Alexander Fleming and Early Microbial Art

Illustrated by materials from the collections of the Center for the History of Microbiology / ASM Archives (CHOMA)

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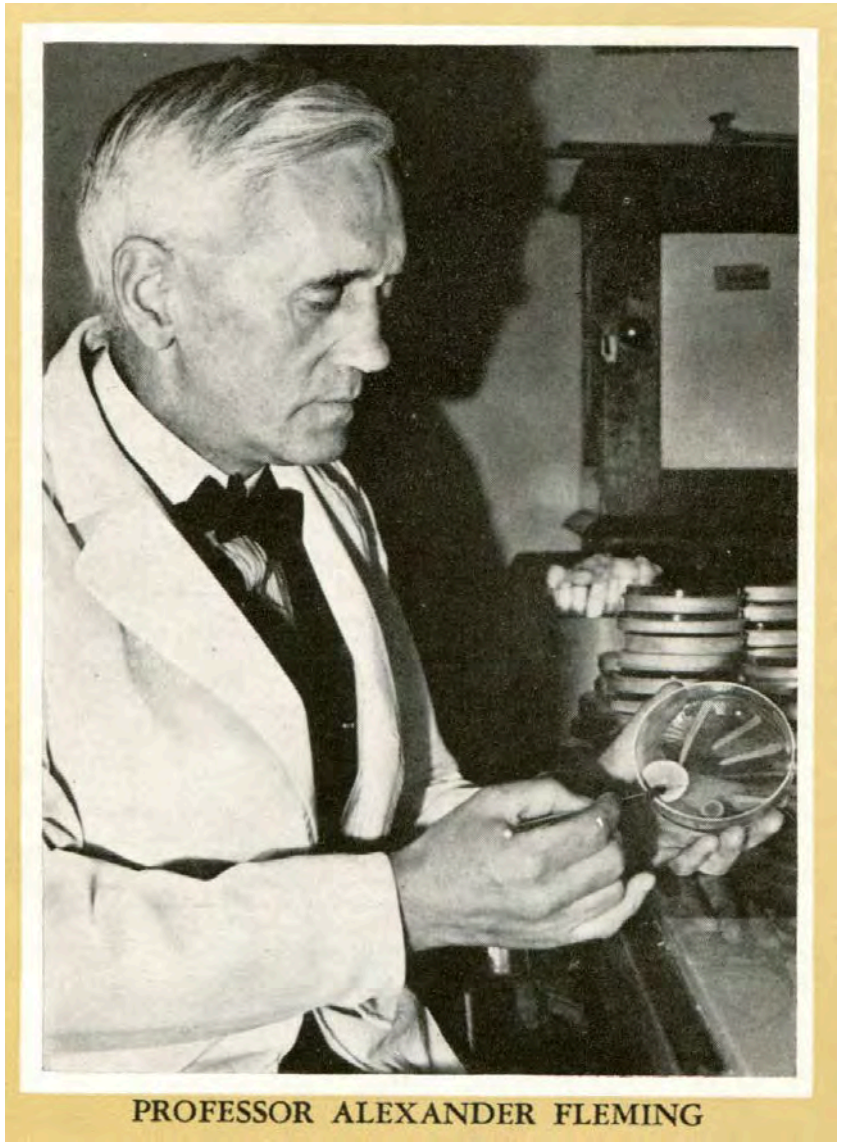
PROFESSOR ALEXANDER FLEMING

Though most well-known as the discoverer of penicillin, Sir Alexander Fleming (1881-1955) was also a pioneer in the field of microbial art.

Six of his “paintings” were reproduced on the endpapers of Andre Maurois’s 1959 biography of the scientist.

