A single, complete experiment is given in the table, the titres representing the best bottle of a triplicate group. Repeated experiments gave the same indications, but not usually the same figures.

EFFECT OF PLANT-GROWTH SUBSTANCES ON PENICILLIN TITRES FROM *P. notatum* ON A SIMPLE MEDIUM.

Medium	Days after inoculation	Penicillin (Florey units per ml.)
Control	6	30
Indole acetic acid, 1 in 10,000	6	50
Naphthalene acetic acid, 1 in 10,000	6	25
Control	7	35
Indole acetic acid, 1 in 10,000	7	50
,, ,, ,, 1 in 100,000	7	35
Naphthalene acetic acid, 1 in 10,000	7	40
,, ,, ,, 1 in 100,000	7	50
Control	11	28
Indole acetic acid, 1 in 10,000	11	50
,, ,, ,, 1 in 100,000	11	30
Naphthalene acetic acid, 1 in 10,000	11	30
,, ,, ,, 1 in 100,000	11	45

It is thus seen that indole acetic acid at a concentration of 1 part in 10,000 gives the quickest high titre of penicillin, whereas it is not so active at 1 to 100,000. Naphthalene acetic acid is more active at 1 part in 100,000, giving a titre peak in seven days. The two concentrations mentioned were the only ones studied, and it is likely that the optimal one has not been chosen. Work along these lines is being continued.

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Ripening of the Onion Bulb and Infection by *Botrytis* Species

THE first sign of normal ripening in the onion plant, it is supposed, consists of a local collapse at the neck, resulting in the leaf blades falling over on to the ground while several of them are still green and turgid; this can occur with plentiful soil moisture[1,2], though hastened by drought, and has been attributed (*loc. cit.*) to a softening of the tissues of the neck. The true explanation would appear, however, to be purely mechanical, and connected with the mode of development of the onion bulb. In the absence of bulbing, as in an onion plant growing in short days, new leaves emerge at regular intervals. Each leaf consists of a thin-walled hollow cylindrical leaf base surmounted by a more or less cylindrical 'blade' which is at first solid but later develops a lysigenous cavity. At the junction of the leaf base with the leaf blade a pore is found, through which the next younger leaf emerges. The neck of the actively growing onion plant thus consists of a number of very thin concentric leaf bases enclosing a practically solid core of growing leaf blades. The outermost leaf bases are dead and papery, but even the living ones have little inherent rigidity; the solid core is formed by the blade or blades of the one or two leaves next emerging. When, under the stimulus of long days, bulb development occurs, leaf emergence ceases immediately or soon according to conditions[2,3] and the three leaf initials next due for emergence become instead swollen bulb scales with practically no leaf blade[3]. The result is that after the blade of the last leaf has emerged there are no more to provide the solid core of the neck, which thus becomes a thin-walled hollow tube. This soon buckles and collapses under the weight of the green leaf blades, especially in wind or drought. Experiment has shown that removal of the central core very greatly reduces the resistance of the neck to buckling.

The common horticultural practice of bending onion plants over at the neck to hasten ripening thus appears groundless. If bulbing has not proceeded far enough to stop leaf emergence, the practice can only result in breaking or bruising the next emerging leaf blade, while if leaf emergence has ceased the neck will of itself collapse very soon, though there seems no obvious reason why this should either hasten the drying of the leaf blades or the onset of dormancy, which together accompany ripening.

Before bulbing occurs, the pore at the junction of leaf base and blade is from the earliest developmental stages of the leaf initial blocked by the tip of the subsequent leaf[3]. The last leaf to emerge after bulb development, however, has an open pore, since the next leaf initial forms a swollen bulb scale the blade of which fails to elongate. If, therefore, this last leaf emerges fully before collapse of the neck occurs, the onion plant has then a more or less open pore communicating directly by the hollow neck with the interior of the bulb. Since we have in a number of cases found the swollen bulb scales infected (apparently with *Botrytis* spp.) while the surrounding swollen leaf bases[3] have appeared healthy, it would seem that this probably provides one of the modes of infection of the onion bulb by spores of *Botrytis* spp., which constitutes one of the main problems of economic importance connected with onion culture and storage in Great Britain. Another likely path of infection is via the pores of the other (older) leaves, since these sag open as the leaves wither and thus provide pockets for the lodgment of air-borne spores and probably fairly high humidities for their germination. This would presumably lead in the first instance to infection of the swollen leaf bases rather than of the swollen bulb scales, and this is the most frequently observed condition in the early stages of *Botrytis* 'neck rot'. That infection does in fact occur via these pores is indicated by our observations of the occurrence of 'neck rot' in the greenhouse, where the plants are somewhat etiolated and the necks very much longer than under field conditions. Here the tissues of the leaf bases are killed high up on the neck near the pores, and even the whole neck rotted through at that level, before the bulb shows any obvious infection.

The above considerations provide yet another example of the importance of the cessation of leaf emergence with bulb development in accounting for the behaviour of the onion plant[2].

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