caterpillars were so numerous that there were 100 to 150 of them to [illegible] are foot, they will, however, consume all available food rapidly and completely.

MIGRATION OF LARVÆ AND BEHAVIOUR TO LIGHT.

As soon as the food supply is exhausted the larvæ, as though by common consent, leave the stripped fields where they passed the winter and migrate, more or less in a body, in search of pastures new. We do not know for certain what factors control their course of migration, but it is evident that something very definite causes each individual to take up a general line of march and hold to it with little variation. The guiding principle appears to be that of light. They are certainly positively phototropic to artificial light at night time. We proved this by setting out in an infested field a number of 18-inch pans, in some of which we placed lanterns. The pans were all sunk in the ground so that the rim was level with the surface of the soil. Each was partly filled with coal oil.

Each of four pans, provided with lanterns, caught on an average 850 larvæ a night, whereas similar pans without lights captured an average of 94 larvæ only.

This attraction to light was demonstrated also at Bow Island, where the streets are lighted with natural gas. Although the larvæ were not sufficiently numerous in the immediate vicinity of the town to attract general attention, they swarmed in dense masses under every street lamp, covering an area of about six feet in diameter.

When our lantern experiments were made, the larvæ ranged from about the third stage to full grown, and the various stages were found in the oil in about the same proportions whether a light had been placed in the pans or not. From this it would seem that all of the stages found in the spring are similarly oriented by light.

It has been noticed both here and elsewhere that the larvæ usually remain below the soil from sunrise until about 4 or 5 p.m., when they come to the surface in search of food. At this time the sun has lost most of its strength, and it is seen that the general migration is towards it. Thus their course of migration at this time is towards the west.

Usually the larvæ hide from the direct rays of the sun when it is high. The reason is, apparently, that at such times the light is too powerful for them, and its action has changed from one of attraction to one of repulsion. Normally, then, they remain below ground during bright sunny days, until the sun is sufficiently low for its weakened rays to have lost their repelling power. When food is scarce, however, hunger overcomes their aversion to exposing themselves to the sun, and at such times the larvæ may come above ground during the hottest part of the day. If the day be clear they will then crawl directly away from the sun, and thus travel in a northerly direction. At such times they move with great rapidity. This appears to be the explanation of the phenomenon noticed here and elsewhere that the general trend of migration is in a north-westerly direction. There are, of course, local and temporary variations due to cloudy days and excessive migratory activity at night, but in all instances which have come under our observation the general direction of migration has been as above indicated.

The distance traversed by the worms in their migration depends largely upon the abundance of food. We have not data upon this point as definite as desirable. It was seen, however, that within a week nearly all of the larvæ had left a newly seeded, and therefore quite clean, quarter-section which had been protected against further infestation.

Wilcox (1898) states that in Montana an army of worms travelled 3 miles in a north-west direction between the first of April and the first week in May, "doing considerable damage all along the line of mareh". This would indicate that there was a moderately plentiful supply of food available, and it is reason-