

M. Wheeler, Corps of Engineers, for 1879, contains an ornithological report on observations and collections made in portions of California, Nevada and Oregon, by Assistant H. W. Henshaw. Mr. Henshaw is now in Oregon and Washington Territory, taking the census of the Indian reservations in that region, but will doubtless find opportunities for ornithological studies in that interesting section.—Under the heading "Infusoria as parasites," Mr. W. S. Kent, in the *Popular Science Review*, enumerates ten species of *Flagellata* and fifteen species of *Ciliata* which are genuine parasites in the viscera of birds, frogs, &c., ducks and geese, house-fly, the blood of Indian rats, a nematode worm, the common cockroach, a myriopod (*Julus*), a water beetle, earthworm, a marine planarian of several fresh water snails, besides Dr. Salisbury's *Asthmatos ciliaris*, which he regards as an active agent in the production of one form of hay asthma or hay fever.—In a recent paper in *Kosmos*, Fritz Müller describes a Brazilian fly (*Paltostoma torrentium*) with two forms of females.

ENTOMOLOGY.¹

LARVAL HABITS OF BEE-FLIES (BOMBYLIIDÆ).—In the last number of the *American Entomologist*, we gave from advance sheets of the Second Report of the United States Entomological Commission an account of the larval habits of *Systœchus* and *Triodites*, showing that they prey on locust eggs, and drawing the following conclusions:

The discovery of the "parasitism" of these bee-flies upon locust-eggs at once suggests a comparison with the similar diversity of parasitic habits among the Meloidæ as given in our first report, some of them infesting bee-cells, while others, as the true blister-beetles (*Lyttni*), feed on locust eggs.

The Anthracids are now united by the best authorities with the Bombyliidæ, of which family as a whole Osten Sacken has said, they are "perhaps the most characteristic and one of the most abundantly represented families of Diptera in the western region, including California." The abundance of blister-beetles is also well known to characterize this region, and we have shown how this abundance is connected with the abundance of locusts. It is

