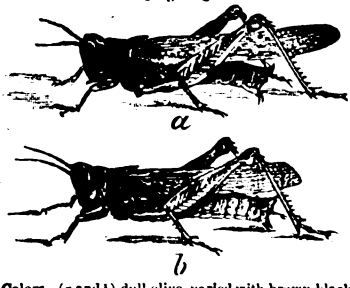
THE HATEFUL OR COLORADO GRASSHOPPER.

(*Caloptenus spretus*, Uhler and Walsh.)

We have frequent enquiries from correspondents, whether the Grasshoppers that have, for the last three years, done so much damage in Kansas and Nebraska, in western Missouri, and in western Iowa, are not likely to spread gradually eastward, just as the Colorado Potato-bug has done. In the following paragraphs we shall give, as briefly as possible, our views upon this most important subject. Those who desire to see the subject discussed at full length, in all its bearings, are referred to the 14th chapter of the Annual Report upon Noxious Insects, by the senior editor of this journal.

At first sight the Hateful Grasshopper (Fig. 65, *a*) may be readily confounded with the common Red-legged Grasshopper, (*Caloptenus femur-rubrum* DeGeer, Fig. 65, *b*), which swarms everywhere from Maine to Minnesota, and from Pennsylvania to Kansas and Nebraska. In reality the two species only differ by the wings of the former being from a fourth to a fifth longer, so as to enable it to fly miles at a stretch, while our Eastern species cannot fly more than a rod or two at a single flight. Trivial and unimportant as this difference may seem to some, it is yet sufficient to separate the two forms as distinct species, seeing that, so far as regards this character, the two forms do not graduate imperceptibly the one into the other.

[Fig. 65.]



Colors—(*a* and *b*) dull olive, varied with brown-black; hind shanks blood-red.

As is also the case with the Colorado Potato-bug, the native home of the Colorado Grasshopper is in the canons (kanyons) of the Rocky Mountains. But the two insects differ in one most important particular. The former can, and does, breed freely, generation after generation, in the lowland country into which circumstances have, within the last ten or twelve years, allowed it to effect an entrance. The former can not, and does not, so breed; but, on the contrary, the very first generation that hatches out there in the spring, from eggs laid in the preceding autumn, by an invading swarm from the Rocky Mountains, commences to waste away and die out from the very first day of their hatching. Even the comparatively few individuals of this brood that attain the perfect or winged state, never lay any eggs at all, but rise up in the air and fly off in a southeast, east, northeast, or northerly direction, after which they gradually die out and perish from off the face of the earth, without reproducing their species.

"But," it will be objected, "surely these winged individuals can not fly for ever; they *must* light down somewhere for food, and wherever they light down the females will doubtless lay eggs, from which, in the succeeding season, a fresh generation of Colorado Grasshoppers will take its origin." Strange as it may appear, this is not the case. They *do* light down occasionally for food, but their systems are so diseased that even then they eat comparatively but very little—certainly not a thousandth part of what an equally numerous swarm of the same species, fresh from the alpine regions of the Rocky Mountains, would eat—and in no one instance have they ever been known to lay any eggs at all. Neither do they stay any length of time in the particular spot upon which they light down; but, after a few hours' stay, rise up again into the air, and leave for parts unknown. In all these particulars they differ most remarkably from the swarms that are raised in the Rocky Mountains, and wing their way thence, by one almost continuous flight, into the fertile valley of the Mississippi. For, wherever these last light down, they soon make a clear sweep of every green thing, occupying and possessing the whole country as they slowly proceed from point to point; and all accounts agree that, as they progress, they fill the earth full of their eggs.

As the history of these lowland-bred Grasshoppers, after they take flight and disappear from the place of their nativity, has never hitherto been published, we shall make no apology for presenting it in some detail to our readers. We must first observe, however, that, owing to the influence of the comparatively hot climate of the valley of the Mississippi, as contrasted with that of the cold and bleak regions of the Rocky Mountains, the Hateful Grasshopper attains maturity a full month sooner in the former than in the latter region. For example, in Kansas, Nebraska, west Missouri, and west Iowa, all that reach maturity of the spring hatch of Grasshoppers take wing and disappear from the 24th of June to the 14th of July; whereas the usual period for the Rocky Mountain swarms to invade that region of country ranges from the 27th of August to the forepart of October, as ascer-

tained from the records of the numerous invasions which have taken place from A. D. 1820 up to A. D. 1867. In the year 1868, however, probably in consequence of the unusually hot summer, the Hateful Grasshopper must have matured in the Rocky Mountains about half a month sooner than usual; for in that year it invaded Kansas in the forepart of August.

