Of particular concern, from the practical viewpoint, is the effect of dormant lime sulfur and copper sulphate sprays upon the pycnospores lodged in the pycnidia and destined to function after petal-fall.

Wallace[1] in his official reports and Douglas[2] have repeatedly published the statement that a very strong solution of lime sulfur, applied before the buds begin to swell, perfectly controlled this disease and that the summer sprays, consequently, were unnecessary. The writer disagrees with their views, but has discovered from field and laboratory experiments and obervations, the scientific explanation of partial control by the dormant sprays applied late.

The infectious surface of an apple blotch canker in the first season of its functional activity consists of two distinct portions: first, that portion which develops from a single infection, becoming apparent in late summer and ceasing its active growth upon the appearance of cold weather; second, that porton which advances from the initial canker the following spring, approximately two weeks after the buds burst open, and which becomes dotted with pycnidia, with mature pycnospores, simultaneously with the advance of the canker. The first portion is the initial canker and bears pseudo-pycnidia. The contents of the pseudo-pycnidia are completely or partially differentiated into spores by the time it is customary to apply the dormant spray. Furthermore, the epidermal covering over the pycnidia is ruptured, exposing the pycnidial wall. The season's young fruits and new growth are, therefore, subject to two distinct sources of infection from the young blotch cankers.

A dormant spray of lime sulfur applied as the buds begin to swell actually kills the spores and sporidal layer within the differentiated pseudo-pycnidia but has absolutely no effect upon the mycelium of the organism ramifying throughout the cortical tissue beneath. The toxic effect upon the spores is very striking after the first rain following the dormant spray. Dilutions of lime sulfur of 1–3, 1–5, 1–6, and 1–8, were given their trial and all were similarly toxic to the spores in the pycnidia, but it appeared that dilutions somewhat stronger than 1–8 were more efficient. A dilution of copper sulphate (1–6) produces similar toxic effects. Scalecide produces none at all.

As was mentioned above, a new infectious area advances from the initial canker in the spring. It follows, therefore, that the dormant spray exercises but very little control upon the season's infection of the young apples and new growth.

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[1] Wallace, F. N., 9th Annual Report Indiana State Entomologist, 1915–16, pp. 51, 54.

[2] Douglas, B. W., "War and the Fruit Grower," *Country Gentleman*, September 14, 1918; "Fruit Diseases of 1919," *Country Gentleman*, April 17, 1920.

CROWS AND STARLINGS

TO THE EDITOR OF SCIENCE: Last fall at Devon, Pennsylvania, a man shooting blackbirds also wounded a starling, which fell on the grass and which he could not find. Shortly afterwards several crows were seen diving at something in the grass and then lighting and running through the grass after it. Upon his going towards them to see what they were doing, they all flew away, one of them carrying the starling in its bill, and landed on the walk in a neighboring place, where the crows gathered round the starling and proceeded to peck at it. He followed them and scared them, and the crows flew away, abandoning the starling, which was nearly dead.

I have never before known of crows carrying off as large a bird as a starling, though I have seen one carrying off from the nest a young robin nearly ready to fly, and of course they kill many young robins and other young birds of smaller size.

F. R. WELSH

THE SYNCHRONAL FLASHING OF FIREFLIES

DURING a trip in Siam, a distinct flashing of fireflies in unison was observed. The observa-