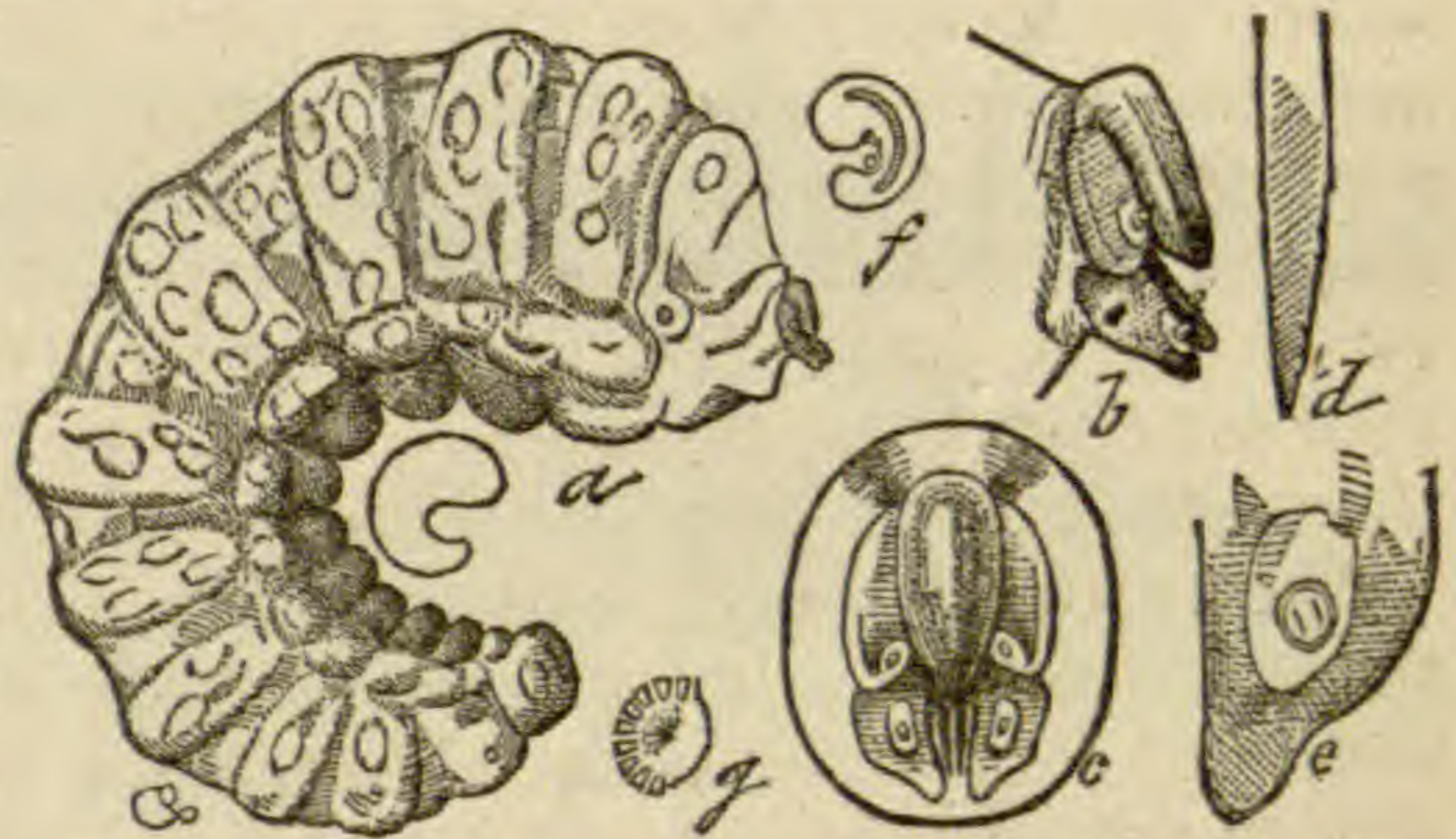


FIG. 1.—*Systæchus oreas*; *a*, larva; *b*, head, from side; *c*, do., from front, partly withdrawn into first joint; *d*, left mandible; *e*, left maxilla; *f*, prothoracic spiracle; *g*, anal spiracle (after Riley).

¹ This department is edited by PROF. C. V. RILEY, Washington, D. C., to whom communications, books for notice, etc., should be sent.

of interest, therefore, to find that the bee-flies bear a similar relationship of parasitism to the latter, and that the characterization of the fauna in these two groups is really dependent upon the presence of the locusts as well as upon the rich representation of the burrowing Hymenoptera.



FIG. 2.—*Systæchus oreas*; pupa (after Riley).

Reviewing what had been published as to the larval habits of the true Bombyliids, we concluded that while there was strong presumptive evidence that they preyed on bee larvæ, there was yet no proof, and that the locust-egg-feeding habit we recorded, weakened the presumption. Since the publication of our article we have met with one previously overlooked, "On the Economy, etc., of Bombylius," by T. A. Chapman, M.D., in the *Entomologists' Monthly Magazine* for February, 1878 (Vol. XIV), p. 196. Mr. Chapman gives abundant proof of the parasitism of the European, *B. major*, on *Andrena labialis*. He records some observations

on the oviposition of Bombylius, the small white egg being thrown with a short jerk against the earth near where the food of its future larva presumably occurred. This would also imply that, as in the case of the blister-beetles, the newly hatched larva must seek its food, and strengthens our suspicion that it will be found to be much more active than the mature larva. Mr. Chapman

