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OF

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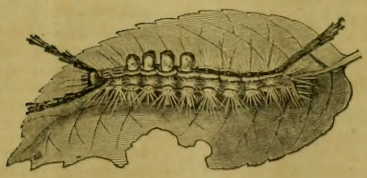
EDITED BY

CHARLES V. RILEY AND DR. GEORGE VASEY.

VOL. II.



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WHY NOXIOUS INSECTS INCREASE UPON US.

It is an old and a very true remark, that the various insects that afflict the Gardener and the Fruit-grower are year by year becoming more numerous and more destructive. One principal reason for this result is sufficiently obvious. The continual tendency of modern improvement is to concentrate vegetable gardens and fruit farms in certain peculiarly favorable localities, instead of scattering them evenly and uniformly over the whole country. Hence every injurious insect that troubles the Gardener and the Fruit-grower has an abundant supply of such vegetation, as forms a suitable nidus for its future offspring, close at hand, instead of having to search for it with much labor over an extensive surface of country. Such insects are therefore enabled by this means to increase and multiply with greater ease and greater rapidity. Upon precisely the same principle, if you scatter over the surface of a whole county the amount of shelled corn that is just sufficient to feed a certain gang of hogs, and compel them to seek it out and pick it up every day of the year, they will not thrive so well nor multiply so fast, as if you feed out the very same amount of corn to them in a ten-acre lot, day after day for a whole year.

To a gentleman in Arkansas, who had expressed the opinion that that State was the best in the Union for the peach and the grape, and that Illinois was not naturally adapted to the culture of fruit, Dr. E. S. Hull recently replied in the following masterly manner. We copy from the *Journal of Agriculture* for August 14, 1869:

SIR—Your confidence in the superior adaptability of your soil and climate will probably not be maintained after a few years' experience. Just in proportion as you increase improved fruits, just in that proportion will fruit insects and fruit and fruit tree diseases increase with you. A recognition of this fact will each year, as you multiply your orchards, become more and more apparent. Your Hale's Early peaches, at first, will be free from rot, your pear trees measurably exempt from pear tree blight, your vines free from vine hoppers, the grapes free from grape codlings and rot, etc., etc. From some cause, not yet well understood, all or nearly all young vineyards are for the first few years of fruitage, free from rot, and then ever afterwards subject to it. The same is true of cherry, peach, and plum rot. Therefore to those engaging in horticultural pursuits, a knowledge of the several difficulties likely to be encountered should be recognized, and so far as known the remedies for each difficulty must be promptly applied.

In this State, or in certain portions of it, many persons believe that horticulture is undergoing a great revolution, and ultimately that the business will be mainly in the hands only of the well-informed — those who understand and promptly apply the proper means. In view of known facts and observations, made during the past twenty-three years in this part of the West, and further South, I am convinced that all sections alike must recognize as facts these statements.

Here the matter seems to have dropped. Nobody has thought of accusing Dr. Hull of being an atheist and a blasphemer, because he has said that the more you multiply your orchards, and the more you increase improved fruits, the more will bugs and other kinds of destructive organisms multiply and increase upon you. Nobody, in fact, has even gone so far as to insinuate that, simply because he has written the letter which we have printed above, he leans towards Socinianism, or Arianism, or Erastianism, or any of the other fine shades of *ism*, whereby heterodoxy (whatever that may be) differs from orthodoxy.

Now, mark how one man is allowed to steal a horse with impunity, and another man may not even look over the hedge without being thrown into jail for it. Henry Ward Beecher, in one of his contributions to the *Ledger*, recently expressed the following sentiments; and turn them which way you will, they merely

amount to the very same doctrine recently promulgated by Dr. Hull, and—we are almost afraid now to avow it—firmly believed in by ourselves; namely, that the larger the masses may be in which you grow any crop, the more will destructive organisms prey upon it:

The only way to exterminate the Canada thistle is to plant it for a crop, and propose to make money out of it. Then worms will gnaw it, bugs will bite it, beetles will bore it, aphides will suck it, birds will peck it, heat will scorch it, rains will drown it, and mildew and blight will cover it.

But does Henry Ward Beecher, after publishing such shocking sentiments, escape with as much impunity as his more fortunate compeer, Dr. E. S. Hull, of Alton, Ills.? Quite the contrary! Forthwith a writer in the *Christian Intelligencer*, signing himself "Puritan," is down upon the reverend gentleman like a thunderbolt, accusing the poor man of "veiled profanity," and arguing the question in the following lucid and certainly most original manner:

These bugs, beetles, aphides, heat, rain, and mildew, are the messengers of God. If they are sent—they *are on an errand for God!* Now, if the above extract has a point, it is that when mankind plant a crop of any kind of grain or seed, *God takes a malicious pleasure in defeating such schemes.*

Excellent! Most admirable logician! But why not attack the Illinois layman as well as the New York clergyman? "Just in proportion," says Dr. Hull, "as you increase improved fruits and multiply your orchards, just in that proportion will fruit insects and fruit and fruit-tree diseases increase with you." What is that but saying, that when mankind try to grow large quantities of extra fine fruit, "*God takes a malicious pleasure in defeating such schemes?*" At him, "Puritan!" Seize him by the throat and worry him to death! The Illinois State Horticulturist is clearly guilty of the most abominable "veiled profanity."

But it seems that "circumstances alter cases," and "the case being altered alters the case," and to parody the language of Shakspeare—

> What in the layman's scientific truth
> That in the parson is rank blasphemy.

For up to this day, though we always read the *Christian Intelligencer* and all the other religious newspapers with the most commendable perseverance, we have not noticed any attack in any of their columns upon the Alton philosopher—whether from the pen of "Puritan" or of any other anonymous scribbler—such as that which has been recently hurled upon the devoted head of Henry Ward Beecher.

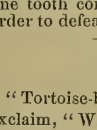
That our readers may not suppose that Mr. Beecher is unable to fight his own theological battles and has hired us, in default of a better ally, to defend him against the murderous thrusts of "Puritan," we shall close this article by quoting his most conclusive and logical reply to this most absurd and irrational attack:

This is exquisite! If mildew attacks my grapevine, it *is on an errand for God*, and if I sprinkle it with sulphur as a remedy, I put brimstone into the very face of God's messenger! When it *rains*—is not rain, too, God's messenger?—does "Puritan" dare to open a blasphemous umbrella, and push it up in the very face of this divine messenger? When a child is attacked by one of "God's messengers"—measles, canker-rash, dysentery, scarlet fever—would it be a very great sin to send for a doctor on purpose that he might resist these divine messengers? There are insects which attack man, against one of which we set up combs, and against another sulphur. "Nay," says "Puritan." "If they are sent, *they are on an errand for God*," and it is profanity to have recourse to fine tooth combs and sulphurous ointments in order to defeat the expressed will of God.

TORTOISE-BEETLES.

"Tortoise-beetles!" the reader will perhaps exclaim, "Why, this picture that you give us in the margin is not a beetle at all, but a true veritable mud-turtle! Beetles, as you have told us time and again, have got *six* legs, and this fellow has got only *four*, two on each side of his body, which, as with other mud-turtles, are evidently used as swimming-paws." Nevertheless, kind reader, this is a true beetle, and if you were to turn him upside down, you would see that he has got, on the lower surface of his flattened body, six very distinct pale-colored legs, though they are so short that they scarcely project when stretched out at full length beyond the thin crust which, as with a mud-turtle, projects from his body all round him. What you take for swimming-paws are not paws at all, but mere patches of dark opaque color on the thin projecting semi-transparent shell. If you refer to the drawing which we gave in our last number of the Mottled Tortoise-beetle (Fig. 179), you will see that that species has two such patches of dark color, representing the front swimming-paws, while those which represent the hind paws are entirely absent. Nor is this a mere fortuitous circumstance, dependent upon variation and what gardeners call "sports." You may take a thousand specimens of either species, and you will find that our species, which is termed the Clubbed Tortoise-beetle (*Deloyala clavata*, Oliv.), always seems to have

[Fig. 1.]



Colors—Brown-black and yellowish.

four paws, while the Mottled Tortoise-beetle always confines himself to two. And what is very remarkable, there is a species found in Hindostan which is marked almost exactly like our insect.*

Of course, in such a case as this, the resemblance must be purely fortuitous; for the discrepancy in size is so enormously great, that it is impossible to believe that any, even the stupidest animal, could mistake this Tortoise-beetle for a real tortoise. In several other cases, however, of entomological mimicry, where a nest-building insect and its parasite have a strong general resemblance, it has been supposed by authors that this is a beautiful provision of nature, in order to enable the parasite to penetrate without danger into the nest of the other insect, and deposit its eggs there without interruption on the part of the nest-builder. It is contended, in fact, that, from the great resemblance between the two, the nest-builder mistakes the parasite for an individual belonging to its own species. So far as regards social insects, such as Yellow Jackets and Humble-bees, this theory will do very well; for as there are here a great number of individuals owning a nest in common, it is reasonable to suppose that a parasite, that strongly resembled the members of the community, might occasionally slip in unobserved by any one of them. But with solitary nest-building insects the case is very different. Here there is but a single individual—the female—that constructs the nest, the male taking no part whatever in this process; and even if she mistook the parasite for an individual belonging to her own species, she would be just as unwilling for the stranger to enter her own private and peculiar nest, as a hen robin would be for another hen robin to make herself at home in the nest which she has herself labored to construct. Indeed, the number of parasites that resemble the insects upon which they are parasitic is so exceedingly small —certainly not exceeding the one hundredth part of the whole number of parasites—that here we are compelled, as in the case of our tortoise-beetle, to attribute the seeming mimicry to chance.

There are, however, very numerous instances of mimicry among insects, where the mimicker gains a manifest advantage by wearing the livery of some other organism, and where consequently the imitation must be attributed, not to chance, but to design. Such are those well-known cases among the span-worms or measuring-worms, where the larva is of the same dingy brown color as the twig upon which it rests, and where it habitually stretches itself out in a straight line at angles with the twig, remaining all the time perfectly stiff and immovable, so that even the acute eyes of the practised entomologist are sometimes deceived by the manœuvre, and mistake the living and breathing worm for a bit of dead and dry stick. Such also is the case of the Stick-bug, otherwise known as "Walking-stick," which we referred to on page 58 of our First Volume, and which has the singular habit of projecting forwards its two front legs and its antennæ all in a straight line, so that the whole insect, remaining immovable in this posture, looks like a straight stick, as represented in the middle of the right hand margin of the cover to our Magazine. Such again are those other cases, where insects, for instance our common Catydid, habitually living among green leaves, imitate those leaves, not only in the general coloring of their bodies, but in the very shape and even in the style of veining of their wings. The very peculiar and remarkable case of the Imitative Butterflies, we have already treated of in a separate article.*

Unlike the four or five species of Tortoise-beetles, which we figured and described in our recent article on the Insects infesting the Sweet Potato, the Clubbed Tortoise-beetle (Fig. 1) infests, not the Sweet, but the common Irish Potato. In the West it is rather a rare insect; for in the course of twelve years' collecting we have only met with some half dozen specimens, and we are entirely unacquainted with the larva. Mr. J. B. Hartwell, however, of Wilkinsonville, Massachusetts, frequently finds the perfect beetle feeding on the leaves of Potatoes and Tomatoes, though not in sufficient numbers to be seriously injurious; and Mr. Blanchard, of the same State, meets with it quite commonly both on the cultivated Potato and on the Bitter-sweet, a weed belonging to the same genus (*Solanum*) as the Potato. Moreover, Isaac Hicks, of Long Island, N. Y., has transmitted to us no less than twenty-six specimens, all found upon potato-stalks in his neighborhood. Thus, as the Tortoise-beetles previously figured by us mostly infest plants belonging to the *Convolvulus* Family, such as Sweet Potato and Morning Glory, the species that we have now to do with seems to be confined to plants belonging to the closely allied *Solanum* Family, such as the Potato, the Bitter-sweet and the Tomato. It is remarkable that the East Indian

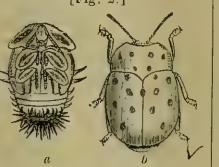
*Westw. *Introd.*, I, p. 379 and p. 377, Fig. 12.

*Amer. Entomologist, Vol. I, pp. 189-193.

species, just now referred to as being almost the exact counterpart in coloring of our Clubbed Tortoise-beetle, occurred in the Botanic Garden at Calcutta upon a convolvulus; but to what genus this insect belongs, authors do not inform us.

The larvæ of all the Tortoise-beetles, belonging to the genera with the body greatly flattened (*Cassida* and *Coptocycla*), always have the prickles that project from their bodies sprangled or barbed, as will be remarked from our figures 174, 177, 179 and 180. In the genus (*Chelymorpha*), to which belongs a brick-red insect with black spots (*Ch. cribraria*, Fabr., Fig. 2 *a*, pupa; *b* beetle) found upon Milkweed (*Asclepias*), and which has the body greatly rounded above with scarcely any lateral flange, the larva, as observed by Dr. Packard, has the prickles smooth and not sprangling. In the genus *Physonota*, to which belongs a new species figured herewith, the Five-dotted Tortoise-beetle (*Ph. quinquepunctata*, n. sp., Fig. 3, *b*), and which is intermediate in form between the last-named genus (*Chelymorpha*), and those with the body greatly flattened (*Cassida, Coptocycla, Deloyala*), the prickles of the larva are also smooth, as may be seen by referring to Figure 3 *a*. Thus it results that structural differences in the perfect beetle are accompanied by corresponding structural differences in the larva.*

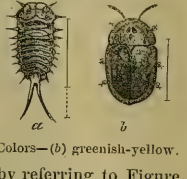
[Fig. 2.]



a *b*

Colors—(*b*) brick-red and black.

