

much as we have done, except that he refers the two lower palpigerous pieces, with a question, to the labrum (misprint for labium?) which they cannot possibly be; they are evidently the maxillæ. The upper lateral pieces bearing the antennæ are much less conspicuous, judging from the description, in *Bombylius* than in *Systœchus*. The pupa of *Bombylius*, from Dr. Chapman's excellent description, differs in the greater prominence and somewhat different arrangement of the cephalic spines, the anterior pair being stouter and more bent forward than in either of the genera we have treated of. Dr. Chapman speaks of these spines forcibly reminding him of the tusks of a walrus and of their admirable adaptation to tearing down the clay stopping and digging through as "with mattock and shovel" the long burrows of the bee upon which it preys. The dorsal and anal spines are also much more prominent than in our locust-egg parasites. The pupa of *Systœchus* and *Triodites*, not being under the necessity of such strenuous digging, have a less formidable armature; otherwise there is strict structural correspondence with *Bombylius*.—*C. V. Riley*.

EXPERIMENTS WITH PYRETHRUM: SAFE REMEDIES FOR CABBAGE WORMS AND POTATO-BEETLES.—The following experiments with Pyrethrum were made, at our request, by Prof. A. J. Cook, of the Michigan Agricultural College, at Lansing. They are interesting as confirming all that we have hitherto said in recommendation of this powder for the imported cabbage worm, no safe and satisfactory remedy for which had been discovered before we recommended this powder and showed that it could be economically used when simply mixed with water. Its value, used in this way, for the Colorado potato-beetle as a substitute for the more dangerous arsenical compounds will at once be appreciated.—*C. V. R.*

Sept. 27, 1880.—I placed ten cabbage caterpillars (*Pieris rapæ* Schrank), in each of two small wooden boxes which were covered with wire gauze. In one box I dusted the least possible amount of Pyrethrum mixed with flour in the proportion of one part of the Pyrethrum to twenty parts of the flour. I sprayed those in the other box with a liquid mixture, using one tablespoonful of Pyrethrum (7 grammes $\frac{1}{5}$ lb) to twenty gallons of water. In five minutes all the larvæ were on their backs. Nor did any of them recover. A large number of the caterpillars on the cabbage plants were sprinkled or dusted with the Pyrethrum, the proportion the same as given above. In one hour the plants were examined and in every case the caterpillars were found dead.

The same experiments as those detailed above were tried with the potato-beetle (*Doryphora 10-lineata*). Those in the boxes were all down in fifteen minutes, both beetles and larvæ; nor did they recover. I watched those on the vines for twenty minutes, when several had fallen to the ground. These were some distance

from my home, and I could not watch them longer. Whether all dropped or not I am not able to say, nor whether all or any recovered.

Wednesday, Sept. 29, 1880.—In the following experiments the cabbages were simply dusted or sprinkled with no effort to secure actual contact of the liquid or powder with the larvæ. The experiments were tried under my direction by a very trusty and careful assistant, Mr. Will. R. Hubbert, with the following results:

1st Experiment.—By use of a common sprinkler, nine cabbages were treated with the liquid mixture, composed of one tablespoonful of Pyrethrum (7 grammes) to a gallon of water. In one and one-half hours after the application, a *hasty* examination discovered thirteen dead larvæ and three live ones.

2d Experiment.—Ten cabbages were treated the same as above, except that two applications of the liquid were made; nineteen dead larvæ and one live one were found.

3d Experiment.—Twenty-six cabbages were treated with a liquid mixture of one tablespoonful of the powder to two gallons of water. One application was made with Whitman's Fountain Pump. Eleven dead and four live larvæ were found.

4th Experiment.—The same as experiment 3, on thirteen cabbages, except that two applications of the liquid were made. There were five dead caterpillars and two alive.

5th Experiment.—Twenty cabbages were dusted with a powder compound of one part of Pyrethrum to forty of flour; five dead larvæ and one live one were found.

6th Experiment.—Twenty cabbages were treated the same as No. 5, except that the mixture was in the proportion of 1 to 20; three dead and three live caterpillars were found.

The examinations in all the above cases were made one and one-half hours after the application of the liquid. The examination was too hasty to be thorough.

The next day all were again examined with great care, so that very few, if any larvæ were omitted in the count.

No. 1.	9 Cabbages,	17 dead,	39 stupefied,	3 alive.
" 2.	10 "	42 "	30 "	1 "
" 3.	26 "	18 "	0 "	58 "
" 4.	13 "	25 "	3 "	1 "
" 5.	20 "	18 "	3 "	9 "
" 6.	20 "	9 "	0 "	1 "

Friday, Oct. 1, 1880. Experiment 1.—Treated twelve cabbages: used one gallon water and $\frac{1}{2}$ spoonful of Pyrethrum. Careful examination revealed eleven dead and eleven alive.

Experiment 2.—Twelve cabbages: used one gallon water to $\frac{1}{4}$ spoonful (2 grammes) of the powder. Eleven dead and four alive.

Experiment 3.—Twenty-six cabbages: used Pyrethrum and flour 1 to 40. Three dead, five alive and one stupefied.

Experiment 4.—Twelve cabbages: one gallon water to one spoonful of the powder. Result, thirteen dead, four alive and four stupefied.

The above experiments show conclusively that this powder is fatal to the caterpillars, and that too in very dilute liquid mixtures, as only $\frac{1}{200}$ of a lb. to the gallon of water was used in Exp. 2 of Oct. 1st, and eleven larvæ were killed. We have only to sprinkle it on to the plants, though it may be necessary to make more than one application to insure complete success. The success was better with the liquid than with the flour mixture, and can be applied with greater speed and economy.

A twig of alder (*Alnus serrulata*), covered beneath with woolly Aphides (*Eriosoma tessellatum* Fitch), was dipped into the liquid mixture of $\frac{1}{50}$ lb. to a gallon of water. The next morning all the lice had fallen to the ground, never to rise again.

Flies and mosquitoes in a room where the powdered Pyrethrum had been blown in not very large quantities, less than $\frac{1}{100}$ of a lb. to a room twelve feet square, were felled to the floor, where nearly all remained till morning; though the application was made the night before. If not swept up some of the flies would recover. The flies commence to fall in ten minutes.

Squash bugs (*Coreus tristis*), were kept in the clear powder, in a close tin box, for three days, and were still alive. I also sprinkled and dusted these insects on the vine, and could see no signs of success in killing them.

THE FOOD OF FISHES.—We have received an interesting contribution, with the above title, by Prof. S. A. Forbes, from Bulletin No. 3, Illinois State Laboratory of Natural History, November, 1880. The author gives the results of a large series of examinations of the stomachs of darters, perches, bass and sunfishes. He also separately considers the food of the young fishes as distinguished from that of the adult. His investigations have led to some interesting general conclusions, among which we commend the following as applying to studies in other departments of Natural History as well: "Nowhere can one see more clearly illustrated what may be called the *sensibility* of such an organic complex—expressed by the fact that whatever affects any species belonging to it, must speedily have its influence of some sort upon the whole assemblage. He will thus be made to see the impossibility of studying any form successfully out of relation to the other forms—the necessity for taking a comprehensive survey of the whole as a condition to a satisfactory understanding of any part. If one wishes to become acquainted with the black bass, for example, he will learn but little if he limits himself to that species. He must evidently study also the species upon which it depends for its existence, and the various conditions upon which *these* depend. He must likewise study the species with which it comes in competition, and the entire system of conditions affect-