Dry as these details may appear to some, it is important to attend to them; because it is chiefly by the date of their appearance, that we are enabled to distinguish accurately between a swarm of healthy and vigorous Grasshoppers, freshly arrived from the Rocky Mountains, and another swarm of diseased and barren Grasshoppers, reared in the lowlands of the Mississippi valley. And now, without further preface, we shall proceed to show what becomes of these last, after they have taken wing and disappeared from the land of their nativity during the latter part of June and the forepart of July.

Mr. D. W. Kauffman, of Des Moines, Iowa, President of the Iowa State Horticultural Society, who certainly ought to know something about the spring hatch of 1867-8, as it damaged his nursery stock in 1868 to the extent of $10,000, informs us that it took wing and disappeared from his neighborhood from the 3d to the 5th of July. Some of them, he says, flew through the air as far as Davenport, Iowa, a place on the Mississippi river, lying about 150 miles to the east of Des Moines, *but did no material amount of damage there.*

"On July 9th, 1868, the people of Jackson county, Minnesota, were surprised to see the sun nearly darkened by immense clouds of Grasshoppers (probably *Caloptenus spretus*) passing over that country. Some of the farmers report that they lit on their wheat fields, and completely loaded the straw to the ground; but they soon raised again, and passed by in a northerly direction with the wind, *doing little or no damage.* They continued to pass over occasionally for several days afterwards—all going north, as the wind was south."—H. A. Munger, in *Farmers' Union* (Minn.), August, 1868.

Mr. Henry Hilvers, of Lafayette county, in the southwest corner of Wisconsin, personally informed us, at Galena, Ills., that in the middle of August, 1868, he witnessed the migration southwards of what, from his description, must have been a vast swarm of these same barren and diseased Grasshoppers, wandering wildly from region to region, and destined to perish eventually, without reproducing their species. According to his account, millions upon millions of them flew high in the air over his farm, traveling from north to south, and presenting the same resemblance to a heavy snow-storm, which has been remarked by so many in the case of the true Hateful Grasshopper, when it descends from the Rocky Mountains upon the lowlands of the Mississippi valley. Only a few of them, as he told us, descended to the earth, and these only for a short time, after which they rose up again in the air, and rejoined their companions. These few were examined, both by Mr. Hilvers and by his daughter, and, in the opinion of both these two parties, they corresponded in size with specimens of the true Hateful Grasshopper, which we had on exhibition at Galena.

It may be asked, "How can we tell that this swarm of Grasshoppers seen by Mr. Hilvers was not a fresh arrival from the Rocky Mountains?" We answer: First, that, upon such a supposition (inasmuch as, when seen by Mr. Hilvers, they were flying southwards), we should certainly have heard of them afterwards descending somewhere in north Illinois, and commencing their usual course of devastation and egg-laying, whereas nobody near Galena seems to have heard of any such thing; and, Secondly, that the date of their arrival in southwest Wisconsin will not correspond with any such hypothesis. It is very true that, in 1868, the Hateful Grasshopper invaded the cultivated, or eastern, parts of Kansas at the unusually early date of August 12th; but, at the customary rate at which these insects progress, after they reach a fertile country (from five to ten miles a day, according to Mr. Goble of Kansas), they could not possibly have reached the southwest corner of Wisconsin in less than a month and a quarter after their arrival in Kansas, or say from the middle to the last of September; whereas, the actual date of their arrival in southwest Wisconsin was the middle of August.

One more such case and we have done. In 1867, about the last of July or the first of August, an immense swarm of night-flying insects—as we were informed by Capt. Beebe, of Galena—lit upon Soulard's place, which lies upon the Mississippi river, west of Galena, and stripped the forest trees there of their foliage, for a space about a quarter to half a mile long and about twenty rods wide. They were heard in the night, by several observers, to come through the air with a roaring and rushing noise, such as has been commonly noticed to be produced by flights of the true Hateful Grasshopper; but in the morning nothing was to be seen of them but the devastation they had caused, neither had

they laid any eggs, so far as could be seen at the time or ascertained from subsequent observations. Their next lighting place was in Dubuque county, Iowa, seven miles to the northwest of Soulard's farm. There they stripped the woods of their foliage to about the same extent, and disappeared in the same hurried manner. Although there is no direct proof of the identity of this insect with the Hateful Grasshopper, yet it is difficult to refer it satisfactorily to any other species. None of the Grasshoppers indigenous to Iowa, Wisconsin, and Illinois, are physically capable of flying great distances through the air, and the only other insect that ever preys in large swarms upon the leaves of trees in that region is the common May-bug (*Lachnosterna quercina*, Knoch), which occurs in May and June, and not in July and August.

