T. To be brief. There is first the "egg" stage. The female fly deposits, according to one authority, about 120 eggs altogether, according to another 70 or 80, four times in its life time, on decaying matter, preferably on stable manure.

S. That is why there are so many in houses near stables? Can the eggs be seen with the naked eye?

T. They can. They are long, oval-ended, white objects, about one-twentieth of an inch in length and one *hundredth* in breadth.

S. That is, one square inch could contain 20 rows of 100 eggs placed side by side.

T. Correct. In one day perhaps, the egg is hatched by the heat, and the *larval* stage commences.

S. It is then a maggot?

T. Yes, and only half as long again as the egg — *seven* one-hundredths of an inch. But in one day it grows too big for its jacket and *moults*, that is, casts off its old skin; and for the next day or two it is from two to three times longer than on the first day. It then moults again, and in three or four days becomes over one-third of an inch in length. About the seventh day the maggot contracts into an oblong mass shaped like a grain of rice or wheat, less than a quarter of an inch long. Its skin hardens into a case called a *puparium* of a dark, reddish-brown color.

S. Is a puparium a cocoon?

T. Not exactly. The *cocoon* is a covering *spun* by the insect. The *pupa* of a fly is contained in a puparium instead of a cocoon. About two weeks from the time the egg is laid, the fly, pale, with short, baggy wings, pressed close to its sides, shoves off a lid on one end of its puparium, and in an hour or so in the air becomes a full grown fly.

S. It goes through all its changes, then, in two weeks. An egg one day, a maggot with three moults, for a week, and a pupa for another week; then a fly for — how long?

T. Perhaps some manage to hibernate during winter and crawl about next summer. But nearly all die from various causes before or during winter time. In very hot weather the transformations may be more rapid, and in cool weather slower than the average time you have just mentioned. The fly does not die after depositing eggs as many insects do. It is generally thought to deposit eggs three or four times in one season, which explains the great numbers which may exist during the end of the hot season.

Other Flies.

S. Some flies look very much bigger than others — the one called the Blue-bottle, for instance.

T. There is some difference in the size of house flies, due to the abundance of food when in the maggot stage. But growth is complete in an hour or two at least after emerging into the air from their pupal cases. The Blue-bottle fly, and others, are all different *species*, although they look so much like the house fly.

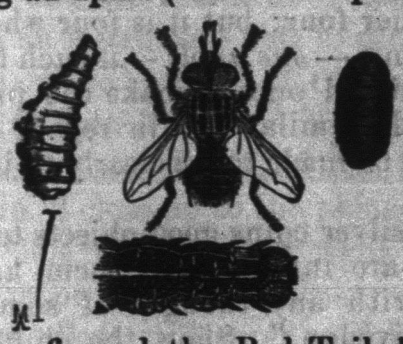
S. How many different *species* of flies are there.

T. Entomologists say there are at least 24,000 in the world, and 10,000 in America alone. Of these 3,000 American species are described. So there are plenty chances for new discoveries, and an entomologist has a very good opportunity to make himself famous. Many of the species are extremely small — such as sand flies, for instance.

S. Mosquitoes, gnats, midges, gad flies, gall flies, and all of this order of the *Diptera* are hurtful, are they not?

T. Those you mention are noxious enough. But there are some useful ones among them, such as some of the *Syrphus* and *Tachina* flies whose *larvæ* are destructive to noxious insects.

Here we have a figure of the Syrphus Fly (*Heliophilis latifrons*) and beside it the maggot larva seizing and destroying an aphis (one of the plant lice).



Here we have figured the Red Tailed Tachina Fly (*Nemoræa leucaniæ*) in its three stages, with, below, a portion of an Army Worm. This fly searches for the Army Worm, then deposits five, or more, of its eggs on the back of the caterpillar, near its head where the worm cannot reach with its jaws to displace them. The larvæ of the fly when hatched enter into the body of the caterpillar, feed upon it; and Howard, the entomologist, says that he searched for hours in a field infested with army worms or caterpillars and that he did not discover one full grown caterpillar which had not one or more of these eggs on its back. This illustrates how insect plagues often come to an end.

Jack. Wouldn't that be the best way to get rid of potato bugs and other insects which we have to destroy ourselves.

T. Quite correct. There is nothing so economical as making the insects fight each other. It is not always we can get the better fighters on our side however. Sometimes we can; but the story is important enough for a lesson at some future time.