[Fig. 3.]



a *b*

Colors—(*b*) greenish-yellow.

As a general rule, to which as usual there are several exceptions, it is also the case that structural differences in this group of plant-feeding insects are accompanied by structural differences in the groups of plants upon which they ordinarily occur. We have seen that certain genera (*Cassida* and *Coptocycla*) are peculiarly attached to the *Convolvulus* Family; that another genus (*Deloyala*) haunts the *Solanum* Family; and that a fourth genus (*Chelymorpha*) is generally found on Milkweed. The genus to which the Five-spotted Tortoise-beetle belongs (*Physonota*) seems to be confined to the botanical Family *Compositæ;* for although we have not been able to ascertain the food-plant of this particular species, we have observed the One-dotted Tortoise-beetle (*Physonota unipunctata*, Say), feeding in the larva state upon a Sow-thistle (*Sonchus*); and as the name denotes, the Sunflower Tortoise-beetle (*Phys. helianthi*, Randall), which we were assured by Dr. Le Conte in 1865 is rightfully referred to this genus must feed upon Sunflower (*Helianthus*).

In the second and third number of our first volume we gave an account of eleven distinct species of insects, including the Black Blister-beetle (*Lytta atrata*), that attack the potato. The Black-rat Blister-beetle (*Lytta murina*), which is frequently confounded with the Black Blister-Beetle, though the former appears early in July and the latter not till the middle of August and forepart of September, has since been received by us from Mr. Munger of Lone Cedar, Minnesota, with the statement that it nearly ruined some fields of potatoes there in the forepart of July. To this formidable list of eleven distinct kinds of Potato Bugs, we must now add the Clubbed Tortoise-beetle, which no doubt works upon the potato in the larva, as well as in the perfect beetle state, though there is as yet no direct evidence to that effect.

It thus turns out that there are no less than a dozen different kinds of Potato Bugs, differing from each other in size, in shape, in coloring, in habits, in the number of broods produced in a single year, in their geographical distribution, and what is of most practical importance, in the best and most available method of fighting them. And yet we can scarcely take up a paper, whether political or agricultural, without stumbling upon some paragraph informing us that "THE Potato Bug" is behaving thus and

* We annex the scientific description of the Five-dotted Tortoise-beetle. The genus was determined for us in 1865 by Dr. J. L. LeConte, according to Bohemian's arrangement of the Family.

PHYSONOTA QUINQUEPUNCTATA, n. sp. Pale greenish yellow. *Head* with the basal half of the antennæ polished both above and below, and black above; the terminal half opaque and black both above and below. *Thoracæ* polished and glabrous, with three black spots behind the middle, equidistant from each other and from the hind thoracic angles; the middle spot often elongate and always more advanced than the other two. Before the middle black spot a double dark olive spot, composed of two trapezoidal spots transversely arranged and not unfrequently more or less confluent with each other. *Scutel* pale. *Elytra* sparsely and rather coarsely punctured, with all but the exterior margin of a more or less pale dull olive color, the olive-colored portion of each elytrum dotted with pale yellow and with a large pale yellow round spot always a little before the middle, the pale yellow dots and spots slightly raised and impunctate. *Thorax* beneath a little varied with black. *Venter*, except the tips of the joints, black. *Legs* with a more or less extensive abbreviated superior spot on the femora, and an exterior line on the tibiæ, black. Length 0.38—0.50 inch. Twenty specimens.

Might be readily confounded with *Ph. unipunctata*, Say, but differs, 1st. by the basal joint of the antennæ having no black spot below; 2d. by the greater number of spots on the thorax (5 instead of 1); 3d. by the scutel being pale, not dark; and 4th. by the disk of the elytra not being unicolored and uniformly punctured.

so in such and such a locality. The Editors might just as well tell us, by way of important and interesting news, that "THE man" was elected to the United States Senate from such and such a State, and that immediately upon his election he married "THE woman."

SCIENTIFIC NOMENCLATURE.

A correspondent from California, Mr. C. P. Faulkner, puts the following questions to us, the answers to which we propose to give in the following article, inasmuch as those answers cannot be comprised in any very limited compass, and will perhaps be interesting to many others of our readers:

1. How is it that the Striped Cucumber Bug is called "*Diabrotica vittata*" in the *Practical Entomologist*, and "*Galeruca vittata*" in Harris's *Injurious Insects?*

2. Should "*Lytta vittata*" be called "*Epicauta vittata?*"

3. Should "*Lytta cinerea*" be called "*Macrobasis Fabricii?*"

4. Should "*Lytta marginata*" be called "*Epicauta cinerea?*"

Every scientific name for every species, whether of animals or of plants, consists of two words either simple or compound, the first of which is the generic and the second the specific designation of the particular species treated of. In popular language the order of these two words is always reversed; for we say "White Oak," "Burr Oak," "Live Oak," etc., in Botany; and in Zoology "Cinnamon Bear," "Grizzly Bear," "Black Bear," etc., instead of "Oak White," etc., and "Bear Cinnamon," etc., as these same words would be arranged according to scientific rule. This is because scientific names are always Latin or what passes for Latin, and in Latin, as in French, the adjective usually follows instead of preceding the substantive. In English, on the contrary, the adjective must almost invariably come before the substantive to which it belongs.

Specific Names.

As regards the specific name, the general rule in science is, that when once given and established by a suitable published description it must not be changed, unless it is manifestly incorrect and ungrammatical, or unless the same name has previously been applied, by some other author, to some other species belonging to the same genus, or, technically speaking, when the name is "pre-occupied." For example, a very large number of our North American Insects received specific names a hundred years ago from Linnæus, and retain those very same names to the present day. The only disputable point here is, what is to be done when a species has been named and described by B in some work of scientific authenticity, and when the name given to this species by B has been universally received by the whole scientific world for ten, twenty, or perhaps even fifty years, provided it should subsequently be discovered by C that several years before B wrote and published, A gave to this very same species, in some obscure publication of perhaps of but little or no value, another and a very different name, along with some kind of brief description. According to what is known as the "Law of Priority," interpreted in its utmost rigor, A's name takes precedence of B's, and all the labels in all the Cabinets in Christendom have to be changed so far as regards this particular species. Why? Because it is held that A, who is supposed to have established a kind of scientific pre-emption to his new species, will be unjustly treated and dishonored, if his scientific name is not adopted, although perhaps the description upon which that name is based is so brief, obscure, incorrect and unsatisfactory, that it is very doubtful whether it really applies to B's species, which may have been described by B fully, clearly and correctly. And yet, in the majority of such cases as these, A is in his grave, and perhaps it would have been a positive benefit to science if he had never been born. So that the practical result is, that, for the sake of appeasing the indignant ghost of some obscure and long-forgotten naturalist of the last century, all the naturalists of the present day are to be inconvenienced, and a great deal of valuable time is to be expended in studying out mere scientific *phrases*, which time might be employed to much better advantage in studying out new scientific *facts*.

The popular reader can form no notion of what a nuisance this perpetual disinterment of old buried names has become in the scientific world, but by putting an analogous case in common life. Suppose a set of industrious antiquaries were to busy themselves in investigating the genealogies of all the leading business men in the United States, and were to prove by the most satisfactory documents from the different Heralds' Colleges in Europe, that Smith's correct name was Jones, and Thompson's proper appellation was Johnson, and Cook's real title was Taylor; and suppose it was the established law that all these unfortunate men had to give up their old names and take up with the new-fangled ones. What confusion there would then be between the old firms of Smith &

Thompson or Cook & Smith, and the new firms of Jones & Johnson, or Taylor & Jones? How everybody would be bothered and tormented, for no earthly purpose, except for the special gratification of the very learned antiquaries who, by toiling without pay or reward for a long series of years, and by covering themselves with the dust of all the libraries in Europe, had made these most valuable and important discoveries! It is just so in Science. This year an insect bears the specific name which it has borne for the last ten or twelve years. Next year some entomological archæologist, who knows a great deal more about books than about bugs, insists upon its receiving a new name, being an old name which he is of opinion was given to this same insect fifty years ago by some ancient author. Well, the obedient scientific world submits to his dictum—relabels its cabinets—and begins gradually to acquire the habit of addressing Mr. Smith as "Mr. Jones." But—lo and behold!—the very next year there comes a still more recondite antiquary, covered three inches deeper with learned dust than his predecessor, and insists upon it that this very same bug was named and described one hundred years ago by an old forgotten author, whose writings are now completely out of date! Alas for the poor helpless victims of the inexorable "Law of Priority!" Everybody has to adopt the newly-discovered name; and while nineteen naturalists out of every twenty curse these archæologists, in their hearts, as the greatest of all possible scientific nuisances, they yet laud them most vigorously in public, as ornaments of science and discoverers of the most important truths. But we have not yet arrived at the last scene in this scientific farce. After our two antiquaries have successively covered themselves with glory by rebaptizing twice over the very same insect, some ingenious person comes along who has access to some European Cabinet of Insects, in which original specimens of several of the species named by old authors are preserved. Upon carefully examining these specimens, he discovers that the two antiquaries are both of them mistaken, and that the two species described by the two old authors are quite different from that which has given rise to all this wilderness of assertions and argument. The result of course is, that we have to return to the original name, and all the cabinets in the world have for the third time to receive new labels. To recur once more to our homely illustration from popular life—we are first compelled to call Mr. Smith "Mr. Jones," and then just as we are getting used to calling him "Jones," we have to give up "Jones" and take perforce to "Thompson" or "Cook." And finally, after all this useless and wearisome chopping and changing, we have to return like a dog to his vomit and call Mr. Smith by his original appellation of "Smith."

Certain scientific associations and certain authors—Dr. Schaum for example—have endeavored to limit and restrict the above abuse of the "Law of Priority." For ourselves, we must confess that we agree with Dr. Schaum and the rest of that school; but at present the fashion tends in the contrary direction, and naturalists are now, many of them, as busily occupied in discovering new names as ladies are in inventing new bonnets, and perhaps with much the same benefits to the cause of science. To us, it appears that a single new fact about the habits of an insect, or a single new idea upon its correct position in the scale of classification, are of far more importance than the knowledge of what particular name it bore some fifty or a hundred years ago. Of course such inquiries as these last are to a certain extent interesting and instructive; and so it is just as well for us to know that New York was formerly called "New Amsterdam," and that London was known to the ancient Romans, not as London, but as "Londinium." Nobody, however, but a fool or a madman would try to persuade the modern Gothamites to call their great city "New Amsterdam," or the English cockneys to have their letters addressed to "Londinium," because these were the old original names. And yet what men of the world would never dream of doing, certain scientific men are busily engaged in doing every day. For unfortunately the entomological antiquaries are never satisfied with simply proving to their own satisfaction that certain species, now universally known by certain specific names, were known a long time ago under other names. But they will insist upon having the privilege of forcing these old-fashioned names down the throats of their neighbors, by virtue of this tremendous "Law of Priority."

To apply the above remarks to the third and fourth questions of our correspondent: About the middle of the last century a German author called Foerster, is thought to have named and described as the "Ash-gray Blister-beetle" (*cinerea*) the very same species of insects, which Fabricius several years afterwards named and described as the "Margined Blister-beetle" (*marginata*), and which was for a long series of subsequent years known in the scientific world exclusively by this latter specific name. As

both Harris and Fitch make use of this name, and it has thus become familiarized to the popular ear in America, we ourselves adopted it in our first volume (page 25). And thinking as we do of the necessity of not pushing the "Law of Priority" to its extremest point, we maintain that this name, the "Margined Blister-beetle," having been once firmly established and received in science, ought never to be changed. Of course, the ultra advocates of the "Law of Priority" will be of the contrary opinion; and this being a free country, everybody can think and act for himself. After all, it is a mere question of *words* and not of *things;* and even those that maintain such changes as these to be necessary will allow that they are an unmitigated nuisance.

On the whole, such scientific reconstructions strike us very much like those heraldic anomalies of the British aristocracy, according to which the man whom we read of in history as Danby, subsequently becomes Marquis Carmarthen, and finally Duke of Leeds. Or we may compare them to the ancient law of the Sandwich Islanders, that, on the death of every King of those islands, so many score words in their language should be radically changed, so that, instead of "bread" and "stone" for example, being called "whang" and "choch," they should, in commemoration of the deceased monarch, be forever thereafter known as "chum" and "fum."

If the reader adopts the views expressed by us above, "the Ash-gray Blister-beetle" (*cinerea*) is the correct specific name for the species which was designated by this appellation by Fabricius after Foerster published his work. If, however, the Margined Blister-beetle is to be rechristened as "the Ash-gray Blister-beetle," in accordance with the strict Law of Priority, then the specific name of "Ash-gray" (*cinerea*) is preoccupied, provided we refer both insects to the same genus. And in that event no new specific name can be more appropriate and in accordance with rule than *Fabricii*. We cannot understand, however, why both insects should not bear the same specific name (*cinerea*), provided they are referred to different and distinct genera, as is now generally done in purely scientific works.