The above facts, and others which it would be tedious to particularize, sufficiently show that the Hateful Grasshopper, when suddenly transferred from its native alpine home in the Rocky Mountains, some eight thousand feet above the level of the sea, to the warm regions of the valley of the Mississippi, less than a thousand feet above the sea level, gradually becomes diseased, and barren, and loses more or less its natural appetites and instincts. Why we do not observe the same phenomena in the case of the Colorado Potato-bug, which was originally a denizen of the same cold, alpine country, is not difficult to explain. The former insect reaches the Mississippi lowlands at one sudden flight, and in one season; it has therefore no opportunity to become gradually acclimatized and inured to the new "conditions of life" under which it is called upon to exist. Consequently, it becomes diseased and barren, and finally perishes. The latter insect, on the other hand, has reached the Mississippi lowlands only by slow and gradual approaches, breeding at every way-station on the road, and thus becoming—generation after generation—more and more acclimatized to a higher temperature, as indicated by the thermometer, and to a greater atmospheric pressure, as indicated by the barometer. Consequently, it may now be considered as a permanently acclimatized resident of our great Western valley; though even here it thrives much better, and extends eastward much faster, in a cold northerly than in a warm southerly latitude. If the good people of Missouri and Illinois are particularly anxious that the Colorado Grasshopper should, like the Colorado Potato-bug, be permanently colonized among them, we think that this might probably be effected by gradually acclimatizing the insect at various points along the road that leads from Colorado to these States. But, as this would be a very slow, expensive, and laborious process, we do not intend to try the experiment, until a few thousand dollars have been appropriated for this express object by the legislatures of those two great and enterprising States.

"But," it may be objected, "allowing that the Colorado Grasshopper cannot breed in the Mississippi valley, what security have we that, at some future time, it may not fly all the way from the Rocky Mountains to the eastern borders of Missouri and Iowa?" We answer, that we have traced back the history of this insect as far as the year 1820; that in all these forty-eight years, although no less than seven invasions of the country to the east of the Rocky Mountains have taken place, namely in 1820, 1856*, 1857†, 1864‡, 1866, 1867, and 1868, it has never yet got within 112 miles of the Mississippi river; and that there is no reason to suppose that it will ever do so for the future. There MUST necessarily be some limit or other to the powers of flight of this insect. It would be absurd, for example, to suppose that it could fly in one season as far eastward as England or France, or even as far as the Atlantic ocean. Consequently, as it can be proved by historical records that it has never, within the last half century, reached within 112 miles of the Mississippi, the fair and reasonable inference is that it never will do so in the future. Because an insect can fly 550 miles, it would be ridiculous to argue that, therefore, it can fly 700 miles. We might as well argue that, because a man can jump a ditch twenty feet wide, therefore he can jump another ditch which is thirty feet wide; or that, because a man can easily carry a young calf upon his back, therefore, if he practises daily, he will be able to carry the same calf upon his back when it has grown up to be a cow.

It will be seen at once, from what has been stated above, that we do not consider the Colorado Grasshopper as a permanent denizen either of Kansas, Nebraska, western Missouri, or western Iowa. It is certainly a very remarkable fact that it has invaded these countries from the Rocky Mountain region for three successive autumns, namely those of 1866, 1867, and 1868; and no doubt the young larvæ that hatch out in the spring of 1869, from eggs laid in the autumn

*In 1856, according to Mr. J. S. Merrill, of Onawa City, Iowa, it invaded west and northwest Iowa.

†In 1857, according to the same gentleman, it invaded west and central Iowa about the last of August. "S. H. K." of Page county, in the southwest corner of Iowa, says that it invaded that county "very late in the fall of 1857."—*Prairie Farmer*, April 25, 1868.

‡In 1864, according to Mr. Merrill, it extended as far as Sioux City, in western Iowa.

