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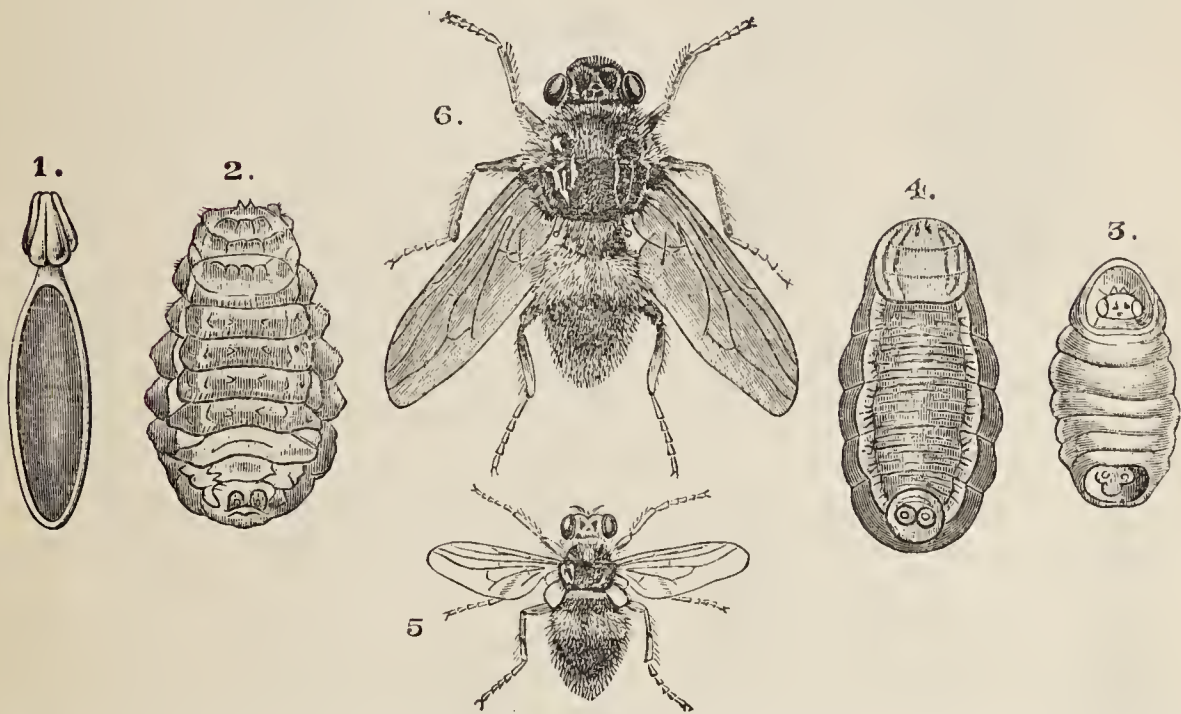
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Ox warble fly, or hot fly.
1895.

One Hundred and Forty-fifth Thousand.

OX WARBLE FLY, OR BOT FLY,

Hypoderma Bovis, De Geer.



1, egg; 2, maggot; 3 and 4, chrysalis-case; 5 and 6, fly; 3 and 5, nat. size, after Bracy Clark; the other figures after Brauer, and all magnified.

THE OX WARBLE FLY, OR BOT FLY, is a two-winged fly, upwards of half-an-inch in length, so banded and marked with differently-coloured hair as to be not unlike a Humble Bee. The face is yellowish; the body between the wings yellowish before and black behind: and the abdomen whitish at the base, black in the middle, and orange at the tip. The head is large; the wings brown; and the legs black or pitchy, with lighter feet.

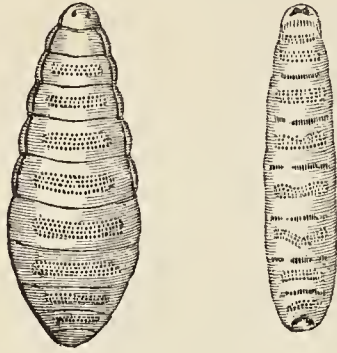
The female is furnished with a long egg-laying tube; but whether she inserts her eggs into the hide or lays them on it has not been made out with certainty.

Egg-laying takes place *during the summer*; it may begin in the month of May, but the time varies with the weather, and with the cattle being on low land or hill pastures, and other circumstances. The egg is oval and white, with a small brownish lump at one end.

