

## A DESCRIPTION OF THE EGG AND OVIPOSITOR OF CUTEREBRA FONTINELLA, CLARK. (Cottontail Bot.)

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In the study of the Oestridae, the most important problem at the present time is to discover the various methods of oviposition for the different species. From an economic point of view the most important question is: How do the larvae gain entrance to their respective hosts, after emerging from the egg? The following observations on the eggs and ovipositor of *Cuterebra fontinella* may be of some interest. Up to the present I have seen no descriptions of the eggs of any of the *Cuterebrae*.

The specimen from which the eggs were obtained was captured out of doors on July 30th, 1914, at Agassiz, B. C.

The measurements of the egg are: Length, 1.05 mm.; width, .03 mm. at the widest part. In shape it bears a resemblance to the egg of *Gastrophilus equi*, being somewhat canoe-shaped (Plate 1, Fig. 1). It possesses a deep groove on the under side, which is at least one-third longer in proportion than that of *G. equi*. In *G. equi* the groove is about half the length of the egg. (Plate 1, Fig. 2). On the upper side, at the end, is a well-marked operculum, very similar in shape and size to that of *G. equi*, though in the latter the operculum has reticulations differing from the markings on the rest of the egg. The egg case is rough and has a shagrenated appearance, the operculum not differing from the rest of the egg surface. (Plate 2, Fig. 3). The groove clearly indicates that the egg is meant to be attached to a hair, and that possibly the larva has, up to a certain point, a similar life history to that of *G. equi*. If so, for the emergence of the larva, moisture and friction must be supplied, such as would be furnished by the tongue of the host animal when licking itself.

The subsequent life history of Cuterebrine larvae must differ considerably from that of *G. equi*; because, in the various host animals, the larvae show a selective faculty for different parts of the body. For instance, *C. emasculator* selects the scrotum of *Tamias striatus lysteri* for its final habitat. Another undetermined species, specimens of which I have received, is reported to have been found in the backs of field mice. Two mature larvae, which were recently sent to me from Manitoba, were taken from the costal region of a domestic cat. Possibly in this case the cat was not the natural host, and the larvae acted in a similar manner to those of *Hypoderma bovis*, when they are found in an unusual host. According to Railliet they wander about and do not settle



Fig. 1.

