

490. *Hydriomena multiferata* Walk.—Lake Louise, Laggan, July 18th, 1907, one specimen.

491. *H. custodiata* Grt.—Three more specimens. Red Deer River, July 21st and 24th, and head of Pine Creek, July 27th, all in 1907.

493. *Cænocalpe magnoliata* Guen.—Two more specimens, at Head of Pine Creek, on July 15th, 1906, and July 16th, 1911; one at Banff, July 1st, and another at Laggan, July 18th, 1907.

495. *C. topazata* Grt.—Head of Pine Creek, May 26th, 1907.

498. *Xanthorhoe abrasaria* H.-S.—One at Head of Pine Creek, July 3rd, 1904.

501. *X. turbata* Hbn., syn. *circumvallaria* Taylor.—I quoted Mr. Prout's MS. reference in a footnote to my previous notes. The same reference is made by Messrs. Barnes & McDunnough in Vol. XLIV., p. 274, Sept., 1912. Taylor described it from Laggan specimens only.

502. *X. fossaria* Taylor—Described from three males and a female from Laggan, Alta., and two males from Mt. Cheam, B. C. One from the latter locality is the type (CAN. ENT., XXXVIII., 401, Dec., 1906). In March, 1906, I visited Mr. Taylor, and received from him, amongst other species, a series of six Wellington specimens as *fossaria*, bearing dates of June 15th to 30th, 1902 and 1905. They certainly look to me the same species, but it is strange that no mention is made of its occurrence at Wellington in the description.

503. *Synelys enucleata* Grt.—Two more Red Deer River specimens, July 24th, 1907.

519. *Deilinia borealis* Hulst.—I have a female taken by Mrs. Nicholl at Banff on June 24th, 1907.

(To be continued.)

ODOUR PREFERENCES OF INSECTS.

BY HARRY B. WEISS, NEW BRUNSWICK, N.J.

Moths, butterflies, bees, flies and other insects feed upon the nectar of flowers, being guided to them presumably by the senses of smell and sight. Various investigators have differed in this, Lubbock claiming that bees, for instance, recognize at a distance and prefer certain colours; while Plateau found that neither form

nor colour played any part in attracting insects and that they were guided entirely by a sense of smell.

This sense is defined by Forel as "a special sense which allows the animal to recognize at a distance by some specialized energy the (chemical) nature of a certain body." Our scientific knowledge of odours is rather meagre. Some are known vaguely as pleasant or unpleasant and for many we have no definite names whatever, and are forced to liken them to the few odours with which we are familiar and for which we have definite names. Moreover, some smells are exceedingly complex experiences involving elements of taste, touch and vision. The most satisfactory classification of smells is that adapted by Zwaardemaker from the classification of Linnaeus, which groups natural objects according to similarities, but does not aim to itemize all smells. This list is as follows:

- 1.—Ethereal smells, including all fruit odours.
- 2.—Aromatic smells; for example, those of camphor, spices, lemon, rose.
- 3.—Fragrant smells, those of most flowers.
- 4.—Ambrosiac smells—all musk odours.
- 5.—Alliaceous smells—those of garlic, asafoetida, fish, chlorine.
- 6.—Empyreumatic smells—those of tobacco, toast.
- 7.—Hircine smells—those of cheese, rancid fat.
- 8.—Virulent smells—those of opium.
- 9.—Nauseating smells—those of decaying animal matter.

In the Lepidoptera practically all members are attracted by fragrant smells. The Coleoptera have a somewhat wider range. Dermestidæ are attracted by fragrant and also hircine odours; *Dermestes lardarius*, for instance, the larva of which feeds on bacon, cheese, meat and feathers. The bumble flower beetle, *Euphoria inda*, finds ethereal and fragrant odours to its liking, being found feeding on peaches, grapes, apples and the pollen of flowers. Locust borers and soldier beetles are plentiful on golden-rod and various Buprestids also visit flowers, while the cigarette beetle has an empyreumatic taste. The Silphidæ, however, are drawn to nauseating odours, feeding, as they do, on decaying flesh.

With the exception of the ants, nearly all Hymenoptera are attracted by fragrant odours and also ethereal odours, the Vespidæ and bees being very fond of nectar and fruit juices. Ants have a

wider range, ethereal, alliaceous, hircine and nauseating odours all being more or less attractive.

The range of the Diptera is exceptionally wide, embracing ethereal, fragrant, alliaceous, hircine and nauseating odours. Certain species of mosquitoes, bee flies, and syrphus flies are found feeding on nectar. *Eristalis tenax* visits cesspools, dung-pits and decaying vegetable matter in addition to different flowers. Drosophilidæ visit decaying fruits both for food and egg deposition, and *Piophilæ casei* is drawn toward cheese, ham and partly spoiled vegetable matter; while the house fly, as everyone knows, shuns nothing except aromatic and virulent odours.

Robertson's records show clearly that the Hymeroptera and Diptera are especially fond of fragrant odours. He found that *Pastinaca sativa* was visited in twenty-six days by 173 Hymeroptera, 72 Diptera, 14 Coleoptera, 9 Lepidoptera, 6 Hemiptera and 1 Neuropteran; also that *Asclepias verticillata* was visited by 52 Hymeroptera, 42 Diptera, 16 Lepidoptera and 3 Coleoptera.

It would be extremely interesting to find the effect of exhaustion upon the end organs of smell. A bee, for instance, visiting innumerable flowers of the honeysuckle must have its organ fatigued by the continuous smelling of this one odor. How, then, would it react to other odours? Does its physiological mechanism of smell consist of distinct parts, one of which might be put temporarily out of commission without impairing the others, or does it consist entirely of one part?

THREE NEW GALL MIDGES (DIPTERA).

BY E. P. FELT, ALBANY, N.Y.

The following descriptions are of species which have been reared and of one concerning which we possess some exceptionally interesting data. There is much to be learned about our tropical or subtropical midge fauna. There must be hundreds of interesting and undescribed species existing in the West Indies and adjacent countries.

Karschomyia cocci, n. sp.

The midges described below were reared from a sugar-cane mealy bug, *Pseudococcus sacchari* (?) collected at Central Providencia, Patillas, P.R., January 30, 1913, by Mr. D. L. Van Dine.

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