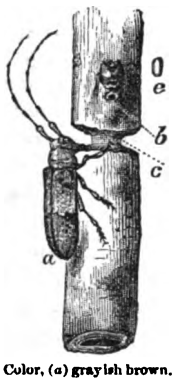
of 1868, will do the usual amount of damage. But, as in the last fifteen years there have been only six Grasshopper invasions, the chances are three to two against any fresh invasion occurring in the autumn of 1869; and the same mode of reasoning will equally apply to any subsequent autumn.

THE TWIG-GIRDLER,

(*Oncideres cingulatus*, *Say.*)

We have been puzzled for a long time, as our readers may see from the Answers to Correspondents on page 57 of our last number, to know what insect it is that girdles and occasionally amputates the twigs of various trees in the manner shown in the following engraving (Fig. 66 *c*). The mystery has at length been solved by one of our correspondents, Mr. Geo. Burnside of South Pass, Ill., detecting the culprit in the very act. Upon examining two specimens kindly sent to us by that gentleman, the girdling insect proves to be one of the rarest of our Capricorn or Long-horn Beetles (the *Oncideres cingulatus* of Say, Fig. 66 *a*). And now that we have been thus enabled to recognize the species, we find that, so far as regards the girdling of hickory twigs by this beetle, the discovery was made and published more than thirty years ago by Prof. Haldeman*. Possibly the amputation of pear-twigs, and especially of persimmon-twigs, which we have ourselves noticed to be so very common in South Illinois, in consequence of such girdling, may be effected by a distinct species; but, as Mr. Burnside says, that he discovered the very same insect, which he had seen actually girdling hickory-twigs, "under very suspicious circumstances" upon a pear-tree, the probability is that it is the same species that operates upon all these three trees.

[Fig. 66.]



Color, (*a*) grayish brown.

The Twig-girdler, according to Prof. Haldeman, "may be seen in Pennsylvania during the two last weeks in August and the first week in September, feeding upon the bark of the tender branches of the young hickories. Both sexes are rather rare, particularly the male, which is rather smaller than the female, but with longer antennae. The female makes perforations (Fig. 66 *b*) in the branches of the tree upon which she lives, which are from half an inch to a quarter of an inch thick, in which she deposits her eggs, (one of which is represented of the natural size at Fig. 66 *e*.). She then proceeds to gnaw a groove, of about a tenth of an inch wide and deep, around the branch and below the place where the eggs are deposited, so that the exterior portion dies and the larva feeds upon the dead wood."

In all the cases noticed by Prof. Haldeman, the tree attacked was the Shagbark Hickory (*Carya alba*) and the twig was girdled so shallowly, as not to fall off until after the larva had matured within it, or nearly a year after the girdling. "Then", as he subjoins, "the decaying portion which is not eaten by the larva is apt from its tender attachment and the rapidity of decay to drop off." The evidence of Mr. Benj. H. Smith, of Upper Darby, Penn., who has kindly sent us specimens both of the insect and of its work, is to the same effect. For he says that it does not attack any tree but the hickory, and that it never cuts deep enough to cause the limbs to fall off. But in most of the cases which we have ourselves noticed upon pear and persimmon trees, the twig was girdled so deeply that it broke off and fell to the ground with the first wind, and while the eggs that had been laid in it by the mother-beetle were still unhatched. Even in a girdled hickory twig thirty-five hundredths of an inch in diameter, which we have now lying before us, but a third part of its diameter is left in the middle ungnawed away; so that in spite of the superior toughness of this timber the twig could scarcely have stood a high wind without breaking off and falling to the ground.

It is worthy of remark that a European species belonging to the same genus (*Oncideres amputator*) has the same remarkable habit of amputating small branches; although European observers failed to discover the eggs in the amputated parts, and were thus unable to explain the object of the proceeding.

Nothing surprises us more in the natural history of the American Twig-girdler than the great number of eggs that may sometimes be found in one amputated branch. In a persimmon branch not more than two feet long, we have counted as many as eight eggs, placed one under each successive side-shoot; and we have found seven eggs all crowded together in a small hickory branch only three inches long. Now, judging from the amount of timber consumed by the larvæ of other boring beetles before they

* See his articles on the History of the Longicorn beetles in the *Amer. Philos. Transactions* for 1837, p. 52, and in the *Farm Journal* for 1851, p. 34.

Mr. Parker Earle, of South Pass, Ill., has since informed us that he found the same beetle on an amputated pear twig.