

THE 17-YEAR LOCUST.

(See page 284.)

The name Locust, being used for the Western scourge and the Eastern Visitors, has led many to suppose that the insect was in both cases the same. Not only are the two insects so unlike as to be placed in distinct sub-orders, but they are strikingly different in their habits. The Western Locust so closely resembles one of our common grass-hoppers, as to require close observation to distinguish them.

The genus *Cicada* is well known to most of our readers in the common harvest-fly, also called Dog-day Cicada and Jar-bug, (*C. canicularis*), a remarkably square-headed insect, about an inch and a half long, which makes its appearance over a wide extent of country near the end of July, and by its shrill note, said to be audible for a mile, announces that the dog-days are at hand. As an account of the 17-year Cicada or Locust, as it is commonly called, will serve to answer numerous questions, and relieve some apprehensions, we give a brief outline of its habits, referring those who would know more about it to Harris' Insects, and to Riley's "First Report on the Insects of Missouri," (1869.) We reproduce here some engravings, made to illustrate an article published in 1866, in which year the insects made their appearance in Western Pennsylvania. The eggs are laid by the parent insect, in grooves in the twigs of trees, as shown in figure 1; they hatch in about six weeks from the time they are deposited, the young larva is about one-eighth of an inch long, white, with long feelers, and six legs, the first pair of which are remarkably large, shaped somewhat like lobster-claws, and well calculated for digging. Soon after it is hatched, the young insect drops to the ground, and at once burrows into the earth; here they live upon the roots of plants, it is supposed they employ their beaks in sucking the juices of the roots; but little is positively known about their manner of feeding. The insect continues this underground life, subsisting upon roots, increasing in size, and occasionally casting its skin, for 17 years. When the time comes for it to end this subterranean existence, it works towards the daylight, making a cylindrical channel five-eighths of an inch in diameter, with cemented sides, which reaches to the surface. The grubs, or more properly, pupæ, remains near the surface for several days, and at a favourable time they crawl out, always in the night. In this condition they are soft, whitish, and bear but little resemblance to the perfect insect; they crawl part way up the trunks of trees, or to some other place, and firmly fasten themselves by their claws. After a while the skin bursts along the back, and the perfect Cicada gradually works its way out, leaving the shell in a perfect state, save the rent in the back, (fig. 2), where it was made fast; it is semi-transparent, and has somewhat the appearance of parchment. When the insect leaves the skin, it is at first very soft and limp, with no conspicuous wings; in a few hours a great change takes place, its body dries and hardens, its wings unfold and take their proper shape, and it appears as in figure 3; it is soon able to fly off in search of a mate, and to add its note to the orchestra already in full blast. The sound is not produced by the mouth, but by a curiously constructed drum, found only in the males; a tightly stretched membrane, made to vibrate by the muscles of the insect, produces the note. When the insects are numerous, their combined drumming sounds like a threshing machine in operation. The 17-year Cicada is distinguished from the common Harvest-fly, by its much narrower head and body, and especially by its red eyes, and the orange-red colour of the edge and larger veins of the wings. Near the tips of the wings there is a darkish line, somewhat like the letter W, which, to the superstitious, has long stood for "war," though, as there are two of them, some one has suggested that "warm weather" is the more appropriate interpretation of these "signs and omens." After pairing, the females deposit their eggs. They are provided with powerful piercers, with which they make grooves in the small branches or twigs of trees, in which the eggs are deposited in two rows, in clusters containing 15 or 20 eggs each. Each female lays 400 to 500 eggs, after which she dies. The chief damage done by the insect, is in mutilating the twigs of fruit trees in depositing the eggs; though provided with a beak, it is not known that the perfect insects feed to any extent, and they are unable to eat the foliage. They are much more frequent upon forest trees than in orchards, but when they come upon fruit trees, there seems to be no remedy. The only thing to be done is to cut and destroy the twigs containing the eggs, to prevent the larvæ from entering the ground in that locality. The insects do not appear the same year all over the country, there being a great number of different broods, each appearing at intervals of 17 years, and there is

scarcely a year but what they are present in some parts of the country. Mr. Riley, in the report above referred to, gives the statistics of 22 different broods, some of which, mostly confined to the Southern States, complete their career in a shorter time, and appear every 13 years. The present brood is found on both sides of the Hudson River, in a part of Connecticut, in Northern New Jersey, and in parts of Pennsylvania, Indiana, Michigan, North Carolina, Virginia, and Maryland. Its appearance at intervals of 17 years has been recorded ever since 1724. Next year a brood is due in Central Illinois, Southern Iowa, and Northern Missouri.

THE SURINAM TOAD.

(See page 284.)

The history of our common toad is a strange one; the eggs are laid in the water, and hatch out, not as toads, but as tadpoles, or "pollywogs," as boys often call them. In the early part of their life, they live in the water, just like a fish; at length the tadpoles get legs, lose their tails, and come out as regular toads. Frogs do the same, and it is difficult to tell a frog tadpole from one that will turn out to be a toad. All this is strange enough, but there is a toad in Surinam that manages in a different, and still more singular manner. After the eggs are laid in the water—and most of you have seen the eggs of our toads and frogs, which the boys call "frog's-spittle," in which the eggs are all surrounded by a clear, jelly-like substance—the male-toad heaps the eggs on the back of the female, where they are vivified under the skin in little cells, or cysts, as shown in the illustration, and these remain until they are able to leave the maternal cradle and take care of themselves.

ANDERSON'S EQUILIBRIO COUCH.

(See page 285.)

This couch is designed for use in passenger ships, to counteract the rolling motion, and so provide for its occupant a means of exemption from the principal cause of sea-sickness. Its dimensions are similar in all respects to those of an ordinary couch. Any number may be placed together, end to end, when they will act in unison, and occupy very little more space than is required for ordinary couches.

The couch is provided with two pairs of flanged wheels, with india-rubber tires running upon concave rails attached to any suitable frame, and forming arcs of a circle, of which the length of the couch may be the radius, and consisting of as many degrees on either side of the centre as it is desired to counteract; it is thus caused to maintain its own level by the influence of gravity, and when placed transversely across the ship, remains horizontal while the latter is rolling.

The extent to which the motion of the ship may be thus neutralized, is only limited by the length given to the concave rails, a very slight extension of which—in the ratio of about an inch to a degree—will considerably increase the counteracting action. The rails in our illustration do not exceed the length of the couch itself, but the couch will nevertheless counteract 15 deg. of rolling each way, or 30 deg. in all, and will therefore allow of its free action in either direction while the ship may be rolling to that extent. The india-rubber tires on the wheels render the motion and checking of the couch easy and noiseless.

The object of the designer is to substitute a horizontal movement for the upward and downward motion produced by the rolling of the ship, and which is the principal cause of sea-sickness. The couch is about to be tried in the Channel, and if the results of such trial are as satisfactory as is anticipated, it will prove a valuable addition to the means available for lessening the discomforts of a sea voyage. It is also susceptible of being used, with the necessary modifications of form, as sleeping berths, or cots for the sick.

Mr. Anderson has several plans for application of the principle to larger structures for carrying a number of passengers, and to other purposes of a like nature. These plans comprehend a ship's cabin to counteract both the rolling and pitching motions; a structure for use in ships' saloons, to counteract either the rolling or pitching motion, or both, in which any number of persons may find a refuge from the effects of bad weather; and horse or cattle stalls for conveying valuable animals in safety across the Channel or on longer voyages. It is at all events so inexpensive that its value can be easily tested.