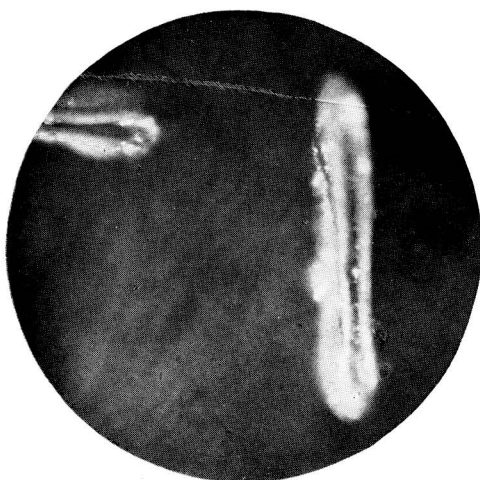


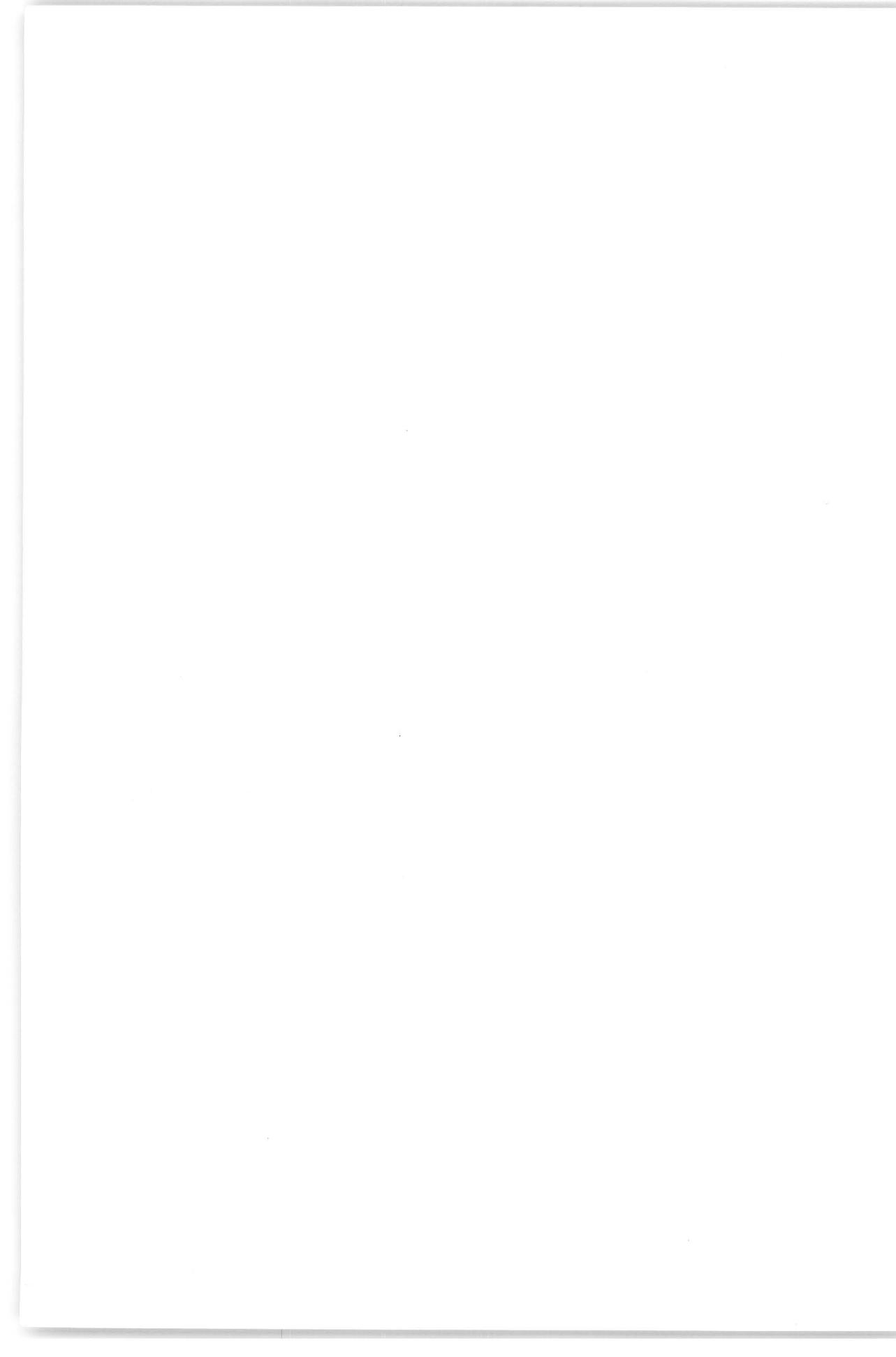
Fig. 2.



Fig. 3.



Fig. 4.



in any definite portion of the animal. In the case of the cat the larvae may have been swallowed when it was feeding on a squirrel. The only available reference of a similar kind is quoted by Washburn, where, he says: "Unidentified bots, possibly belonging to this genus (*Cuterebra*), have been taken from beneath the jaws of kittens."

According to Townsend the larvae of *C. fontinella*, which he found in rabbits, showed no selective faculty for any special part of the body. The positions he mentions are: The dorsal, pectoral and the ventral regions.

It may be well here to make a brief comparison between the eggs of the different Oestridae, of which I have descriptions.

*Hypoderma bovis* and *H. lineatum* have smooth eggs, attached to the hairs by a pedicel, and show no trace of operculum. The egg splits open to allow the emergence of the larva.

The egg of *Oedemagena tarandi*, the reindeer Warble-fly, has a modified operculum in the shape of a thin flap, along the edge of which the egg splits open. It is attached by a pedicel. According to Carpenter's figures, the egg of *O. tarandi*, apart from the opening flap, closely resembles that of *Hypoderma*.

