sure the factors in the environment which act in reducing the number of eggs present at various times during the period when the population is rising to the quasi-equilibrium. In order to do this four beakers were set up, each containing 32 grams of whole wheat flour which had been reduced to a fineness which would permit it to pass through a number four standard silk bolting cloth. In one of these beakers eight pairs of flour beetles were introduced as a check population. Sixteen adult male beetles were placed in each of the other three beakers to be compared with the check population; and each day eggs were added at the rate that they would have been laid at the prevailing temperature, if half of the number of adults had been females. Thus the number of eggs added became a known quantity. Inasmuch as Park[10] has shown that males eat eggs at the same rate as females, the egg eating in these populations should be comparable with the check population. If nothing in the environment interfered with the eggs they should have increased in number until they reached the "potential number" and remained constant.

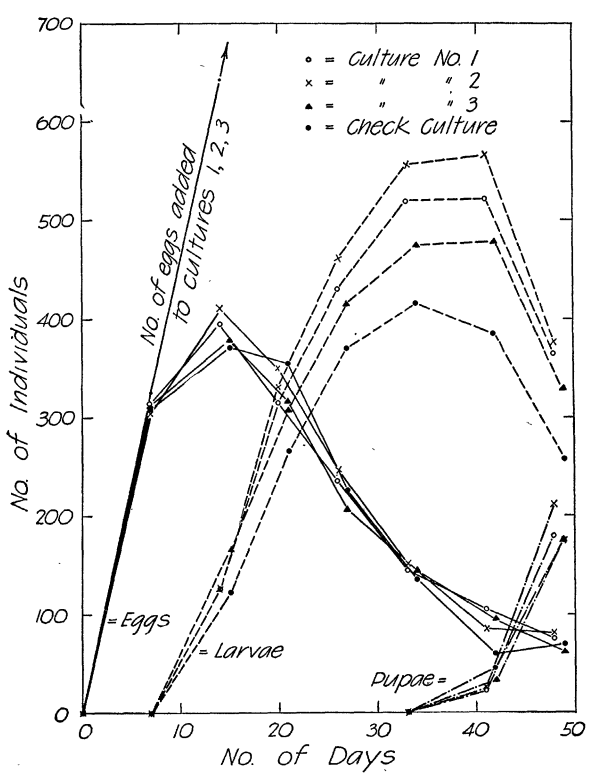

FIG. 1. A comparison of the egg populations in a check culture of 8 pairs of beetles in 32 grams of wheat flour with three cultures of 16 males each to which eggs were added at the same rate as would have obtained had half of the beetles been females.

[10] Thomas Park, "Studies in Population Physiology: II. Factors Regulating the Initial Growth of *Tribolium confusum* Populations," *Jour. Exp. Zool.*, 65: 17–42.

The accompanying graph (Fig. 1) shows that the number did not remain constant and that all four egg populations followed approximately the same course. On the 33rd and 34th days after 1,455 eggs had been added to the three synthetic populations the numbers of eggs were 142, 150 and 141. The check environment with eight females contained 135 eggs. The drop in the number of eggs present is coincident with the rise in the number of larvae. Since the larvae are known to eat eggs[4] and seem to represent the only change in the environment, it seems probable that they were the major factor concerned with the decrease in the number of eggs.

Park[11] and Maclagan[12] compared the number of eggs and larvae "per female per day" based upon counts of cultures on the 11th and 25th days and concluded that the smaller numbers at higher population densities demonstrated that population density decreased the oviposition rates. In the "synthetic populations" in the present experiment there were only 3.2, 3.4 and 2.87 eggs and larvae "per female per day" on the 26th day, although 4.6 had actually been added.

It is to be noted, however, that the numbers of larvae appearing in the three "synthetic populations" are greater than in the normal population which served as the check. The difference between the numbers of larvae in the three "synthetic populations" is comparable to that between the lowest "synthetic population" and the check. Comparison with other data[13] shows that there is a considerable fluctuation in the number of larvae present at the peak of the larval curves and as yet there seems to be no adequate explanation other than to ascribe the differences to experimental errors.

From the present experiment it seems evident that population systems of flour beetles produce a resistance to their own potential rate of increase, in spite of a constant rate of oviposition, and that this resistance is responsible for the decrease in the egg population which occurs in the early history of a population of flour beetles.

ROYAL N. CHAPMAN
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[11] *Op. cit.*
[12] *Op. cit.*
[13] See footnotes 2 and 6.

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