In any case, if we are careful to add to the specific name the name of its author, there can practically be no confusion or mistake. Everybody, for example, will understand at once, that "*Lytta cinerea*, Foerster," means the Blister-beetle described under the name of *cinerea* by Foerster and "*Lytta cinerea*, Fabricius" means the very different Blister-beetle subsequently described under the very same name of *cinerea* by Fabricius.

Generic Names.

As a general rule, species may be considered as having a real existence in nature, and as creations which, however much they may become changed and modified in a long series of indefinite ages, are yet practically unchangeable within the very limited times to which the knowledge of the present generation extends. Take, for example, the magnificent group of Moths formerly comprised by Linnæus under his extensive genus *Attacus*, to which the *Polyphemus* Moth, figured on page 121 of our first volume, belongs. In the United States there are four species of this group commonly met with, besides two or three others which are more or less rare. Thousands of specimens of each of these four species pass annually through the hands of American Entomologists; and yet nobody ever met with a single specimen, which could not be referred at a glance to its appropriate species. With genera the case is very different. It will be allowed on all hands that a genus is not a definite and unchangeable creation—the same in the days of our grandfathers as it is now, and likely to remain the same till the days of our grandchildren. On the contrary, genera in the scientific world are in a constant state of fluctuation, two or three old genera being sometimes amalgamated together to form a new one, but the more usual tendency being for one old genus to be split up into several new ones. For instance, the four splendid Moths referred to above, which in the times of Linnæus and his immediate followers were all considered as belonging to the same genus, are now referred by almost all scientific entomologists to three distinct genera, and in the opinion of some few are divided among no less than four—or a genus for every single species. No doubt, in the great majority of cases, this subdivision of one old genus into several new ones is a benefit to science and a great practical convenience to the student. When, for example, an old genus contains a very great number of species—say fifty or a hundred—and we wish to ascertain whether a species that belongs to it has been already described, we then have to compare our species with no less than fifty or a hundred different descriptions before we can decide the question one way or the other. Whereas if this unwieldy old genus had been separated by well-marked characters into four or five new genera, each containing some twen-

ty-five or thirty species, we should manifestly then have a much smaller number of descriptions to refer to. It must be confessed, however, that in many instances small genera, containing but a very few species, are unnecessarily cut up into a number of new genera each containing but one or two species, while on the other hand large unwieldy genera are rendered still more unwieldy by amalgamating them with other large genera. Usually this latter process is had recourse to, because one or more species are discovered, which form a sort of transitional stage or intermediate grade between the two large genera. Such species are generally called "aberrant;" and probably, if all the species that ever existed in the world in all geological time were placed side by side, there would be no two genera in Nature, that would not then graduate into one another imperceptibly by such aberrant forms. In such a case as the above, therefore, instead of uniting two large genera, and thereby making the rich richer still, as by splitting up small genera the poor are made poorer still, the appropriate course seems to be indicated by Audubon and Bachman in the following passage:

In every department of Natural History, a species is occasionally found which forms the connecting link between two genera, rendering it doubtful under which genus it should properly be arranged. Under such circumstances, the Naturalist is obliged to ascertain, by careful examination, the various predominating characteristics, and finally place it under the genus to which it bears the closest affinity in all its details.—*History N. A. Quadrupeds*, Vol. II, page 215.

Up to a comparatively recent date, the general opinion has been that generic characters should be founded exclusively upon structural peculiarities, and that color is not a generic but a specific distinction. It is now, however, beginning to be recognized in science, that there are certain colors and colorational patterns peculiar to almost every genus, and which are therefore as truly generic characters as the minutiæ of structure usually employed for that purpose. Take, for example, a few of our largest and best known genera of Butterflies. We shall find that *Argynnis* is usually some shade of tawney-red with zigzag lines running across its wings in a very remarkable pattern; while *Hipparchia* and its allies are brown with eye-like spots transversing its wings near their tips; and *Colias* ranges from white through sulphur-yellow to orange, with the tips of its wings black and a small silvery spot in the middle of each wing below. It is on this account, as well as for other reasons, that we believe those authors to be in error, who have referred our N. A. *Cecropia* and *Promethea* moths and the Asiatic *Cynthia* moth to three distinct genera; for in all three may be found very nearly the same coloring and the same very peculiar colorational pattern.

To return to the questions asked by our correspondent: The old and very extensive genus *Lytta* has been very satisfactorily divided by Dr. Le Conte into a number of new genera, such as *Macrobasis*, *Pomphopœa*, etc. If we were writing a purely scientific Paper for the Proceedings of some learned Society, we should certainly name the insects specified by Mr. Faulkner as *Epicauta vittata*, Fabr., *Macrobasis cinerea*, Fabr., and *Epicauta marginata*, Fabr., instead of referring them all three to the old genus *Lytta*. But writing as we do for the popular eye, and endeavoring to simplify as much as possible that technical nomenclature, which in spite of all the sauce we can serve it up with is still so distasteful to many palates, we have preferred to follow Dr. Harris's example and use the more generally known generic appellation for all these three insects. For similar reasons, Harris called the Striped Cucumber Beetle *Galeruca vittata*, instead of *Diabrotica vittata*, *Galeruca* being the old genus, which included a great number of the less extensive modern genera, such as *Diabrotica*.

One word more and we have done with this somewhat dry subject. It should never be forgotten that scientific nomenclature is a means and not an end. It is necessary to be able to name with accuracy and precision each organized being, before we can record any knowledge that we may have acquired concerning it, or understand such knowledge when recorded by others. And as Law is said to be "the perfection of human reason," so Science may be perhaps sufficiently well characterized as the perfection of human accuracy. But to learn by rote the names of a great number of organisms, without any intention of applying what we have learned to any ulterior purpose, and without troubling our head one particle about the grand system upon which all scientific classification is based; is about as unprofitable a task as the human mind can be employed in.

☞ Should a number of the ENTOMOLOGIST, through whatever cause, fail to reach any of our subscribers, we will cheerfully send another one upon being informed of the fact.

ON THE PRESERVATION OF ENTOMOLOGICAL CABINETS.

BY JOHN L. LECONTE, M. D.

[From the American Naturalist for August, 1869.]

I have tried at various times many experiments for the preservation of collections of insects, but with such limited success that I did not think the results obtained worth publishing. For the sake of deterring others from pursuing these different lines of unsuccessful attempts, it would be useful, perhaps, to give a brief account of my failures before describing a process recently devised, which seems to be both simple and effective.

Corrosive sublimate and various preparations of arsenic have been recommended by several high authorities. The former, even when most diluted, will finally render the pin brittle by the amalgam developed; the latter, when used in a very weak alcoholic solution so as to leave no efflorescence on the specimens, will preserve them well, but it is troublesome to apply, as the insects must be thoroughly soaked with the fluid before being placed in the cabinet. Binarseniate of potassa being deliquescent, suggested itself to me as a material that might be applied in greater strength, and many years ago I prepared two boxes of specimens with it. They had a good appearance for some time, and have never been attacked, but eventually a considerable deposit or efflorescence came on the surface, so that the specimens required cleaning before they could be used for study.

Painting the interior of the boxes with arsenious acid was also only partially successful; I have seen, though not often, living larvæ of *Trogoderma* in boxes thus prepared.

Having thus failed in finding any satisfactory mineral poison I then tried the vegetable alkaloids.

I soaked specimens in moderately strong alcoholic solutions of strychnia and picrotoxia, dried them, and put them into pill boxes with *Trogoderma* larvæ. After some weeks the specimens were partly eaten, and the larvæ transformed into perfect insects.

The effects of benzine and carbolic acid are powerful, but only temporary. The former is preferable on account of its less disagreeable odor, and may be used by pouring about a teaspoonful in each box; it must be renewed every four or five months.

Packing the collection in chests painted with coal-tar has been also recommended, and would certainly be efficient, but troublesome, and renders the collection, practically, nearly useless for study, on account of the difficulty of access to the boxes. Surgical art has, however, given to us an instrument by which a poisonous liquid can be rapidly and most effectively applied to the entire surface of large numbers of specimens as they stand in the cabinet boxes, without the trouble of moving them. I refer to the *Atomizer*. Opinions may vary as to the nature of the liquid poison to be used, but after several trials I have found the following formula to be quite satisfactory; it produces no efflorescence, even on the most highly polished species, while the odor is quite strong, and persistent enough to destroy any larvæ or eggs that may be already in the box:

Saturated alcoholic solution of arsenious acid, eight fluid ounces; Strychnine, twelve grains; Crystallized carbolic acid, one drachm; Mineral naphtha (or heavy benzine) and strong alcohol, enough to make one quart.

I have not stated the quantity of naphtha, since there are some varieties of light petroleum in commerce which dissolve in alcohol only to a slight extent. These should not be used. The heavier oils which mix indefinitely with alcohol are the proper ones, and for the two pints of mixture ten to twelve fluid ounces of the naphtha will be sufficient.

Care should be taken to test the naphtha on a piece of paper. If it leaves a greasy stain which does not disappear after a few hours, it is not suitable for this purpose.

The best form of atomizer is the long, plated, reversible tube; it should be worked with a gum elastic pipe, having two bulbs to secure uniformity in the current. The atomizing glass tubes and the bottle which usually accompany the apparatus are unnecessary: a common narrow-necked two ounce bottle will serve perfectly to hold the fluid.

I trust that the use of the means here indicated may render the preservation of insect collections less troublesome than heretofore, and thus increase the interest of amateurs who frequently become disgusted with the science of entomology, by seeing the results of years of active and intelligent labor destroyed by a few months of inattention, or by carelessness in introducing infected specimens.

KILLING APPLE-WORMS BY MACHINERY.

The world certainly moves! Men are constantly making discoveries, which though trivial in themselves, greatly benefit their fellow-men. The hay-band remedy against the Apple-worm (*Carpocapsa pomonella*, Linn.) is an excellent one, but we are obliged to seek for the worms which spin up under it, and crush each one separately. Mr. D. N. Brown, an enterprising fruit-grower of St. Joseph, Mich., has however devised a plan of slaughtering them by wholesale, which commends itself to the good sense of every apple-grower. Here it is, as given in a late number of the St. Joseph *Herald*, by our friend and correspondent, L. P. Haskell of that place:

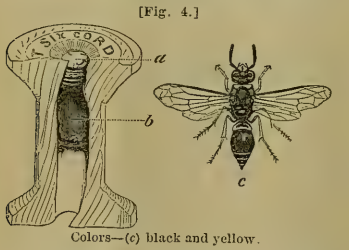
"Place early in June *rags*, not hay bands, in the forks of the tree, or trunk below the lower limb, and in these the larvæ will secrete themselves to enter the chrysalis state. Once in two weeks remove these rags, and destroy the insects. Mr. Brown does it very quickly and effectively by passing the rags through a clothes-wringer. In this manner he believes the nuisance may be got rid of; and yet the effort will be useless unless every owner of an orchard does the same thing. There must be *united* effort. Let every man feel it his duty to urge his neighbor to act at once and persistently, remembering that, 'eternal vigilance is the price of'—*good fruit*."

A POTTER-WASP.

(*Odynerus flavipes?* Fabr.)

In our article on "Wasps and their Habits," in Vol. I, No. 7, of the AMERICAN ENTOMOLOGIST, we showed how the various kinds of solitary Wasps provisioned their nests with different kinds of insects and spiders—how they first stung these little creatures so as to paralyze but not to kill them—and how the egg deposited by the mother-wasp, along with this living but dormant prey, subsequently hatched out into a soft defenseless larva, which fed at its ease upon the living provisions accumulated and stored up with such provident care by the author of its being. On page 138 we cursorily referred to the genus *Odynerus*—a very extensive group of the Solitary True Wasps, of which there are no less than ninety-nine described species found in North America. Several European species belonging to this genus are known to provision their nests with green lepidopterous larvæ, some of them excavating holes in sandy banks, some building their nests in the interstices of stone walls, and some selecting for that purpose wood that had been honey-combed by boring larvæ. We have a small North American species in our collection, which had made two nests in the central hole of a common wooden spool upon which cotton had been wound, closing up each end of the hole with tempered clay and separating one nest from the other by a partition of the same material. (See Fig. 4, *a*, *b*.) For this specimen and the spool in which the nests had been constructed we are indebted to Miss Marion Hobart, of Port Byron, N. Ills. Quite recently we have received a much larger species, which we figure herewith (*Odynerus flavipes?* Fabr., Fig. 4, *c*), from Mr. E. Daggy, of Tuscola, Central Illinois, with the following account of its operations:

[Fig. 4.]



Colors—(*c*) black and yellow.

Enclosed I send you five small worms, one brown and four green ones. They came to my notice as follows: I was sitting in the sanctum of the *Journal* office this morning, and saw a yellow jacket or wasp deposit one of these worms in a hole in the top of a common black wooden ink-stand which was upon the table just before me. After the wasp had coiled it down nicely it left, and I of course examined to see what was done. I saw there were more than the single worm, so I left it, to await results. Presently the wasp returned, but not with a worm, and worked some little time with its head in the hole where the worms were. After it left, I noticed that the hole was sealed over with mud; presently it returned with still more mud, and thrice this operation was performed. On examining the contents of the hole in the ink-stand, I found, to my astonishment, thirty-five worms in it, doubtless the work of the same wasp. I send you five of these, wasp and all, as I have just captured it since I commenced writing to you.