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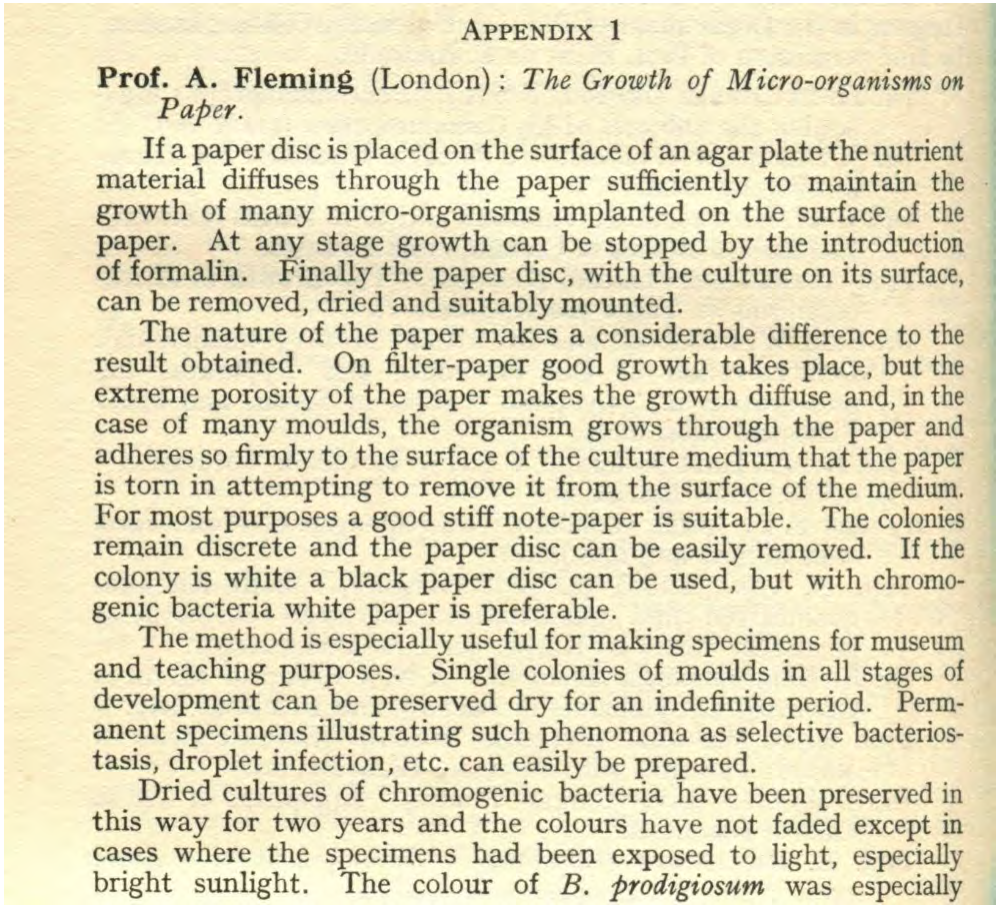
Fleming attended the Second International Congress for Microbiology in London in 1936.

In addition to papers on “Selective Bacteriostasis” and “The Use of Stapylococcus Antitoxin, Toxin, Toxoid and Vaccine,” he offered this brief technical paper.



APPENDIX 1

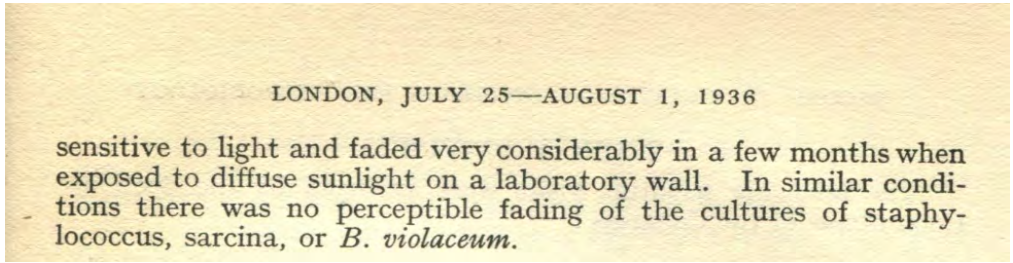
Prof. A. Fleming (London): *The Growth of Micro-organisms on Paper.*

If a paper disc is placed on the surface of an agar plate the nutrient material diffuses through the paper sufficiently to maintain the growth of many micro-organisms implanted on the surface of the paper. At any stage growth can be stopped by the introduction of formalin. Finally the paper disc, with the culture on its surface, can be removed, dried and suitably mounted.

The nature of the paper makes a considerable difference to the result obtained. On filter-paper good growth takes place, but the extreme porosity of the paper makes the growth diffuse and, in the case of many moulds, the organism grows through the paper and adheres so firmly to the surface of the culture medium that the paper is torn in attempting to remove it from the surface of the medium. For most purposes a good stiff note-paper is suitable. The colonies remain discrete and the paper disc can be easily removed. If the colony is white a black paper disc can be used, but with chromogenic bacteria white paper is preferable.

The method is especially useful for making specimens for museum and teaching purposes. Single colonies of moulds in all stages of development can be preserved dry for an indefinite period. Permanent specimens illustrating such phenomona as selective bacteriostasis, droplet infection, etc. can easily be prepared.

Dried cultures of chromogenic bacteria have been preserved in this way for two years and the colours have not faded except in cases where the specimens had been exposed to light, especially bright sunlight. The colour of *B. prodigiosum* was especially



LONDON, JULY 25—AUGUST 1, 1936

sensitive to light and faded very considerably in a few months when exposed to diffuse sunlight on a laboratory wall. In similar conditions there was no perceptible fading of the cultures of staphylococcus, sarcina, or *B. violaceum*.