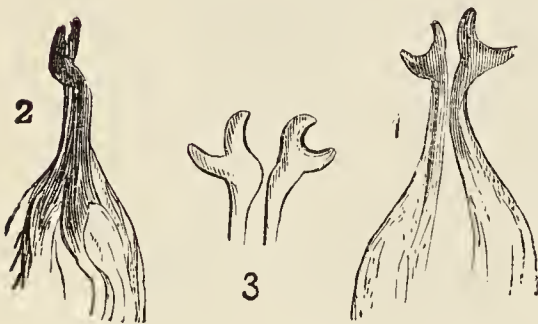
When full-grown the Warble-maggot is the shape figured above.

The mischief may first be found on the flesh side of the hide early in the winter. Specimens received from Messrs. Hatton, Hereford, on November 13th, showed the first appearance as small swellings bluish in colour, as if half a large shot was under the skin, and much inflamed round. The maggots were very minute and blood-colour, and lying free (not in a cell) with a fine channel down through the hide to where they lay.

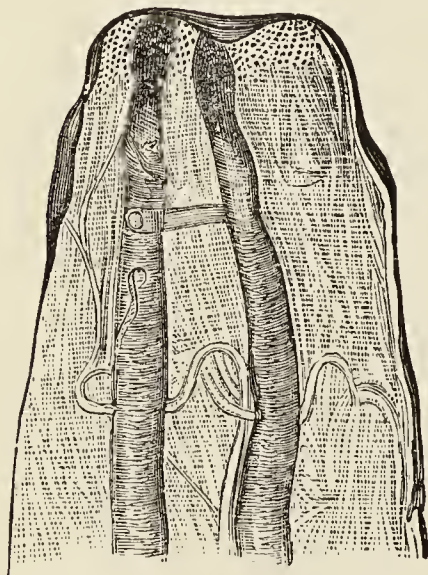
The open Warble was first found towards the end of January, and by the end of February open Warbles were noticeable in many places, and the maggot was now white (not being feeding in bloody matter), worm-like, and with strong mouth-forks; in its next stage it was club-shaped, and had a power of inflating itself by drawing in fluid until it was almost as hard and transparent as ice, and, lying small end uppermost, thus kept pressing the opening through the hide larger. In its next stage it gained its well-known shape, with a thicker and more prickly skin, the Warble-cell at the same time gaining its membranous coating.



Maggots.
Club-shaped. Worm-like.
Magnified.



Mouth-forks of young maggot,
much magnified.



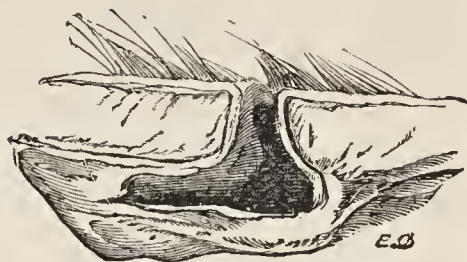
Breathing-tubes of maggot,
magnified.

The maggot can move up and down, but commonly has its brownish-tipped tail at the opening, and it draws in air through breathing-pores in these brown-black tips or spiracles. The mouth-end is down below, feeding in the ulcerated matter caused by irritation from perpetual suction of the mouth parts. The maggot cannot protect itself from the effect of applications, therefore anything put on the opening where the breathing-tips show will choke the breathing-apparatus, or run down into the hole and poison the maggot. The earlier this is done in the season the better it will be for the animal; and the less difficulty there will be in the Warble-holes healing.

Whilst the maggots are in the Warbles, though a skin-like membrane forms round the surface of the perforations (see figure, page 3), they cannot heal up because the maggot lies within; and when the Warble-grub has *fallen out*, though the hole contracts, the surfaces, being already covered with a film of tissue, are slow to unite; and, as may be seen in warbled hides, union is often prevented by this skin-like film shelling off, and lying with dried matter in the perforation. On

the under side of the hide, though the *surface may not* be broken, yet the subcutaneous tissues are often left as a mere film of no strength, which injures the surface of the leather.