It has been supposed by some entomologists that Wasps always provision the same nest with the same species of insect. But the five worms forwarded to us by Mr. Daggy, which averaged about one-third of an inch in length, although they were all the larvæ of small moths, mostly leaf-rollers, yet belonged to at least three distinct species. Along with them was sent a Wasp-larva which had attained maturity and already spun its cocoon, showing that there must have been more than one nest built by the mother wasp in the hole in the ink-stand, and that the tenant of the bottommost nest had already consumed its private and peculiar stock of larvæ and was preparing to lie up for the winter. In the cotton-spool, which was less than one and a half inches long, there were, as we have seen, no less than two distinct nests, although both ends of the central hole had to be filled up with clay to fit it for the purpose for which it was employed.

In the drawing which we have given above of this Potter Wasp (Fig. 4 *c*), the wings are represented as fully expanded. In repose, however, they are always doubled over upon themselves in the singular manner shown in figure 96, page 123 of our First Volume. This is a remarkable peculiarity of the True Wasps (*Diplopteryga*), not to be met with in a single species of the Digger Wasps (*Fossores*), although these last have precisely the same general habits as the *Solitary* True Wasps, to which our species appertains. The habits of the *Social* True Wasps, such as the Yellow Jackets, the Bald-faced Hornet, etc., are entirely different from those of the Solitary True Wasps; and yet their wings are folded in repose in exactly the same manner.

☞ The publishers of those papers which advertise to club with ours, will please take notice of our change of subscription price.

TOMATO-WORMS NOT POISONOUS.

For some unaccountable cause there are certain of God's creatures, that everybody seems to take a pleasure in vilifying and slandering, while on the other hand there are others that are almost worshiped in the popular mind. For instance, Toads and Snakes are considered by most persons as all of them equally poisonous and dangerous; whereas in reality the number of venomous snakes to be found in the United States may be counted on the fingers of one hand; and as to Toads, they may be freely handled with the most perfect impunity, and they prove themselves to be one of the very best friends to the gardener and the farmer by preying to a great extent upon noxious insects. On the other hand our small birds are considered by many as a kind of Sacred Animal, that it would be as impious for us to shoot when they are destroying our grapes and our cherries, as it would be for a Hindoo to drive away the holy Brachman Bull when that Bull is devouring his rice-crop before his very eyes. Among our insect friends, however, we find but very few that are popular favorites, the only instance that occurs to us at present being that of the Lady-birds (*Coccinella* family), which are the children's pets all over Europe, and are known in France as "the Virgin's Cattle," and "God's Cows." With this exception, perhaps, all other insects are commonly devoted to destruction as ugly and hateful abominations, which it is dangerous to touch and ridiculous to admire. More especially are the different kinds of Caterpillars, or "worms" as they are often called, which are the larvæ of our multifarious species of Butterflies and Moths, objects of the most unmitigated disgust. And perhaps of all these none is in worse repute than the common Tomato-worm.

This larva belongs to an extensive group (the *Sphinx* Family), almost all of which have a stiff pointed horn growing out of their tails—a merely ornamental appendage, such as those which are distributed in considerable numbers over the body of the magnificent larva, which we illustrated in the Frontispiece to our first volume. Why or wherefore it is impossible to say, but this poor unfortunate Tomato-worm has been selected by the popular voice, out of about fifty others belonging to the same Family and found within the limits of the United States—all of which have a similar horn growing out of their tails—to be falsely accused of using this horn as a sting. The Tomato-worm and the Tobacco-worm are as like as two peas, and produce moths which resemble each other so closely, that entomologists for a long time confounded them together. Each has exactly the same kind of horn growing on the hinder extremity of its body; yet while the Tomato-worm is generally accused of stinging folks with this horn, nobody, so far as we are aware, ever yet said that the Tobacco-worm would or could do so. The real truth of the matter is that neither of them can sting, either with its tail, or with its head, or with any part of its body. Yet not a season elapses but the newspapers publish horrible accounts of people being stung to death by Tomato-worms, and earnestly recommend those that gather tomatoes to wear heavy buckskin gloves. These stories, however, have been contradicted so flatly and so often, that latterly the penny-a-liners have struck off upon another tack. Tomato-worms, it appears, do not sting with the horn that grows on their tails, but they "eject with great violence a green caustic fluid from their mouths to a distance of from three to fifteen inches"!! Now what is the real truth about this matter? Tomato-worms do really discharge from their mouths, when roughly handled, a greenish fluid, and so do the larvæ of almost all moths, and so does every species of grasshopper with which we are acquainted, and so do many different kinds of beetles. But it is not true that they can spit out this fluid even to the distance of a quarter of an inch, much less to the distance of fifteen or even of three inches; and especially it is not true that the fluid is poisonous. If it were so, we should have been in our graves long ago; for we have had it repeatedly daubed over our fingers, but without the least ill effects therefrom, and so have scores of other entomologists in this country. The strangest thing of all is, that of two worms almost exactly alike, one of which eats tomato leaves, and the other eats tobacco leaves, the tomato-chewer should be accused of spitting, and the tobacco-chewer should be held to be guiltless of this offensive practice.

Now then, Gentlemen of the Public Press, if Tomato-worms neither sting nor spit, what is the next charge that you are going to bring against them? Why not assert that they can leap a distance of from ten to twenty feet, having taken deadly aim at the human eyes, which they forthwith proceed to gouge out with their rough rasp-like pro-legs? Of course you would follow this up by recommending everybody never to go near a tomato patch, without a large pair of green goggles to protect the eyes from being destroyed.

GOOSEBERRY AND CURRANT WORMS.

We candidly confess that we are discouraged. Nearly a year ago we published a full account of the different Potato Bugs to be found in the United States, showing that there are about a round dozen of perfectly distinct species attacking the Potato plant—some burrowing in the stalk, but most of them devouring the leaves—some infesting the plant both in the larva and in the perfect state, others in the perfect state exclusively—and most of them to be found all over the Union, while one of them is almost entirely confined to the Eastern States, and another is at present only to be met with in the West, though it is gradually advancing with giant strides towards the devoted East. In that article we further pointed out the practically very important fact, that different Potato Bugs having different habits must be attacked in different modes; and that what is excellent sauce for the goose will often turn out to be very poor sauce indeed for the gander. Yet—wonderful to relate!—in spite of all our efforts to disseminate correct knowledge on this subject, several newspapers have continued to publish paragraphs through the summer of 1869, showing how "THE Potato Bug" has done thus and so in such and such a neighborhood! They might just as well publish as interesting and satisfactory news, that "THE sheep" took the first premium at such and such a Wool-growers' Convention, or that "THE horse" won the race at the last meeting of the Honorable Jockey Club of Swindleton.

What then, under the circumstances, are we to do? Shall we give up in despair and discontinue the ENTOMOLOGIST, simply because it is demonstrated by hard dry facts, that such a paper is urgently needed, and that the popular ignorance on the subject of insects urgently requires to be enlightened? Far from us be such faint-heartedness! We acknowledge that we find a great many very "hard cases" among our adult population—men who maintain stoutly, that it is beneath the dignity of the human species to pay any attention to these infinitesimally minute little creatures, which are every day picking our pockets of untold millions of dollars. But we have great faith in the rising generation. School Superintendents are now beginning to recognize the fact, that Natural History is not only a very pleasing, but practically a most important study; and that as insects outnumber tenfold all the other animals in the world put together, so they annually inflict upon us ten times as much pecuniary damage as all the other animals in the world put together. Hence the very legitimate inference is drawn, that of all the various departments of Natural History, Entomology, viewed in the light of dollars and cents, is of the greatest practical importance; and but for the want of competent teachers and suitable text books, it would no doubt be introduced at once, as a regular branch of study, into all our best schools. We would suggest, however, to those who have such matters under their official charge, that where there is a demand there will always sooner or later be a supply; and that the very best way to create a demand for good Entomological Text-books, suited to the comprehension of children, is to disseminate among children a taste for the more pleasing and popular branches of Entomology. It is for the express purpose of creating such a taste in the public mind, that our Magazine has been set on foot; and in spite of our well-known modesty, we cannot help throwing out a hint here, that worse text-books than the AMERICAN ENTOMOLOGIST might on a diligent search be found in some of our public schools. But we must stop here. The publisher gravely admonishes us, that if our little work were generally introduced into all our Public Schools, or even into all our High Schools, it would be utterly impossible for him, with his present typographical facilities, to supply the demand for it. Such an idea, if practically carried out, would certainly ruin him; for he would then have to purchase, at a vast expense, one of the Patent Forty-Cylinder Printing-presses, that throw off 1,539,141 impressions every five minutes.

We have determined, therefore, upon a cool consideration of the state of the case, not to be daunted or discouraged, because a few benighted individuals will still persist in talking about "THE Potato Bug," instead of telling us in so many words whether they mean the Colorado Potato Bug, or the Ash-gray Blister-beetle, or the Three-lined Leaf-beetle, or whatever the particular species of Potato Bug may be that is destroying their potato-vines. We have thrown our bread upon the waters; we hope and believe that, after many days, or at all events after many years, it will be found and appreciated by the world. In the meantime, with unflagging resolution and unabated confidence, we shall proceed with our task. We have already given a complete history, illustrated by figures, of the different bugs that afflict the Irish Potato. We have done the same thing

with those that infest the Sweet Potato. We have commenced a series of articles, throwing light upon the multifarious species that destroy the health and vigor of the Grape-vine. In the present Paper we propose to give the Natural History of three perfectly distinct kinds of worms, or larvæ as they would be more properly termed, that devour the foliage of the Currant and the Gooseberry. There are other larvæ that bore into the stems or twigs of one or both of these plants, and should rather be called "Borers" than "Worms;" but with these we have at present nothing to do. In a future Paper we shall perhaps treat of these last by themselves.

The Currant and the Gooseberry, although the general appearance of the two plants is very different, and although almost all the species of Gooseberry are thorny and bear each fruit upon a separate stem, while all the species of Currant are devoid of thorns and bear their fruit in a peculiar kind of bunch technically known as a "raceme," are yet referred by Botanists to the same genus (*Ribes*). Our common Garden Gooseberry (*Ribes grossularia*) has been introduced among us from Europe; but we have four wild species commonly found in the Northern States; and besides these four there is a Californian species, the Showy Gooseberry (*R. speciosum*), which is sometimes cultivated as an ornamental plant in our gardens, for the sake of its fine deep-red hanging flowers and red stamens. On the contrary, our common Garden Red Currant (*R. rubrum*), of which the White Currant is a mere variety, is indigenous in the more northerly of the Northern States from New Hampshire to Wisconsin, although it is also a native of Europe; while on the other hand the Black Currant of our gardens (*R. nigrum*) is a European plant, and is thought by the best authors to be distinct from our American Wild Black Currant (*R. floridum*). Besides the above we have three other Currants peculiar to America. One of these, the Missouri or Buffalo Currant (*R. aureum*), grows wild in the Far West and is often cultivated in gardens, where its small, bright-yellow, spicy-scented flowers are very conspicuous in the early spring. Another of them, peculiar to Oregon and California, the Red-flowered Currant (*R. sanguineum*), is also occasionally grown as an ornamental plant on this side of the Rocky Mountains.

We have entered into these botanical details, because it is a remarkable fact that the three different Currant and Gooseberry Worms, now to be brought under our notice, all of them attack almost indiscriminately in our gardens the Red Currant and the Gooseberry, while they are none of them ever found upon our cultivated Black Currant or, so far as is known, upon our wild Black Currant. On the other hand our common imported Currant Borer (*Ægeria tipuliformis*) infests the Red or White Currant, but is never found in the twigs of the cultivated Black Currant or in those of the Gooseberry, whether wild or tame: while our wild Black Currant has a peculiar borer of its own (*Ægeria caudata*), belonging to the very same genus as the imported species which attacks the Red Currant; and we ourselves recently noticed, in the grounds of Mr. D. F. Kinney at Rock Island, Ill., that the tips of the rank vigorously growing twigs of the tame Black Currant were extensively bored on the last of June by that very general feeder the Stalk Worm (*Gortyna nitela*).* Finally, the common Currant Plant-louse (*Aphis ribis*)—a species introduced among us from Europe—may be noticed almost every spring in every patch of Red Currants, curling up the leaves in great numbers into blister-like elevations, on the inferior surface of which it resides; while neither this particular species of Plant-louse, nor any other species so far as we are aware, is ever met with either upon the Gooseberry, whether wild or tame, or upon the Black Currant, whether wild or tame. These facts may serve to show us how unsafe it is to infer that, because one insect can thrive upon a number of different species of a particular genus of plants, therefore another insect can do the same thing.

The Gooseberry Span-worm.

(*Ellopia* [*Abraxas*] *ribearia*, Fitch.)

