, and with the usual precautions mounted twenty cover-glass cultivations, also a few blind duplicate-cultures of the media employed. The batch was then removed to a situation where a temperature of about 80–85° F. was maintained. I first examined these cultivations after about twenty-four hours, when they all appeared sterile: on a second examination the following day, however, I found one single development, and as the *Bacilli* then appeared settling down for spore-formation (their motion having almost ceased), I am inclined to think that this single growth had escaped my observation the previous day. Nearly all the other mounted spots remained quite sterile for several days after.

The cultivation was not a pure one; but the contrast in size between *B. Megaterium* and *B. subtilis* (with which I think it was contaminated) was very marked.

This development of *B. Megaterium* from its spores seemed to me quite normal as regards time, and partly for this reason I think the observation an interesting one.

I am inclined to think that my want of success with the remaining nineteen cultures of the batch, may have been due to actual rupture of the cells in attempting to remove them with the platinum needle. But it may well be that the life-limit of the spores had been reached in the majority of cases; and that the successful culture was due to a variation in the direction of longevity. This would put the life-limit of the spores of *Bacillus Megaterium* at about four and a half years, which is far below that of *B. subtilis* or *B. Anthracis*.

I again tried to revive the remaining spores of the same old cultivation in December 1891: the cover-glass had been broken in several pieces, and had remained exposed for more than a year under an inverted tumbler in my laboratory at Bushmills. I used both solid and liquid media, but on this occasion failed with both—I, however, attach no absolute confidence to this negative result.

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