The egg of *Gastrophilus equi* is somewhat curved, probably owing to the groove by which it is attached to the hair, which runs along the under side for about half its length. This groove must occupy space inside the egg, hence the corresponding bulge on the other side, to give room for the larva. It has a well-defined operculum, differently marked from the rest of the egg.

*Cuterebra fontinella*—This closely resembles the egg of *G. equi* in shape and in possessing an operculum and a similarly shaped groove. The groove, however, is proportionately longer. The main difference is in the surface of the egg case, which is rough but not lined as in *G. equi*, there is no different marking on the operculum.

According to the conformation of the egg, it is thus possible to separate the species mentioned above. As *C. fontinella* is close to *G. equi*, it would be reasonable to suppose, then, that in their manner of entrance at least, the larvae of *Cuterebra* resemble those of *Gastrophilus*; and the fact that rodents are continually licking themselves adds strength to the hypothesis.

According to Townsend and Bau the host of *C. fontinella* is *Lepus artemisia*, Bachman (Cottontails). In this part of British Columbia rabbits are not plentiful and we have no records of any having been found parasitized by this grub. It would appear that there is a possibility of *C. fontinella* having another host, two females were collected by Mr. R. S. Sherman on Savary Island, which is a small island in the Straits of Georgia where no rabbits exist. However, mice are quite common on

the islands and on the mainland, this coupled with the fact that an undetermined species has been collected for mice, strengthens the supposition.

An interesting habit of Cuterebrine larvae mentioned by Townsend is their custom of emerging after their host animal has been killed. This apparently takes place only when they are sufficiently mature to pupate. Confirmation of this habit has been obtained from observers in British Columbia. The occurrence has not been observed in *Hypoderma*, and seems peculiar to the parasites under discussion.

Through the kindness of Dr. C. Gordon Hewitt I have obtained Townsend's original description of *C. fontinella*, and find that he gives no description of the ovipositor. The most striking thing about the ovipositor is its shortness, as compared with those of the other Oestridae; and this fact makes one wonder how oviposition is accomplished on, for instance, a small active rodent? One experiment was made with the fly mentioned in the first part of this paper. Immediately after it was captured it was placed in a jar with a white mouse. The mouse became terrified, and whenever the fly buzzed against it, the mouse turned viciously and bit at it. The experiment was, of course, a failure, as both mouse and fly wanted to escape.

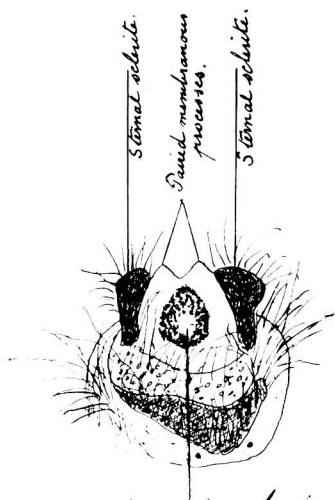
#### Description of the Ovipositor.

The ovipositor is very short and set in a horse-shoe space, the opening being toward the ventral part of the insect. (Plate 3, Fig. 7). The horse-shoe ring is surrounded by what Townsend describes as the fourth and last segment of the abdomen. He is certainly wrong in this, as there are two distinct segments following the fourth, forming part of the ovipositor, and, in addition to these, the sternite and tergite plates represent suppressed segments. So that there are at least six visible segments in the abdomen. All the segments, including the ovipositor, are densely covered with hairs, a fringe of hair on the margin of the fourth segment partly conceals the ovipositor.

The ovipositor ends in two blunt processes, which correspond to the latero-sternal sclerites, and another, the tergal sclerite, described by Carpenter for *Hypoderma*. (Plate 3, Fig. 6). Ventrally in front of the tergal sclerite, there is a chitinous plate which fits between the latero-sternal sclerites.

In front of the chitinous plate is a paired membranous organ with two points, which are designated in the figures as paired membranous processes. (Plate 3, Figs. 5 and 6).