This may be at once distinguished from any other worm, found either on Gooseberry or Currant, by its being what is popularly called a "measuring-worm" or span-worm. The annexed sketch (Fig. 5) shews this larva in three different positions, No. 1 representing it in profile in the looping attitude, and No. 2 giving a dorsal view of it as it hangs suspended by a thread. When full-grown it measures about an inch, and is of a bright yellow color, with lateral white lines and numerous black spots and round dots. The head is white, with two large black eye-like spots on the outer sides above and two smaller ones beneath. The six true legs are black and the four pro-legs yellow. It attains its growth about the middle of June, when it descends to the ground and either burrows a

* Figured with its larva in Amer. Entom. I. page 22, fig. 11.

little below the surface or hides under any rubbish that may be lying there; but in neither

[Fig. 5.]

Colors—(1 and 2) yellow, black and white; (3) mahogany brown.

case does it form any cocoon. Shortly after this it changes to a chrysalis (Fig. 5, No. 3), of the usual shape and shining mahogany brown color. After remaining in the pupa state about fourteen days, it bursts the pupa shell and in the forepart of July appears as a moth (Fig. 6), of a pale nankin yellow color, the wings shaded with faint dusky leaden-colored spots arranged so as not to present any definite pattern. The sexes then couple as usual, and the female lays her eggs on the branches and twigs of the bushes. Owing to this peculiarity, the species is frequently carried in the egg state upon transplanted bushes from one neighborhood to another; which accounts for its sudden appearance in parts where it was before unknown. For there is but one brood of this insect in one year, and the eggs must consequently, like those of the Tent-worm of the Apple-tree, be exposed, on the twigs and limbs to which they are attached, to all the heats of July and August without hatching out, and to all the frosts of December and January without freezing out. At length, when the proper time arrives, and the gooseberry and currant bushes are out in full leaf so as to afford plenty of food, the tiny but tough little egg hatches

[Fig. 6.]

Colors—Pale yellow and faint lead-color.

out about the latter end of May, and in a little more than three weeks the worms attain their full larval development.

This Gooseberry Span-worm was first noticed near Chicago in 1862 or '63; and for two or three years afterwards it increased rapidly, so as in most gardens not to leave a single leaf on the gooseberry, and in many instances to entirely strip the currant bushes. It is quite common also in St. Louis and Jefferson counties in Missouri, and for the past two seasons has entirely stripped the Gooseberry bushes on many farms in these counties. Elsewhere in the Western States it is not by any means common; but in many localities in the East it has been a severe pest for a great number of years, especially in the States of New York and Pennsylvania. Near Rock Island, Ill., in the course of twelve years collecting, we only met with one solitary specimen of the moth, although there are plenty of wild gooseberries growing in the woods there, which plant was in all probability its original home, before the introduction into this country of the cultivated gooseberry. We have observed that the species shows a decided preference for the gooseberry, always attacking that plant first when growing side by side with the currant. Hence we have given it the English name of the "Gooseberry Span-worm," to distinguish it from the Imported Currant Worm next to be treated of, which conversely prefers the Currant to the Gooseberry. In reality, however, as we hinted before, the "Gooseberry Span-worm" frequently becomes a Currant Span-worm, and the "Imported Currant Worm" is often to be met with performing the part of an Imported Gooseberry Worm.

It should be carefully observed that the Gooseberry Span-worm is a native American insect, not to be found on the other side of the Atlantic. In Europe, indeed, there is an allied span-worm (*Abraxas grossulariata*), which infests their gooseberry and currant bushes much in the same way as our indigenous species infests our bushes; but the larva and especially the perfect moth are marked very differently.* We mention this fact, because it was erroneously stated four years ago in an Article in the *Prairie Farmer*, that the two were identical; and because, as we shall show in a future article, the truth is here of some considerable scientific interest and involves some very curious consequences.

*Figures of both will be found in Westw. *Introd.* II. p. 396, Figs. 1 and 3.

The Imported Currant-worm.

(*Nematus ventricosus*, Klug.)*

It is only about a dozen years since this most pernicious enemy to the Currant and Gooseberry was introduced from Europe into the United States. So far as can be ascertained, it made its first appearance among us in the neighborhood of Rochester, N. Y., and is supposed to have been imported along with some gooseberry bushes from Europe by the celebrated Rochester nurserymen, Messrs. Ellwanger & Barry. In nine years time, besides colonizing in other directions, it had gradually spread to Washington Co., N. Y., on the east side of the Hudson River—a total distance of about 225 miles. Thus, as it appears, it traveled at the average rate of some 25 miles a year, establishing a permanent colony wherever it went, and not passing through the country as a mere moveable column of invaders. In 1860 or '61 it appeared at Erie in the N. W. corner of Pennsylvania. In 1864 Prof. Winchell found it at Ann Arbor, Michigan. In 1866 it was generally distributed over the N. E. counties of Pennsylvania. And judging from a conversation which we had in October, 1868, with Mark Carley, of Champaign, in Central Illinois, this gentleman must have had it in great numbers upon his currant bushes in the summer of that year. At all events he described the worm which had infested his bushes as being green with many black spots and as not being a looper.

But besides the principal centre of distribution at Rochester, N. Y., this Currant-worm seems to have been imported from Europe at one or two other points in the Eastern States, and as at Rochester to have spread therefrom as from a focus. Unless our memory greatly deceives us, Mr. Geo. Brackett, of Maine, described this same insect many years ago, as existing in that State, though he gave it a different specific name, and was not at all aware that it had been introduced from the other side of the Atlantic. We also heard of it in the summer of 1867, from Mr. A. H. Mills, of Vermont, as being very destructive in his neighborhood. Not improbably, it was independently imported at other points in the East. Wherever it is introduced it spreads with great rapidity, and as there are two broods every year, it soon multiplies so as to strip all the currant and gooseberry bushes bare and utterly ruin the crop, besides eventually destroying the bushes, unless proper measures be taken to counteract it. Throughout the western parts of New York, as we have been informed by our ornithological friend Dr. Velie, the cultivation of currants and gooseberries has been almost entirely given up, on account of the depredations of this seemingly insignificant little savage. And, according to Dr. Fitch, at Watertown, N. Y., "it kept the bushes so destitute of leaves in most of the gardens, that in three years they were nearly or quite dead."

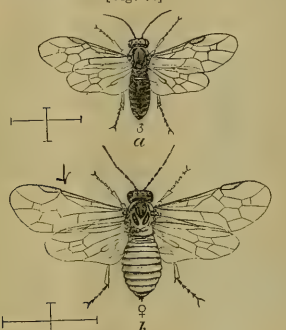
The Imported Currant-worm Fly (Fig. 7, *a* male, *b* female, both enlarged), belongs to the Sawflies (*Tenthredo* Family)—a group of the Order of Clear-winged Flies (*Hymenoptera*), which is remarkable for having most of its larvæ with the same plant-feeding propensities as those of the great bulk of the larvæ of the Moths, and with very much their general appearance. Sawfly larvæ, however, may be readily distinguished from moth larvæ, in the majority of cases, by having either 22, 20 or 18 legs; whereas the greatest number of legs that any moth larva has is 16. The species that we now have to do with

*In the PRACTICAL ENTOMOLOGIST for September, 1866, the Senior Editor published the first complete history of this Insect, as it exists in the United States, and in an addendum to the Article gave its full scientific synonymy, showing that, in accordance with the Law of Priority, its correct name was *Nematus ventricosus*, Klug, and that, according to Snellen Von Vollenhoven, this was as early as 1850 the received name for the species in Europe. As is stated in that Article, the species was first described by Klug in the year 1816 under the above specific name, and an author till four years afterwards that St. Fargeau blunderingly described the male under the specific name of *affinis*, and the female under the specific name of *trimaculatus*—thus manufacturing two species out of one! Two years after the above Paper from the pen of the Senior Editor had been published, Dr. Fitch gave to the world an Article on this subject in the *Transactions of the New York State Agricultural Society* for 1867, pp. 969–932. In this Article, though he incidentally remarks (p. 910) that the same insect had been described by another author under the name of *ventricosus*, he yet adopts St. Fargeau's name for it, or rather that one of St. Fargeau's two names which applies exclusively to the female sex—namely "*trimaculatus*." This, however, is a trifling matter; for although Dr. Fitch has frequently busied himself in upsetting old established names, and in accordance with the rigid Law of Priority supplanting those old names by still older ones, which he has chosen to resurrect from the buried dust of ages, we ourselves attach but little importance to this kind of scientific legerdemain. But Dr. Fitch has not been satisfied with adopting St. Fargeau's name published in 1823 in preference to Klug's name published in 1849, thus flying in the face of the very Law of Priority, for which he is generally so great a stickler: he must also adopt St. Fargeau's blunder in giving that name. It will scarcely be believed, but it is positively and absolutely true, that Dr. Fitch describes exclusively the female sex of this insect, and palms it off upon his readers as a description of both sexes! (See pp. 926-7). Yet the males are almost entirely black and the females almost entirely yellow; so that a description that suits the female is altogether inapplicable to the male. Nor is this an unusual thing among the Sawflies; for it was shown by the Senior Editor as long ago as December, 1866, that in this Family the body of the male is very generally much darker than that of the female, while in the *Ichneumon* family it is exactly the reverse. (See *Proc. Ent. Soc., Phil.*, VI, pp. 238-9).

In the Paper in the *Practical Entomologist* which was thus already referred to (Vol I, pp. 120-1) it is expressly stated that "the males and females of this Sawfly differ so widely that they would scarcely be taken by the inexperienced entomologist for the same species;" and a very full description of each sex is then and there given. Yet two years subsequently Dr. Fitch, as it appears, was totally unacquainted with the male sex, or at all events his description applies exclusively to the female, and he says not one single word about the sexes. And this when, by his own account, the insect was swarming in his own garden under his very nose! Of course, under these circumstances, it is impossible that he could ever have looked into the Paper on the same subject published two years before in the *Practical Entomologist*. But when an author is careless enough to make such blunders as the above, would he not do well, before he gives his own lucubrations to the world, to see what others have published in the same special department of Natural History?

comes out of the ground soon after the leaves of the currant and gooseberry bushes, upon which it feeds, put forth in the spring, or from

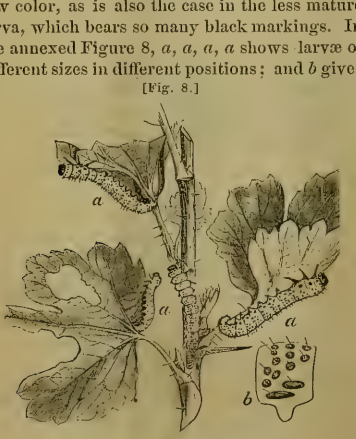
[Fig. 7.]



Colors—Black and yellow.

the latter part of April to the forepart of May. The sexes then couple, and the female proceeds to lay her eggs along the principal veins on the under side of the leaf. From these eggs shortly afterwards hatch out minute green 20-legged larvæ or worms, which at first have black heads and many black dots on their bodies, but after moulting for the last time are entirely of a grass-green color, except the large dark eye spots on each side of the head found in all larvæ belonging to this genus, and except that the joint next the head and the two hindmost joints are of a yellow color, as is also the case in the less mature larva, which bears so many black markings. In the annexed Figure 8, *a, a, a, a* shows larvæ of different sizes in different positions; and *b* gives

[Fig. 8.]



Colors—Green, yellow and black.

an enlarged view of one of the abdominal joints in profile, so as to exhibit the position of the black spots. When full-grown the larvæ are about three-quarters of an inch long, and from their greatly increased size, make their presence readily known by the sudden disappearance of the leaves from the infested bushes. Shortly afterwards, having attained a length of fully three-quarters of an inch, they burrow underground, generally beneath the infested bushes, or, if there are many leaves lying on the ground, simply hide under those leaves. In either case they spin around themselves a thin oval cocoon of brown silk, within which they assume the pupa state. But frequently, as we are assured by Mr. Saunders of Canada West, and as European observers have noticed, they spin their cocoons in the open air upon the bushes. About the last week in June or the first part of July, or occasionally not until the beginning of August, the winged insect bursts forth from the cocoon and emerges to the light of day; when the same process of coupling and laying eggs is repeated. The larvæ hatch out from this second laying of eggs as before, feed on the leaves as before, and spin their cocoons as before; but the perfect fly from this second brood does not come out of the cocoon till the following spring, when the same old series of phenomena is repeated.

From the drawings of the Male and Female Fly given above (Fig. 7), the reader will see at once that the two sexes differ very widely. This is very generally the case among the Sawflies, and it is a remarkable and most suggestive fact that, when this takes place, the body of the male is almost invariably darker than that of the female. Nor does our species, as will be observed at the first glance, form any exception to the rule. Indeed, as with two other Sawflies that devour the foliage of our Pines and Firs (*Lophyrus Abbottii* and *L. abietis*), the body of the male is almost entirely black and that of the female almost entirely yellow; so that at first sight we should suppose the two to belong to different species. Since, from some unaccountable oversight, Dr. Fitch has overlooked this fact, and described both sexes as being colored in the manner which is exclusively to be met with in the female, it will be as well to add here full descriptions, first of the female fly and secondly of the male fly. These descriptions were, indeed, published by the Senior Editor two years before Dr. Fitch's appeared; but the writings of that gentleman circulate so extensively that, when he makes an important mistake such as this, it is proper that it should be corrected in our columns in detail.

