The failure of pustules to produce æcia after intermixing of the nectar is not a new phenomenon. It has been observed from time to time in the F_2, F_3 and F_4 progeny of certain crosses, but uredia and telia were never before found associated with this condition.

The other culture that produced uredia and telia on barberry was obtained from a field collection made in 1934, and was identified as race 21. Sporidia from telia developed in the greenhouse in 1936 produced two types of pustules on barberry in about equal numbers. Pustules of the first type were normal in appearance and, on intermixing of the nectar, produced æcia. The pustules of the second type were almost white, with no pycnia, or only rudimentary ones that rarely produced pycniospores. Uredia were recently observed on five pustules of this type on a barberry plant inoculated 43 days previously. Two of these pustules also contained teliospores. Fig. 1 shows an infected barberry leaf bearing a compound pustule, one component of which contains æcia and the other small uredia.

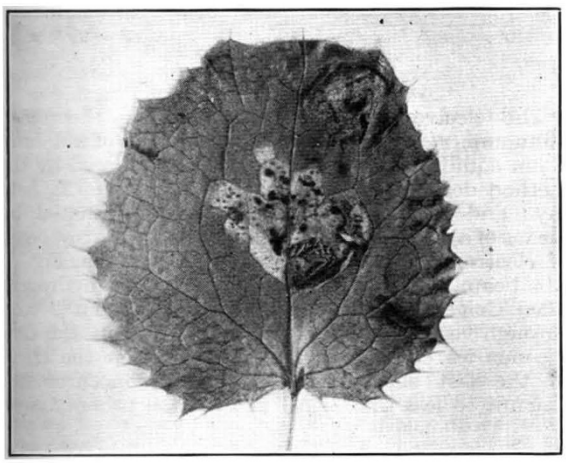

Fig. 1.

LOWER SURFACE OF A BARBERRY LEAF SHOWING A COMPOUND PUSTULE OF *Puccinia graminis Tritici* OF RACE 21. ONE COMPONENT OF THE PUSTULE CONTAINS AECIA, THE OTHER, SMALL UREDIA. (SLIGHTLY ENLARGED.)

The urediospores and teliospores produced on the barberry by both of these races are normal in appearance. The urediospores germinate normally and readily infect wheat seedlings, but are apparently unable to infect barberry leaves. The strains are therefore still heterœcious. The nuclear condition has not been investigated. A fuller report will appear later.

MARGARET NEWTON.
THORVALDUR JOHNSON.

Dominion Rust Research Laboratory,
Winnipeg, Manitoba.
March 25.

Flashing of Fireflies in Jamaica

DURING the past summer, the members of the Seventh Botanical Expedition of the Johns Hopkins University witnessed displays of firefly activity in the British West Indies as spectacular in their way as any reported from the Orient.

In front of the expedition's laboratory at Chestervale, in the Blue Mountains of Jamaica, there was a thatch palm which bore below its whorl of leaves an inflorescence a metre in diameter. For about a week in June, and again a month later, this inflorescence was transformed nightly into a sphere of seething flame by the flashes of thousands of fireflies which gathered there. Later, other displays were discovered, particularly on two large acacia trees overhanging the Clyde Valley which harboured such prodigious swarms of fireflies that the nebulous glow was visible half a mile away.

All the fireflies on these trees were of one species, *Photinus pallens*, and the females outnumbered the males in the ratio of 4 : 3. Each firefly flashed regularly about twice a second while walking along the twigs, and entirely independently of any other individual. There was no sign of synchronism or of response between any individuals or between different trees. The flashing was not inhibited by heavy rain, by lightning, or by the beam of a powerful flashlight, but did not occur on moonlight nights. It continued from about 8 p.m. until 3 a.m., and during dull days many of the fireflies remained in the trees all day.

Although these enormous aggregations were particularly brilliant on rainy nights, it is probable that they did not arise as a consequence of the fireflies taking shelter, because displays were also observed on clear nights. Likewise, although some individuals were seen apparently sucking juice from the fresh fruit scars on the palm tendrils, it is probable that food was not the specific cause of the aggregations, since the fireflies collected in several species of trees.

Photinus pallens is conspicuously positive to continuous illumination, and is the only Jamaican Lampyrid firefly which is frequently attracted indoors by lamplight. It was found that when the beam of a flashlight was directed into a bush or on to the grass, specimens of both sexes of *P. pallens* soon begin to fly from all directions, alight in the illuminated area, and flash regularly. Such nuclei, when they came to contain a dozen or so specimens, maintained themselves autonomously by the addition of new individuals from the surrounding area. Accordingly, it seems probable that this photo-positivity is the explanation of the huge swarms which gathered in the palm and acacia trees. Several individuals collected fortuitously in a small area would make sufficient illumination to serve as a focus for the addition of new recruits, like bees joining a swarm, and sufficient individuals remain on the tree during the day to insure its becoming a focus on the following night.

Whatever the cause of the aggregation, it serves an important function in bringing the sexes together for mating, and many coupling pairs were observed on the palm tendrils. The mating, however, appears to be due entirely to accidental contact of the sexes during their peregrinations on the branches. The aggregation habit thus seems to take the place of the accurate systems of flashing signals which serve to bring male and female together in some species of firefly.

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JOHN B. BUCK.

California Institute of Technology,
Pasadena, California.