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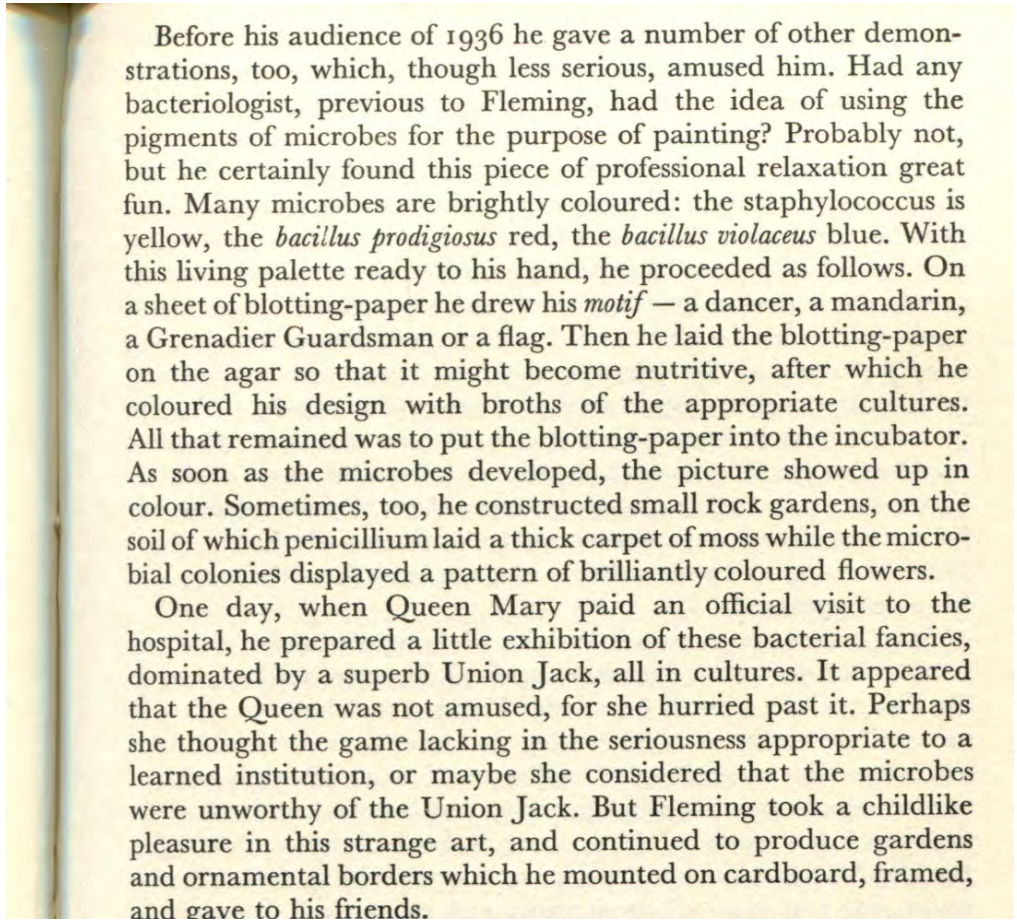
Here, Maurois discusses Fleming's technique

The Life of Sir Alexander Fleming. Translated from the French by Gerard Manley Hopkins

New York: E. P. Dutton & Co., Inc. 1959, p. 153



Before his audience of 1936 he gave a number of other demonstrations, too, which, though less serious, amused him. Had any bacteriologist, previous to Fleming, had the idea of using the pigments of microbes for the purpose of painting? Probably not, but he certainly found this piece of professional relaxation great fun. Many microbes are brightly coloured: the staphylococcus is yellow, the *bacillus prodigiosus* red, the *bacillus violaceus* blue. With this living palette ready to his hand, he proceeded as follows. On a sheet of blotting-paper he drew his *motif* — a dancer, a mandarin, a Grenadier Guardsman or a flag. Then he laid the blotting-paper on the agar so that it might become nutritive, after which he coloured his design with broths of the appropriate cultures. All that remained was to put the blotting-paper into the incubator. As soon as the microbes developed, the picture showed up in colour. Sometimes, too, he constructed small rock gardens, on the soil of which penicillium laid a thick carpet of moss while the microbial colonies displayed a pattern of brilliantly coloured flowers.

One day, when Queen Mary paid an official visit to the hospital, he prepared a little exhibition of these bacterial fancies, dominated by a superb Union Jack, all in cultures. It appeared that the Queen was not amused, for she hurried past it. Perhaps she thought the game lacking in the seriousness appropriate to a learned institution, or maybe she considered that the microbes were unworthy of the Union Jack. But Fleming took a childlike pleasure in this strange art, and continued to produce gardens and ornamental borders which he mounted on cardboard, framed, and gave to his friends.

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This memento, prepared by Fleming using the technique described in the 1936 abstract, was presented to Dr. Kenneth Raper during Fleming's 1945 visit to America.

Raper (1908-1987) was a mycologist at the USDA's Northern Regional Research Laboratory in Peoria during World War II and directed the search for more productive strains of Fleming's *Penicillium notatum*. The result was the isolation of *Penicillium chrysogenum* NRRL 1951, which became the forerunner of all commercial strains.

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“Functional Incubator – Daily Registration Totals Plated Ea[ch] Night”

This is from the May,1955 Annual Meeting of the Society of American Bacteriologists (now ASM.) It may be that this practice, unique to this SAB meeting, was an homage to Fleming, who had died two months earlier.

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