Female Fly.—General color of body bright honey-yellow. *Head* black, with all the parts between and below the origin of the antennæ, except the tip of the

mandibles, dull honey-yellow. Antennæ brown-black, often tinged with rufous above, except towards the base, and beneath entirely dull rufous except the two basal joints; four-fifths as long as the body, joint 3, when viewed laterally, four times as long as wide, joints 3-5 equal in length, 6-9 very slowly shorter and shorter. In two females the antennæ are 10-jointed, joint 10 slender and ¾ as long as 9. *Thorax* with the anterior lobe above, a wide stripe on the disk of each lateral lobe which is very rarely reduced to a mere dot, or very rarely the whole of each lateral lobe, a spot at the base and at the tip of the scutel, the two spots sometimes confluent and very rarely subobsolete, a small spot at the outer end of each cenchrus and a geminate small spot transversely arranged between the cenchri, the tip of the metathoracic scutel, the front and hind edge above of what seems the 1st abdominal joint, but is in reality the hind part of the metathorax, or very rarely its whole surface above, and also the whole lower surface of the breast between the front and middle legs, or very rarely two large spots arranged crossways on that surface, all black. Cenchri whitish. *Abdomen* with joints 1 and 2 very rarely edged at tip with black. Sheaths of the ovipositor tipped more or less with black, the surrounding parts sometimes more or less tinged with dusky. The triangular membrane at the base of the abdomen above, whitish. *Legs* bright honey-yellow; all the coxæ and trochanters whitish; the extreme tip of the hind shanks and the whole of the hind tarsi, brown-black. *Wings* glassy; veins and stigma brown-black, the latter as well as the costa obscurely marked with dull honey-yellow. In a single ♀ all three submarginal cross-veins are absent in one wing, and only the basal one is present in the other wing. In another ♀ all three are indistinctly present in one wing, and in the other only the basal one and a rudiment of the terminal one. In a single wing of two other ♀, the terminal submarginal cross-vein is absent. And in a single ♀ there are but three submarginal cells in either wing, precisely as in the genus *Euura*.—Length ♀ 0.22—0.28 inch. Front wing ♀ 0.27—0.33 inch. Expanse of wings ♀ 0.53—0.64 inch, (wings depressed).

MALE FLY.—General color of body black. *Head* with the clypeus and the entire mouth, except the tip of the mandibles, dull honey-yellow. Antennæ brown-black, often more or less tinged with rufous beneath except towards the base: as long as the body, the joints proportioned as in ♀, but the whole antenna, as usual in this sex, vertically much more dilated, so that joint 3 is only 2½ times as long as wide when viewed in profile. *Thorax* with the wing-scales and the entire collare honey-yellow. Cenchri whitish. *Abdomen* with more or less of its sides, the extreme tip above, and its entire inferior surface honey-yellow. *Legs* as in ♀. *Wings* as in ♀. In two ♂ the middle submarginal cross-vein is absent in both wings, so that if captured at large they would naturally be referred to the genus *Euura*. In two other ♂ this is the case in one wing only. Another ♂ has but the basal submarginal cross-vein remaining in each wing. And in two other ♂ the terminal submarginal cross-vein is absent in one wing.—Length ♂ 0.20—0.22 inch. Front wing ♂ 0.23—0.25 inch. Expanse of wings ♂ 0.44—0.51 inch, (wings depressed.)

Described from 22 ♂ and 13 ♀, 3 ♂ and 1 ♀ of the spring brood. The fact of two ♀, contrary to the established character of the genus *Nematus*, having 10-jointed instead of 9-jointed antennæ is a variation of a kind of which no other example in the whole Family of Sawflies is on record. Had such a specimen been captured at large, instead of being bred, along with a lot of normal ♀, from the same lot of larvæ taken from the same lot of bushes, it would probably have been made the basis for a new genus and a new species by some of our genus-grinding closet-entomologists.

The mode in which this Currant Worm has been transmitted, first from the European nursery to the American nursery, and afterwards all over several States of the Union, can be easily explained. As has been stated just now, it usually passes the autumn and winter in the ground under the bushes, where it has fed, housed in a little oval cocoon from ¼ to ½ inch long. Hence if, as often happens, infested bushes are taken up in the autumn or early in the spring, with a little dirt adhering to their roots, and sent off to a distance, that dirt will likely enough inclose a cocoon or two. A single pair of cocoons, if they happen to contain individuals of opposite sexes, will be sufficient to start a new colony. The first and probably the second year the larvæ will not be noticed; but increasing, as almost all insects do, unless checked from some extraneous source, in a fearfully rapid geometric progression, by the third or fourth year they will swarm, strip the bushes completely bare of their leaves, and ruin the prospect for a good crop of fruit. Of course, like other winged insects, they can fly from garden to garden in search of a suitable spot whereon to deposit their eggs; so that any point where they have been once imported becomes, in a few years, a new centre of distribution for the immediate neighborhood.

Nurserymen and all others, importing Gooseberry and Currant bushes from a distance, should be particularly careful, before they plant them, *to wash the roots thoroughly in a tub of water, and burn or scald whatever comes off them.* Any cocoons, that may happen to be hidden among the dirt attached to the roots, will then be destroyed. By attending to this precaution the dissemination of this mischievous little pest, throughout the United States, may be greatly retarded for many years to come.

For those who are already cursed with it, the same hellebore which we shall recommend at the end of this Article, as universally efficient against all three kinds of Gooseberry and Currant Worms, is the best, the cheapest and the most available remedy. Where this cannot be conveniently obtained, the Imported Currant Worm, owing to a peculiarity in its habits, can be pretty successfully fought upon a system, which is inapplicable to the other two species on account of the difference in their habits. Unlike the other two, the Imported Currant Worm, as has been already stated, lays its eggs in large groups on the under side of the leaf, and upon the principal veins, as shown at No. 1 in Figure 9, instead of attaching them in comparatively small patches to the twigs and branches. Hence, when the eggs hatch out, the minute little larvæ can find

[Fig. 9.]

plenty of food without wandering off, and they have the habit when very young of boring small holes through the leaf as shown at No. 2 in Figure 9, and when they become a little older, holes that are a little larger as shown at No. 3. It is evident that such holes as these may be readily recognized, and the leaf be carried larvæ and all far away from any currant or gooseberry bushes and left to wither there, or—to make assurance doubly sure—thrown into the fire. If, however, the young larvæ are removed a few rods away from any plant belonging to the botanical genus *Ribes* (Currant and Gooseberry), they will be sure to die of starvation. For they cannot feed on anything else, any more than the common Locust-borer can live on an Apple-tree. As the eggs are laid in such large groups, there will be but a few leaves bearing these newly hatched larvæ to remove from every bush.

Wherever this Currant Worm has been introduced, there has prevailed from some cause or other a popular superstition, that the currants grown upon the infested bushes are poisonous. This is a mere delusion. They may be, and very probably are, unwholesome, just as any other fruit would be perhaps more or less unwholesome, if grown under such unnatural conditions as to seriously affect the health of the tree; but we have the authority of Dr. Fitch, himself a physician, for believing that the common notion on this subject is entirely erroneous.

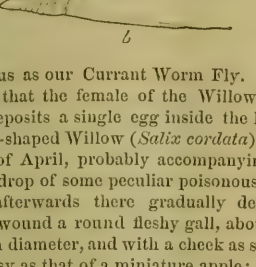
Entomologists have often speculated, whether the same parasite will attack several distinct species of insects, and whether any European species, which has been introduced into America without its peculiar parasites, will ever be attacked by the indigenous parasites of this country. So far as regards our Imported Currant Worm, both these questions can be answered in the affirmative. Three years ago the Senior Editor published the fact, that this worm was parasitically infested by the larva of a small Ichneumon-fly (*Brachypterus micropterus*, Say), which has such short and rudimentary wings, that it has very much the appearance of an Ant; and more recently it has been discovered by that excellent observer, J. A. Lintner of Schoharie, N. Y., that the eggs of this Currant Worm Fly are so generally inhabited by the larva of a minute Hymenopterous Parasite, that among fifty eggs he only found four or five which hatched out into Currant Worms.

As these pages were going through the press, we received from the Editor of the *Canadian Entomologist* a third parasite, which he had himself ascertained to prey, not on the egg of the imported Currant Worm Fly, but on the larva. This parasite is a small four-winged fly belonging to the great *Ichneumon* Family, and scarcely one-fifth of an inch long, with its front wings very prettily ornamented each of them with two dusky bands. A full description of it (under the name of *Hemiteles nemativorus*, n. sp.) will probably appear before long, from the pen of the Senior Editor, in the columns of the excellent Periodical just now referred to. This very same species of *Ichneumon*-fly had been captured near Rock Island, Ill., several years ago by the Senior Editor; and as the Imported Currant Worm has not as yet been introduced into that region, we must conclude that this Ichneumon-fly could not have been imported into America from Europe along with this Currant Worm, but that in all probability it is an indigenous species. Hence we have additional proof that, under certain circumstances, native American parasites can, and actually do, acquire the habit of preying upon European insects when the latter are imported into America. It is certain, however, that they will not do so in all cases without exception; for although the Wheat Midge, or Red Weevil as it is incorrectly termed in the West, invaded our shores some forty or fifty years ago, not a single parasite has yet been discovered to prey upon it in this country, although there are no less than three that prey upon it in Europe.

The Sawfly Family (*Tenthredo*), to which both this and the next species to be noticed belong, derives its name from the "ovipositor" or egg-laying instrument being modified so as to mimick the blade of a saw. Under the microscope—and in the larger species even under a good lens—it will be seen that the lower edge of each of the two horny blades, of which this instrument is composed, is furnished with very

fine teeth, the shape of which differs in different species. With this tool the female fly saws into the texture of the leaf or of the twig, in which the instinct of each particular species teaches it to deposit its egg; and—wonderful to relate—it was demonstrated long ago that the eggs thus deposited inside the substance of the plant, which is to supply the future food to the young larva as soon as it hatches out, actually grow and derive nourishment from the sap of that plant, so as often to attain double their original size. Hence we may see at once why the eggs are deposited by this group of insects in such situations as these, and why Nature has provided the female Sawflies with saws in their tails. But—as the thoughtful reader will perhaps have already observed—our Currant Worm Fly lays its eggs upon the surface, and not in the interior, of the leaf, glueing them thereto by some adhesive fluid which it secretes for that purpose. And we may add that there are a few other Sawflies—such for example as the Rosebush Sawfly (*Selandria rosæ*)—which do the very same thing, and consequently, as well as our species, can have no use for any saws at their tails. If, therefore, as was formerly the almost universal belief of the scientific world, each species whether of animals or of plants was independently created, with all its present organs and instincts, and not derived, as is the more modern doctrine, from the gradual modification of pre-existing species through a long series of geological ages, we might naturally expect our Currant Worm Fly, and the Rosebush Sawfly and such few other Sawflies as practice similar modes of laying their eggs, to have no saws at all. For why should nature, when she is creating new species, bestow an instrument upon a particular species which has no occasion whatever to use that instrument? In point of fact, however, all female Sawflies, no matter what their habits may be, possess these saws, though in one genus (*Xyela*) the saws, instead of being hard and horny throughout, are said to be soft and membranous above and below;* and in certain other Sawflies, though they are as hard and horny as usual, they are degraded and—to use the technical term—"defunctionated." This will be seen at once from an inspection of the following drawing (Fig. 10) copied by ourselves from nature and very highly magnified. Here *a* represents the two saws of the female of the Willow-apple Sawfly (*Nematus salicispomum*, Walsh), which belongs to the very

[Fig. 10.]



same genus as our Currant Worm Fly. Now, we know that the female of the Willow-apple Sawfly deposits a single egg inside the leaf of the Heart-shaped Willow (*Salix cordata*) about the end of April, probably accompanying the egg by a drop of some peculiar poisonous fluid. Shortly afterwards there gradually develops from the wound a round fleshy gall, about half an inch in diameter, and with a cheek as smooth and as rosy as that of a miniature apple; inside which the larva hatches out and upon the flesh of which it feeds. Of this gall we propose to present a figure to our readers in the next number of our Magazine, in illustration of a Second Article on "Galls and their architects." In this particular case, therefore, as the female Fly requires a complete saw with which to cut into the Willow leaf, nature has supplied her with such saws, as is seen at once from Figure 10, *a*. Now look at Figure 10, *b*, which is an accurate representation under the microscope of the two saws of our Currant Worm Fly. It will be noticed at the very first glance, that although the blade of the saw is there, the teeth of the saw are almost entirely absent.

What, then, are we to make of these and many other such facts? Manifestly the teeth of the saw are in this last species degraded or reduced to almost nothing, because the female Fly, laying her eggs upon the surface of the leaf, and not cutting into the substance of that leaf as does the female of the Willow-apple Sawfly, has no occasion to perform any sawing process. But why, it will be asked, is the blade of the saw there in its normal size and, with the exception of the degradation of the saw-teeth, as completely developed as in the other species, when such a tool can not be necessary for the simple process of glueing an egg on to the surface of a leaf? The modern school of philosophers will reply, that this is so, because the primordial Sawfly, in the dim far-away vista of bygone geological ages, had a complete pair of saws, and our insect is the lineal descendant of that species, slowly and gradually modified through a long series of years, so as to conform more or less to the change in its habits. On the other

* See Westwood's *Introduction*, II, p. 95.