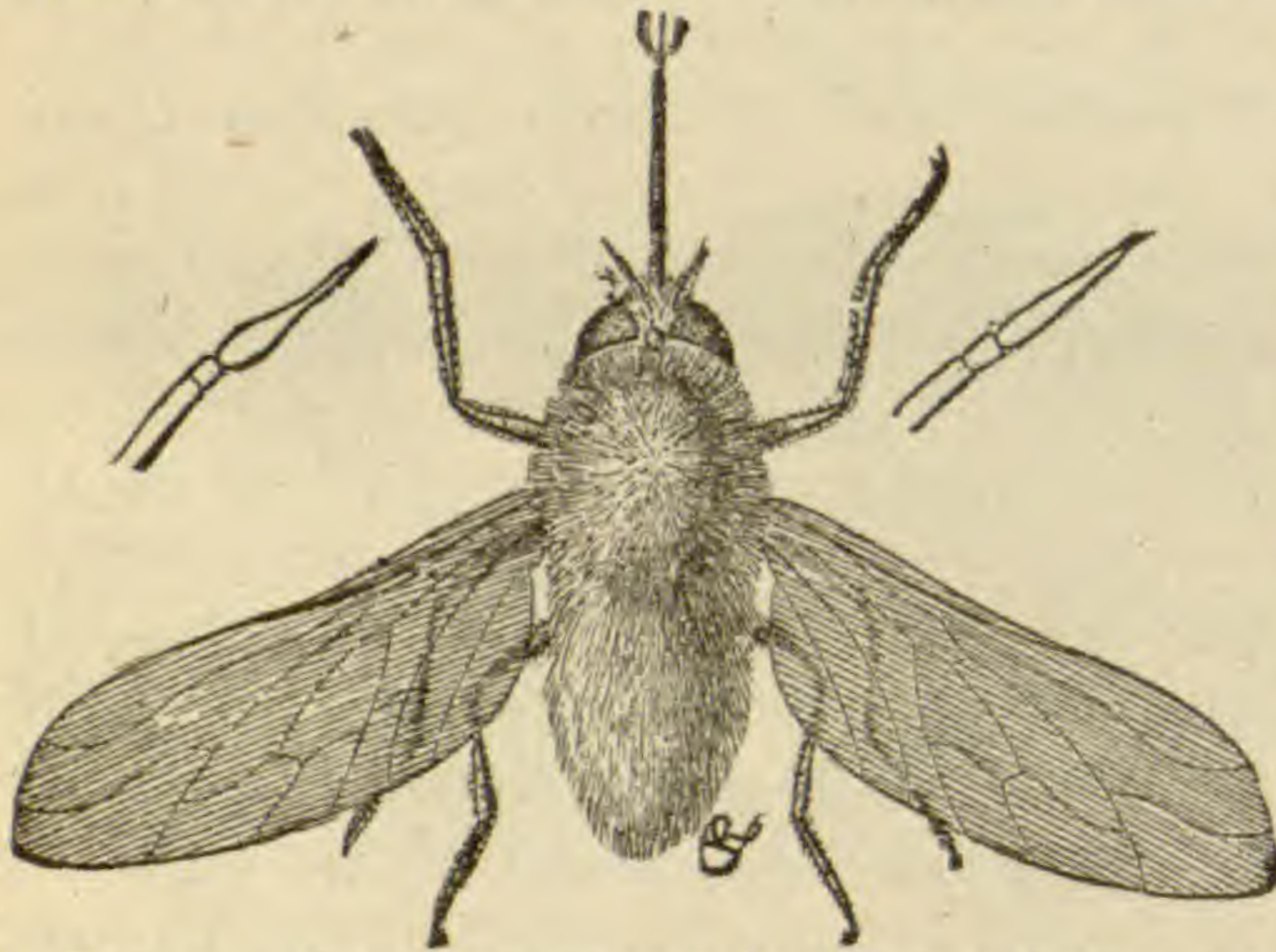


FIG. 3.—*Systæchus oreas*; female; antenna, side view, to left; do. top view, to right.

very fully describes the mature larva and the pupa, and his descriptions show that in all essential points the larva of Bombylius accords with those of Triodites and Systæchus. We quote his description of the head: "The head is set into this segment [the 1st thoracic] and is retractile; it is very small; its center is occupied by a prominent

wedge-shaped portion, the point of the wedge being downwards, and immediately in front of the mouth. Immediately beneath this are two black, very sharp, setiform jaws (?); on each side is a papillary eminence (antenna?) of three joints set in a circle of softer tegument, and immediately below project downward on each side two large palpi (labrum?) looking like jaws, but having a vertical, not a lateral mobility, on the anterior face of each of these there is a palpus of some length, apparently unjointed, set in a circle." It will thus be seen that he homologizes the parts

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