I am indebted to Mr. Hugh Scott, Curator in Entomology at Cambridge, and Mr. E. E. Austen of the British Museum for the determination of *C. fontinella*; to Mr. G. H. Unwin for collecting literature, and to Dr. F. Torrance, Veterinary Director-General, for permission to publish this article.



Chitinous plate showing  
through transparent  
membranous processes.

FIG. 5

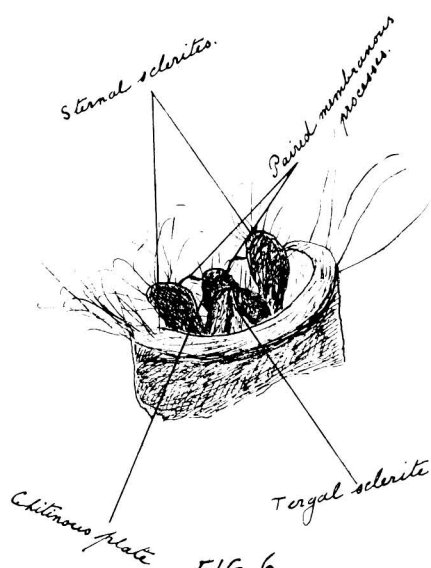


FIG. 6

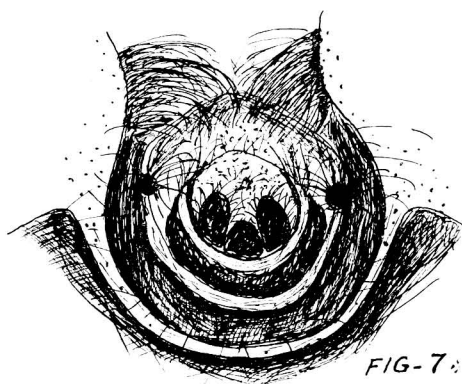
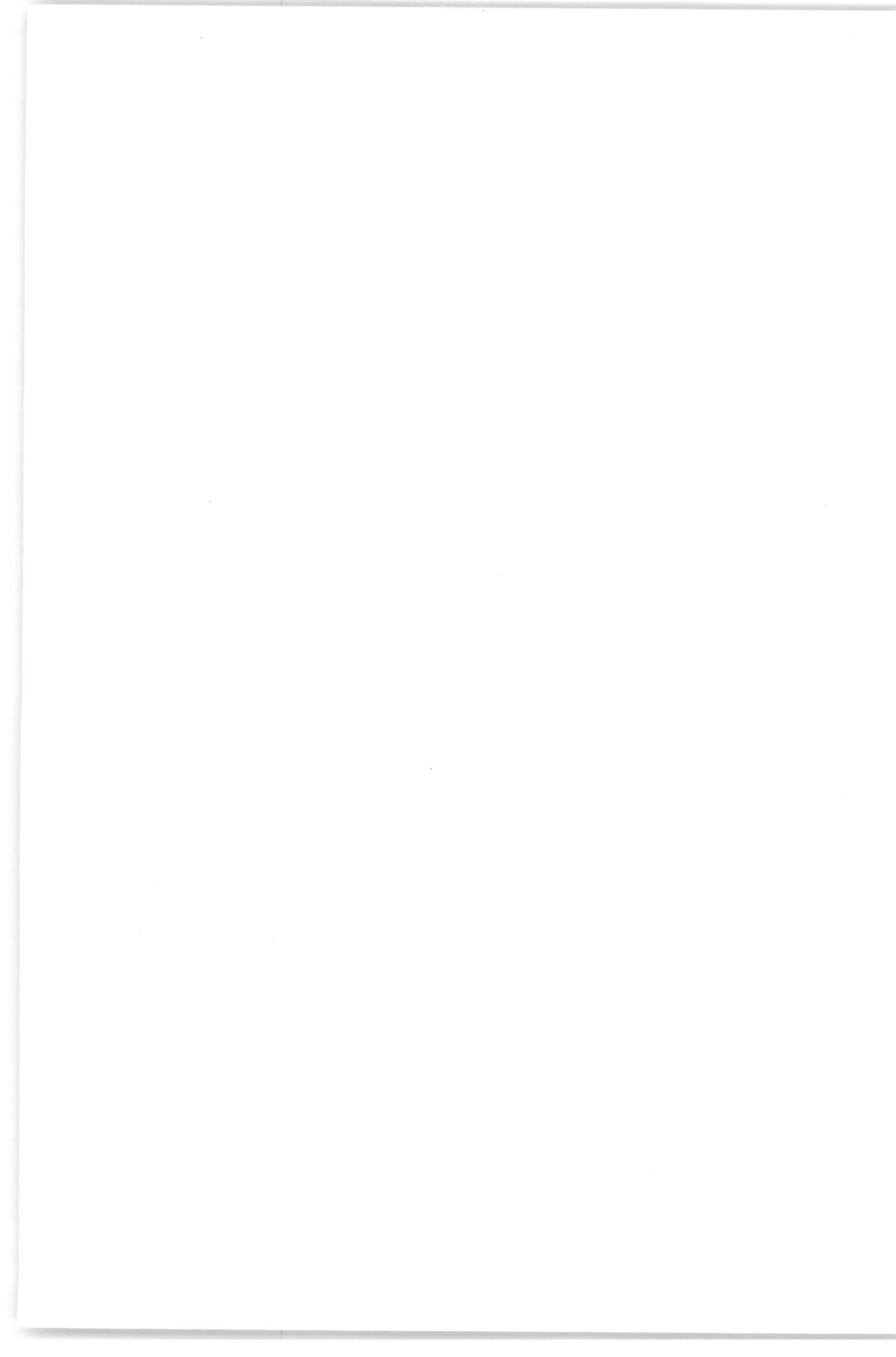