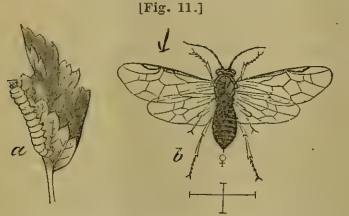
hand the old school of philosophers, who believe that every species was independently created, will argue that this is so, in order to "complete the System of Nature," and "carry out the Plan of the Creation," and "give full and free expression to the Thoughts of the Creator." Possibly this may be the true solution of the difficulty; but—and we say it in no irreverent spirit—what should we think of a Potter, who made all his teacups without exception with handles; those for which handles were required with complete ones such as you could put your finger through, and such cups as were not wanted to have any handles at all, with solid unperforated ones, such as would be nearly useless? And what should we say, if the Potter's friends were to gravely argue, that he took all this unnecessary trouble in order "to complete the System of Art," and "carry out the Plan of the Tea-drinker," and "give full and free expression to the Thoughts of the Potter"?

The Native Currant Worm.

(*Pristiphora grossulariæ*, Walsh.)

Like the Imported Currant Worm, this worm produces a Sawfly, which, however, belongs to a different genus (*Pristiphora*), chiefly distinguishable from the other one (*Nematus*) by the front wing lacking what is technically termed the "first submarginal cross-vein." In Figure 11, *b*, we give a magnified drawing of the female of this fly, and if the reader will look at this drawing and compare it with that of the Imported

[Fig. 11.]



Colors—(*a*) green and black; (*b*) black and honey-yellow.

Currant Worm Fly (Fig. 7, *a* and *b*), he will see that there is in each of them but one cell, or "pane" as it might be termed, on the upper edge of the front wing towards its tip. This is technically called "the marginal (or radial) cell." Now let the reader look a second time at these two figures, and he will see that, underneath this "marginal cell," there is a tier of four cells in the one genus (*Nematus*) and a tier of only three cells in the other genus (*Pristiphora*), the first or basal cross-vein being absent or "obsolete" in the latter, so as to leave the first or basal cell extravagantly large. These three or four cells, as they underlie the "marginal cell," are technically known as "the submarginal (or cubital) cells;" and upon the difference in the number and arrangement of these marginal and submarginal cells depends to a considerable extent the generic classification of the Sawflies. For example, in another genus (*Euura*), which is closely allied to the two of which we present drawings, there are, as in the second of these two, one marginal and three submarginal cells; but here it is the *second*, not the *first* (or basal) submarginal cross-vein that is obsolete; so that here it is the *second*, not the *first* (or basal) submarginal cell that is extravagantly large, being formed in this last case by throwing the typical second and third cells into one, and in the other case by throwing the typical first and second cells into one, just as by removing the folding doors two rooms are thrown into one.

Persons who are not familiar with this subject are apt to suppose, that the pattern of the curious network on every fly's wing varies indefinitely in different individuals belonging to the same species. As a general rule, there is scarcely any variation at all in this matter, each species and even each genus having its peculiar pattern, and all the individuals belonging to a particular species having the network of their wings as exactly similar as the different photographs executed by a Daguerreotypist from the same negative plate. You may take, for instance, a thousand honey-bees, and you will find that in the front wing of every one of them there are exactly one marginal and three submarginal cells, which however are all of them shaped very differently from the corresponding cells in any Sawfly, though all the thousand honey-bees will be found to have them shaped exactly alike, cell corresponding to cell, as in any particular issue of $5 Bank notes, vignette corresponds to vignette and medallion die to medallion die. Among the Sawflies, indeed, as was noticed in the description of the Imported Currant Worm Fly, the pattern of the wing-veins in different specimens of the same species varies occasionally a little; but this is the exception and not the rule, and is philosophically of high interest, as showing how one genus may in the course of indefinite ages change gradually into another genus.

The Native Currant Worm Fly differs in another remarkable point from the Imported Currant Worm Fly. The sexes are here almost exactly alike in their coloration, and with the exception of the legs of the male being a little

more marked with black than those of the female, it would not be very easy to distinguish one from the other, but by the usual sexual characters. Hence we have not thought it necessary to give a figure of the male as well as of the female; whereas in the imported species the two sexes differ so essentially in their coloration that, as already observed, a figure of one would give scarcely any idea of the other.

The larva of the Native Currant Worm Fly (Fig. 11, *a*) is of a uniform pale green color, without those black dottings which are always found except after the last moult in the imported species. Before the last moult, indeed, the head is of a uniform black color, though it afterwards has a good deal of green in front; but the body remains throughout of the same immaculate green shade. It differs also in its habits from the imported species, never, so far as we can find out, going underground to spin its cocoon, but always spinning that cocoon among the twigs and leaves of the bushes upon which it feeds.

This species agrees with the other one in being double-brooded, the first brood of larvæ appearing about the end of June and the beginning of July, and the second brood from the middle of August to the forepart of September. But instead of the larvæ of the second brood lying underground in their cocoons all winter, they burst forth in the fly state from the beginning to the middle of September. Hence the female fly is compelled to lay her eggs upon the twigs instead of on the leaves; for if she laid them upon the leaves, as is the habit of the imported species, the second laying of eggs, which has to pass the winter in that state, would fall to the ground along with the leaves in the autumn, and the young larvæ would starve when they hatched out next spring before they could find their appropriate food. Consequently, in the case of this species, we cannot apply the method of counterworking the other species which has been already referred to. For we have particularly remarked that the very young larvæ were not gathered in great numbers upon one particular leaf—as with the imported species—but were distributed pretty evenly over the whole bush. Neither did they bore the singular holes through the leaf (Fig. 9), which render the other species so easy of detection when young.

As will have been observed from the figures given above, the Native species, besides the differences already noticed, is only about two-thirds the size of the other in all its states. Like the other, it infests both Currant and Gooseberry bushes, but appears rather to prefer the Gooseberry. Indeed there can be little doubt that our native gooseberries formed its original food-plant; for many years ago we captured a single specimen in the neighborhood of Rock Island, Ill., in woods remote from houses, where the wild gooseberry was pretty abundant, and there was no wild Red Currant. The species was described in 1866 by the Senior Editor* from numerous specimens found stripping the gooseberry and currant bushes in Davenport, Iowa; and it has since been reported to us by Miss Marion Hobart, of Port Byron, N. Ills., as so abundant in her neighborhood in 1868 on the gooseberries as to completely defoliate them three times over, so that she inferred—but we think erroneously—that there were three distinct broods of them, one generated by another. Mr. Jas. H. Parsons, of Franklin, N. Y., has in a letter to us expressed the same opinion with regard to the imported species. Probably both parties have been deceived by what is a very common occurrence with many leaf-feeding larvæ. There is often a warm spell early in the year which causes a moiety of the eggs of a particular brood to hatch out. This is taken for the first brood. Then follows a long series of cold weather, which prevents the other moiety of the same batch of eggs from hatching out till perhaps a month or six weeks afterwards. When at last this moiety does hatch out, it is considered by inexperienced persons as a distinct second brood. There is also very frequently a very great variation, probably from similar causes, in the time at which the same batch of pupæ burst forth into the perfect winged state. For example, out of a lot of 31 cocoons of the second brood of the Imported Currant Fly, all received by us at the same time from Dr. Wm. M. Smith of Manlius, N. Y., most of the flies came out between June 26th and July 11th, but a few did not appear till towards the latter end of July and one lingered on till August 13th.

On Sept. 11th, 1869, we captured a single female of the Native American species at large in the City of Rock Island; but the species has not yet prevailed there to any noticeable extent, so far as we have heard. In August, 1867, A .H. Mills, of Vermont, wrote to us about "a small green worm" infesting the leaves of his Currant bushes, which, as he was well acquainted with the Imported species, was most probably the Native American worm. And as long ago as 1858, a species of Sawfly was described in the

* *Practical Entomologist*, I, pp. 122-4.

Ohio Farmer, by an anonymous correspondent, as infesting the gooseberry and red currant bushes in the vicinity of Cleveland, Ohio. This last species seems to agree in every material respect with our insect, except in going underground to spin up, and in the last brood lying underground in their cocoons all through the winter. Now, we particularly experimented with our species, by counting off a large number of larvæ and putting them into a separate vessel half full of earth; and we found subsequently just as many cocoons attached to the twigs in this vessel as we had put larvæ into the vessel. Hence, if the species ever goes underground to spin up—which is perfectly possible, as there is a similar variation in habits in the Imported Currant Worm—it must be only occasionally. Moreover, we raised fifty-three flies in all (4 ♂, 49 ♀), from larvæ which spun up the last week of August, and none of these flies came out later than Sept. 12th of the same year. Hence—unless the Ohio insect be a distinct species, which we can scarcely believe—we suspect some error in the statements put forth in the *Ohio Farmer*.*

Remedies.

In the case of the multifarious species of Potato Bugs, we showed that different groups must be attacked upon different systems. In the case of the three Currant and Gooseberry worms, that we have here treated of, there is a single remedy which, like Dr. Cureall's Never-failing Pills, is a universal specific. That remedy is powdered White Hellebore, which can be bought at any drug-store at quite a low price. All that is required is to dust it lightly over the infested bushes, taking care to stand to windward during the operation, as if taken into the nostrils it excites violent sneezing. For this purpose, the best plan is to put the powder into a common tin cup, tying a piece of very fine muslin over the mouth of the cup; or the powder may be simply enclosed in a bag of muslin of convenient size. In either case, the apparatus must be fastened to the end of a short stick, so as to avoid coming to too close quarters with it. It is best to select a moderately still day for the operation; as the powder is so exceedingly fine that on a windy day it is apt to get wasted.

To test the genuineness of the article, a very small pinch of it should be applied to the nose. If it is good and has not lost its strength by keeping too long, it will immediately produce a tingling sensation in the nostrils; if it does not produce this effect, it is worthless and should not be used. There is every reason to believe that in those cases where men have used White Hellebore to kill Currant Worms without any perceptible effect, that they had been deceived into buying an adulterated or worthless drug. Although, like almost all our medicines, Hellebore, in large doses, is poisonous, yet in minute doses there is no reason to be afraid of it; for, according to Dr. Fitch, it has long been in use as the basis of those snuffs, which are designed to excite violent and continued sneezing.

We might easily fill two or three columns, and distract the minds of our readers, by enumerating two or three dozen other remedies, which are highly recommended on good authority, and which may, or may not be as efficient as White Hellebore, but we prefer to "let well enough alone."

INSECTS INJURIOUS TO THE GRAPE-VINE: No. 2.

The Hog-caterpillar of the Vine.

(*Chærocampa pampinatrix*, Smith & Abbott, alias *Sphinx* [*Darapsa*] *myron*, Cramer, alias *Otus cnotus*, Hübner).*

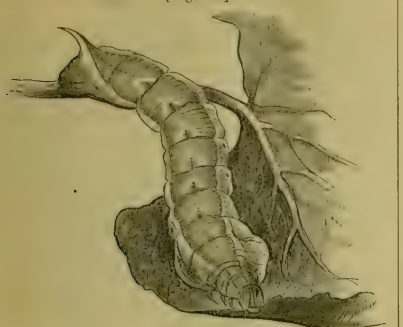
Of the large, solitary caterpillars that attack the Grape-vine, this is by far the most common and injurious in the Mississippi valley. We have frequently found the egg of this insect glued singly to the underside of a leaf. It is 0.05 inch in diameter, perfectly round, and of a uniform delicate yellowish-green color. The young worm which hatches from it, is pale-green, with a long straight horn at its tail; and after feeding from four to five weeks it acquires its full growth, when it presents the appearance of Figure 12, the horn having become comparatively shorter and acquired a posterior curve.

This worm is readily distinguished from other

* The Article in the *Ohio Farmer* appeared in Vol. VII, p. 233, and is supposed by Dr. Fitch—to whom we are indebted for our knowledge of it—to have been written by Dr. J. P. Kirtland. Dr. Fitch, who entirely ignores *Pr. grossulariæ*, Walsh, supposes that the Ohio insect may perhaps be the European species, *Pr. ruſipes*, St. Fargeau, which is not known to feed on gooseberry or currant.

* Of the four different generic names under which this species has been classified, "*Sphinx*" is a general term for all the Hawk-moths and refers to the sphinx-like attitude often assumed by their larvæ; "*Chærocampa*" is derived from two Greek words which mean "Hog-caterpillar;" and "*Darapsa*" and "*Otus*" are gibberish. Of the three different specific names, "*Myron*" refers to an ancient Greek who bore this appellation, "*cnotus*" is pure unadulterated gibberish, and "*pampinatrix*" is from the Latin and signifies "a female vine-pruner." Both Harris and Fitch describe this insect under the name of *Chærocampa pampinatrix*; and this, as the appellation best known to our grape-growers, and the most characteristic of the habits of the species, we should prefer to retain, although no doubt, according to the strict Law of Priority, the specific name of *Myron* ought to be employed. Mr. Walker, Dr. Clemens and Dr. Morris call this species "*Darapsa Myron*," and Mr. Grote calls it "*Otus Myron*." By ringing the changes with sufficient ingenuity upon the four generic and the three specific names, we may obtain no less than twelve different names for this one insect!

