

Fig. 84, copied from Prof. C. V. Riley's first report of Missouri, gives a very good idea of the appearance of this insect in its various stages: *a* represents the pupa which is honey-yellow in colour; *b*, the cast-off skin from which the perfect insect has emerged through the rent in the back. When the larva is first hatched from the egg it presents the appearance shown at Fig. 86, and is an active little creature which moves its long eight jointed antennae as dexterously and rapidly as does an ant; the mature larva differs considerably from the newly-hatched one, but principally in having shorter antennae; *c* represents the fully developed fly, and *d* a piece of a young branch which has been bored by the ovipositor of the female for the reception of her eggs, which are shown at *e*. As its name implies, this insect generally requires seventeen years to complete its transformations; this fact was pointed out many years ago by the botanist Kalm.

Prof. Riley, who has given this species a great deal of study, and discovered many interesting points in its history, was the first to work out the problem of its periodical appearances. He found that there are also thirteen year broods and that both sometimes occur in the same locality, but that in general terms the thirteen year brood might be called the southern form, and the seventeen year the northern form; at the two limits of their respective ranges these broods overlap each other. The shorter-lived form he called provisionally *C. tredecim*. It was the existence of this brood which caused Entomologists to doubt the propriety of Linné's name, until Prof. Riley cleared the matter up, because they could not make the dates of its periodical visits correct when calculating each appearance as occurring at the end of every seventeen years in any one locality. In his first Missouri Report he gives a full account of his investigations, and relates that "it happened that one of the largest seventeen year broods occurred simultaneously with one of the largest thirteen year broods in the summer of 1868. Such an event, so far as regards these two particular broods, has not taken place since the year 1647, nor will it take place again till the year 2089.

There are absolutely no specific differences between the two broods other than in the time of maturing. Another interesting discovery was, that there is a dimorphous form which appears with both these broods. It is much smaller and differs in many important points from the ordinary form. The colour is much darker, it has an entirely different voice, appears a fortnight sooner, and the two forms never copulate. This form was described by Dr. J. C. Fisher in 1851, as *C. Cassinii*, but the specific differences are not considered to be sufficiently well defined to give it the rank of a species.

The perfect insects make their appearance in the United States in the beginning of June, and last for about a month, and as they generally appear in vast numbers, they do considerable damage. Local changes take place so rapidly now, and these flies take so long to perfect themselves, that frequently roads are built and paths made in places where, perhaps seventeen years before, when they were hatched from the egg, it was virgin soil. This contingency frequently makes it necessary for them to bore through hard roads and between stones well beaten down; and that they do this, the honeycombed state of the ground bears ample testimony. When the larvæ, in which stage the insect passes the greater part of its life, is full grown, it works its way up towards the surface, and then turns to the pupa state, which only lasts a few days. When they are ready to emerge they leave their burrows as evening draws on, and crawl up on to some object elevated above the ground, such as a fence or the stem of a plant; this they grasp firmly with their claws, the skin of the back bursts and ten minutes afterwards the perfect insect has entirely freed itself of all encumbrance; the wings soon develop, but it is not for three or four days that the muscles harden sufficiently for them to assume their characteristic rapid flight and shrill song. As is the case with several other insects the males make their appearance some days before the females, and also leave sooner. The skin of the pupa (Fig. 84 *b*) retains its perfect shape for many months after the fly has left it. Those of *C. pruinosa* are very common here in a dry rocky wood. Prof. Riley also figures a remarkable chamber built up by the larva of this species in localities where the soil was low and swampy, and in which was found the pupa awaiting the time of its change to the winged state. These