FIG. 7



### References.

- Bau, A. (1906), *Genera Insectorum*. Diptera 43 me., Fascicule.
- Carpenter, G. H. (1914). Notes on the Warble-fly of the Reindeer. *Jour. Ec. Biol.*, Vol. 5, No. 4.
- Carpenter, G. H., and Hewitt (1914). The reproductive organs and the newly-hatched larva of the Warble-fly (*Hypoderma*). *Sci. Proc. Royal Dublin Soc.*, 268-289.
- Osborne, H. (1896). Insects affecting domestic animals. *Oestridae*, 72-114.
- Patton, W. S., and Craig, F. W., (1913). *A Textbook of Medical Entomology*.
- Townsend, C. H. T. (1893). Further notes on the cottontail bot, with the breeding and identification of the fly. *Insect Life*, Vol. 5, 317-320.
- Washburn, F. L. (1905). (*Cuterebra*), Univ. of Minnesota, Bul. No. 93, 125-140.

### Explanations and Plates 1, 2 and 3.

Photographs and drawings by S. Hadwen.

- Fig. 1. Eggs of *C. fontinella*, showing canoe-shape.
- Fig. 2. Groove on under side of egg.
- Fig. 3. The operculum.
- Fig. 4. *Cuterebra fontinella*, Clark.
- Fig. 5. Ovipositor, ventral view, showing the sternal sclerites, the paired membranous processes and chitinous plate.
- Fig. 6. Dorsal view of ovipositor. Tergal sclerite, sternal sclerites, paired membranous processes and chitinous plate.
- Fig. 7. Reproductive organs, general view.

### NOTES ON THE HABITS OF SOME LEPIDOPTERA.

By J. W. Cockle, Kaslo.

Mr. Treherne (Secretary):

Mr. Cockle was unable to come, and he sent me his paper. It is one of the most gratifying things to me, as Secretary of this Society, to receive papers without any special exertion on my part. In getting up the programme for this meeting, a few weeks before I started I had nothing in mind, but on sending out circulars, these papers came rolling in, and we have more than enough for today's meeting. Two papers from the Upper Country have come in without any solicitation, one of them being Mr. Cockle's. I take pleasure in reading it for Mr. Cockle.