

## Something New About Warble Flies

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**W**ARBLE flies injure cattle in several ways: they puncture the skin, thus spoiling the hide from the tanner's point of view; they annoy cattle in the open, sending them in panic-stricken and headlong flight all over the pasture; they undoubtedly create channels of entrance for disease germs (such as anthrax) which live in the soil; and, when infesting an animal in any abundance, they cause emaciation, weakness, and irritability. This article, however, is primarily concerned, not with economic aspect, but with their life history and habits.

The latest investigators are Dr. Carpenter in Ireland, Glaser in Germany, and Dr. Hadwen in British Columbia. Previous to their work the life cycle of this remarkable insect had not been fully worked out, though the warble maggot was described by De Geer as early as 1776, and careful descriptions have been published from time to time by Bracy Clark (1815), and more lately by Miss Ormerod in England and Dr. Curtice in America. These descriptions covered the adult fly and the full-grown maggot as it is found in the backs of cattle; but the intermediate stages, the egg, and the newly-hatched larva, were not fully described until recently; nor was it at all certain how and where the egg was laid by the fly, nor how the little grub gained entrance to the host. These problems have now been solved and their solution will be described subsequently.

First, however, it would seem advisable to give a short account of the adult fly and its methods of attack. There are two kinds of warble flies,

which, though closely related, (being in fact first cousins) show some striking differences not only in appearance, but in their manner of doing business. We shall give these their scientific names in order to distinguish between them: they are respectively *Hypoderma bovis* and *Hypoderma lineatum*. The general appearance of these flies shows a close resemblance to a small bee, though the legs are much longer in proportion to the body. The first-named, *H. bovis*, is the larger fly of the two, thicker in the thorax, and shows more of the "bull dog" build. In general coloring *H. bovis* shows more yellow, while *H. lineatum* is a darker colored, more sedate-looking insect.

The greatest difference between these two species, however, lies in their method of attack. The larger fly, *Hypoderma bovis*, inspires the greatest fear in cattle, causing that familiar performance known as "gadding"; the animals stampede madly about the pasture, frequently colliding with any-



Fig. 1—*Hypoderma bovis*, which causes cattle to stampede.