When the maggot is full-grown it is about an inch long and dark grey; it presses itself out of the opening *tail foremost*, and falls to the ground, where it finds some shelter, either in the ground or under a stone or clod, where it changes to a chrysalis. The chrysalis is dark brown or black, much like the maggot in shape, only flatter on one side; and from this brown husk the Warble Fly comes out in three or four weeks, but this length of time is *increased by cold weather*.



Section of Warble, after soaking in water.

With regard to methods of remedy, there does not appear to be any difficulty of getting rid of the Warble-maggot easily and cheaply, when the Warble has "ripened"—that is, opened so far that the black end of the tail is visible. *Then* it may be destroyed cheaply and quickly. From special observations, taken during the last three years, it has been found that where the Warble-maggots have been destroyed before they drop from the cattle, there is little if any summer attack of Warble-flies. Consequently the cattle can rest in peace, and, as there is very little egg-laying on them, there are scarcely any Warbles in the following spring.

Squeezing out the maggots is a sure method of getting rid of them, but they may be destroyed easily and without risk by dressing the Warble with a little of McDougall's smear or dip, or (without noting by name the applications sent out by different manufacturers, whether Messrs. McDougall, or the Dee Oil Co., Messrs. Calvert & Co., or Messrs. Tomlinson & Hayward, or many others) any grease or mixture thick and tenacious enough for a little "dab" of it, when placed on the opening of the Warble, to adhere firmly, and thus choke the maggot by preventing it drawing in air through the breathing-openings at the end of the tail, will answer well.

Cart-grease, if not containing irritating additions, is a cheap and handy remedy, and acts well, especially if mixed with sulphur; so does lard or rancid butter mixed with a little sulphur, except in very hot weather, when it is apt to melt away. Mercurial ointment answers, if carefully used—that is, in very small quantity, and only applied *once* as a *small* touch on the Warble; but where there is any risk of careless application it should not be used. Tar answers if carefully placed, so as to be absolutely on the hole into the Warble. *Bought cattle are often badly infested*, and need attention.

To prevent fly-attack in summer, train-oil rubbed along the spine, and a little on the loins and ribs, has been found useful; so has the following mixture:—4 oz. flowers of sulphur, 1 gill spirits of tar, 1 quart train-oil; to be mixed well together, and applied once a week along each side of the spine of the animal. With both the above applications it has been observed that the cattle so dressed were allowed to graze in peace, without being started off at the tearing gallop so ruinous to flesh, milk, and, in the case of cows in calf, to produce.

A mixture of spirits of tar, linseed oil, sulphur, and carbolic acid, has also been found useful; and anything of a tarry nature is useful, as sheep-salve (or bad butter and tar mixed with sulphur), or Stockholm or green tar, rubbed on the top of the cows' backs between the top of the shoulder-blade and loins. Washes of a strong pickling brine, applied two or three times during the season, are very useful. Paraffin and kerosine are useful for a time, but the smell goes off before very long.

Where cattle are suffering badly from Warbles, so that the health is clearly affected, and the animal wasting, the use of the well-known old "black oils" has been found to do much good.

Mr. Hy. Thompson, M.R.C.V.S., of Aspatria, Cumberland, gives the following recipe used for a bad case:—"Turpentine, $1\frac{1}{2}$ oz.; sulphuric acid, 1 drachm (here a chemical action sets in and it must be done with caution). To this I added 10 oz. raw linseed oil, and rubbed the cow's back once a day with the mixture. . . . In a fortnight the back was cleaned and all the maggots destroyed."

There are many other points that bear on prevention, of which one is—noting that Warble Flies are *most active in heat and sunshine*, and appear *not to pursue cattle over water*; consequently allowing the cattle the power of sheltering themselves, and access to shallow pools, is desirable. Likewise with regard to pastures, or standing-ground of infested cattle, it is matter of course that where the maggots *have fallen from their backs the flies will shortly appear to start new attacks*.

Warble-attack is one of the few in which each owner benefits surely by his own work.

The attack of Warbles is now grown to be one causing enormous annual national loss, estimated by practical men at sums from *two million to seven million pounds sterling per annum*, at the least. There is no sort of reason why we should suffer it to go on; and the reports sent in from cattle-owners in Great Britain and Ireland during the last ten years show the ease with which the attack may be checked, and the great consequent gain to owners. Any applications to myself on the subject will receive immediate and most careful attention, and any information would be gladly received; I shall be happy also to forward copies of this leaflet gratuitously to any applicant.

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