[Fig. 12.]



Colors—Pea-green, lilac, and yellow.

grape-feeding species by having the third and fourth rings immensely swollen, while the first and second rings are quite small and retractile. It is from this peculiar appearance of the fore part of the body, which strikingly suggests the fat cheeks and shoulders and small head of a blooded hog, that it may best be known as the Hog-caterpillar of the vine. The color of this worm when full grown is pea-green, and it is wrinkled transversely and covered with numerous pale-yellow dots, placed in irregular transverse rows. An oblique cream-colored lateral band, bordered below with a darker green and most distinct on the middle segments, connects with a cream-colored subdorsal line, which is bordered above with darker green, and which extends from the head to the horn at the tail. There are five and often six somewhat pale yellow triangular patches along the back, each containing a lozenge-shaped lilac-colored spot. The head is small, with yellow granulations, and four perpendicular yellow lines, and the stigmata or spiracles are orange-brown. When about to transform, the color of this worm usually changes to a pinkish-brown, the darker parts being of a beautiful mixture of crimson and brown. Previous to this change of color Mr. J. A. Lintner, of Scoharie, N. Y., has observed the worm to pass its mouth over the entire surface of its body, even to the tip of its horn, covering it with a coating of apparently glutinous matter—the operation lasting about two hours.* Before transforming into the pupa or chrysalis state, it descends from the vine, and within some fallen leaf or under any other rubbish that may be lying on the ground, forms a mesh of strong brown silk, within which it soon changes to a chrysalis (Fig. 13) of a pale, warm

* Proc. Ent. Soc., Phil., III, pp. 663.

[Fig. 13.]

Colors—Yellowish and brown.

yellow, speckled and spotted with brown, but characterized chiefly by the conspicuous dark brown spiracles and broad brown incisures of the three larger abdominal segments.

The moth (Fig. 14) which in time bursts from this chrysalis, has the body and front wings of a fleshy-gray, marked and shaded with olive-

[Fig. 14.]

Colors—Gray, olive-green and rust color.

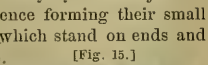
green as in the figure, while the hind wings are of a deep rust-color, with a small shade of gray near their inner angle.

This insect is in northerly regions one-brooded, but towards the south two-brooded, the first worms appearing, in the latitude of St. Louis, during June and July, and giving out the moths about two weeks after they become chrysalids, or from the middle of July to the first of August. The second brood of worms are full grown in September and, passing the winter in the chrysalis state, give out the moths the following May. On one occasion we found at South Pass, Ill., a worm but ½ grown and still feeding as late as October 20th, a circumstance which would lead to the belief that at points where the winters are mild they may even hybernate in the larva state.

This worm is a most voracious feeder, and a single one will sometimes strip a small vine of its leaves in a few nights. According to Harris it does not even confine its attacks to the leaves, but in its progress from leaf to leaf, stops at every cluster of fruit, and either from stupidity or disappointment, nips off the stalks of the half-grown grapes and allows them to fall to the ground untasted. It is fortunate for the grape-grower therefore that Nature has furnished the ready means to prevent its ever becoming ex-

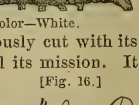
cessively numerous, for in all our entomological experience, we have never known it to swarm in very great numbers. The obvious reason is, that it is so freely attacked by a small parasitic Ichneumon fly—belonging to a genus (*Microgaster*) exceedingly numerous in species—that three out of every four worms that we meet with will generally be found to be thus victimized. The eggs of the parasite are deposited within the body of the worm, while it is yet young, and the young maggots hatching from them feed on the fatty parts of their victim. After the last moult of a worm that has been thus attacked, numerous little heads may be seen gradually pushing through different parts of its body; and as soon as they have worked themselves so far out that they are held only by the last joint of the body, they commence forming their small snow-white cocoons, which stand on ends and present the appearance of Figure 15. In about a week the fly (Fig. 16, *a*, magnified; *b*, natural size), pushes open a little lid which it had previously cut with its jaws, and soars away to fulfil its mission. It is one of those remarkable and not easily explained facts, which often confront the student of Nature, that, while one of these Hog-caterpillars in its normal and healthy condition may be starved to death in two or three days, another that is writhing with its body full of parasites will live without food for as many weeks. Indeed we have known one to rest for three weeks without food in a semi-paralyzed condition, and after the parasitic flies had all escaped from their cocoons, it would rouse itself and make a desperate effort to regain strength by nibbling at a leaf which was offered to it. But all worms thus attacked succumb in the end, and we cannot conclude this article to better advantage than by reminding the Grape-grower, that he should let alone all such as are found to be covered with the white cocoons we have illustrated, and not, as has been often done, destroy them under the false impression that the cocoons are the eggs of the worm.

[Fig. 15.]



Color—White.

[Fig. 16.]



Color—Black.

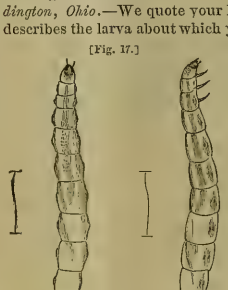
To our Subscribers in Canada.—Parties in Canada, who wish to subscribe for the American Entomologist, can obtain it, postage free, by remitting $2.00 to the Rev. C. J. S. Bethune, Secretary to the Entomological Society of Canada, Credit, C. W.

ANSWERS TO CORRESPONDENTS.

Notice.—Such of our correspondents as have already sent, or may hereafter send, small collections of insects to be named, will please to inform us if any of the species sent are from other States than their own. Lists of insects found in any particular locality are of especial interest, as throwing light upon the geographical distribution of species. But to make them of real value, it is requisite that we know for certain, whether or not all the insects in any particular list come from that particular locality, and if not, from what locality they do come.

Striped Cucumber Beetle—*M. M. Gray, Cardington, Ohio.*—We quote your letter in full, as it well describes the larva about which you desire information:

[Fig. 17.]

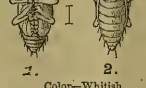


Color—Whitish.

I inclose a specimen of bug which we call the Cucumber or Squash bug, and also a small worm or larva which has destroyed many of my melon and cucumber vines. My object in part is to learn if this worm or larva is the product of the bug or something different and foreign to it. In the early part of the season the small striped bug commenced working on my vines, and they began to wilt and die. I used sulphur and plaster, quassia, tobacco, etc., to prevent or check their ravages, but with little effect. Finally I hunted out and killed a good many, and shortly they seemed to disappear, and my vines began to revive and grow. About three weeks later the vines began to wilt and die worse than before! But this time there were no bugs to be found. Upon examination of the roots, however, I discovered this little white-worm with a black head, from 1-16th to 1-4th of an inch in length, eating into and perforating the root and vine; and as the vines they infested the most were the same that the bugs preyed upon the worst, I conjectured there must be some relation between them.

The larva referred to which attacks the roots, and of which we present highly magnified figures (Fig. 17, 1, dorsal view, 2 side view), is in reality the young of the very same Striped Cucumber Beetle (*Diabrotica vittata*, Fig. 19), which is so injurious to the leaves; for we have ourselves bred the beetle from this larva, and in 1865 Dr. H. Shimer, of Mt. Carroll, Ill., first published an account of its transformations.* After boring into and around the roots for upwards of a month, the larvæ enter the surrounding earth, and within a smooth oval cavity soon change to pupæ (Fig. 18, 1, ventral view; 2, dorsal view), which are transformed to beetles about two weeks afterwards. There are two or three broods during the year. By getting rid of the beetles in the early part of the season, you of course prevent the injuries of the larva, and the most effective agents for this purpose, or at least those in which we have the most confidence, are Paris green and white hellebore. This insect has been very injurious the present year.

[Fig. 18.]



Color—Whitish.

[Fig. 19.]

Colors—Black and yellow.

* *Prairie Farmer*, Aug. 12, 1865.

Leafy Oak-gall—*B. H. B., Pickens' Sta., Miss.*—The cone-like leafy oak-gall which you send, and which we herewith illustrate (Fig. 20, *a*), is apparently the

[Fig. 20.]

Color—Green.

gall named *Quercus frondosa* by Bassett, meaning literally "full of green leaves." You do not mention the kind of oak on which it occurred, but from the fact that Mr. Bassett described his as occurring on the Chinquapin, yours might have been taken from this species, though we have found the same gall both on White and on Bur Oak. This gall is developed after the summer growth of the tree is completed, and the axillary bud, which otherwise would not burst till the spring following, is made, by the puncture of the gall-fly, to develop prematurely in the singular manner illustrated above. The cell (Fig. 20, *b*, section showing larva) containing the larva is half immersed in the apex of the cone, and though the perfect fly is unknown, the character of the larva indicates it to be *Cynipidous*. (See article on Galls, Vol. I, No. 6.)

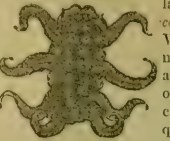
Drop of Gold—*B. H. B., Pickens' Sta., Miss.*—The "drop of gold in shape of a French loaf" attached to a leaf of the Shellbark-Hickory, is in reality the vacated egg-shell of some large moth, and not improbably of that large species which produces the Royal Horned Caterpillar. The smooth short-oval eggs of the same large Stinking Bug, which we figured on page 12 of our first Volume (*Metapodius nasalus*, Fig. 6, *b*), have, even when vacated by the young bug, just the same lustre of burnished gold. In July, 1868, at Lacon, Ill., we found a row of nine of these eggs, all arranged in regular order, like the beads of a necklace, upon a leaf of White Pine; and from these eggs we subsequently hatched out the young bugs.

The Luna Moth—*Geo. W. Kinney, Snow Hill, Mo.*—The immense green moth with an eye-spot in each wing and with each of the hind wings prolonged into a tail, is the Luna Moth (*Attacus luna*, Linn.) The specimen was ♀ and we were glad to get the eggs which she had deposited. The larva feeds on Walnut and Hickory.

T. W. Hoyt, Jr.—The large pale green swallow-tail moth which you describe is the Luna Moth referred to above.

Hag-moth Larva—*Dr. C. T. Farrell, South Pass, Ill.*—The curious brown slug-like larva found on Siberian Crab, of which a better idea can be formed by the accompanying illustration (Fig. 21) than by any descriptive words of ours, is the larva of the Hag-moth (*Limacodes pithecium*, Sm. & Abb.) When received, it had already moulted its long fleshy appendages and attached them to the outside of its round compact cocoon, and ten days subsequently the moth made its appearance. This moth is of a dusky brown color, the front wings variegated with light yellowish-brown. In the Northeastern States this insect is supposed to be single-brooded, but in your latitude it is probably double-brooded. The "spider-like animal" on Blackberries is the pupa of the Many-banded Robber (*Harpactor cinctus*, Fabr., see Vol. I, Fig. 44.)

[Fig. 21.]



Color—Brown.

M. B. Baldwin, Elgin, Ill.—The specimen you found on a spear of grass, and from which you detached, in handling, some of the appendages, is the same Hag-moth larva. At the time you found it, it was evidently in search of some cozy nook in which to form its cocoon, for it had already commenced the operation when it reached us, and the species has never been known to feed on grass.

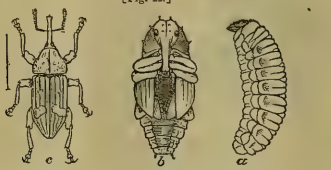
Stinging Bug—*J. M. Shaffer, Fairfield, Iowa.*—The singular craggy-looking bug, about 0.38 inch long, of a yellowish color variegated with brown, with the legs green and a transverse deep-brown band running superiorly across from one side to the other of the dilated abdomen, is *Phymata erosa*, Linn. The genus is characterized by the immensely swollen front thighs, and by the last joint of the antennæ being also swollen, this last character being a remarkable one, as Amyot and Serville well remark, in bugs of such carnivorous propensities. Your statement that one of these bugs stung you severely, does not greatly surprise us, though we never heard of their stinging before, and have handled hundreds of them with impunity. The stinging was of course done by the beak, which is 3-jointed and somewhat resembles that of *Harpactor cinctus*, Fabr. (Vol. I, Fig, 44, *b*.) The plant upon which you found these bugs we take to be *Parthenium integrifolium*, and Mr. A. Fender, of Allenton, Mo., is of the same opinion. We have noticed them ourselves in the latter part of the summer lying quietly in wait for their prey upon a great variety of wild flowers, but mostly on such as like themselves are of a yellowish color so as to conceal them from view. We have also often seen this Bug with its beak inserted into a small bee or a small wasp, which it is wide awake enough to hold at arm's length with its prehensile front legs, so that the poor unfortunate captive has no chance to sting it.

Pear-tree worms—*B. Hathaway, Little Prairie Ronde, Mich.*—The worms found on pear-tree leaves are the same Red-humped Prominent noticed in the answer to D. W. Kauffman of Des Moines, Iowa.

"Dobson"—*Fisherman.*—We cannot tell without seeing specimens, what it is that the disciples of the "gentle art" call "Dobson." It may be the larva either of some May-fly (*Ephemera*), or of some Dragon-fly (*Libellula*), or of a dozen other insects.

White Pine Weevil—*A. S. Fuller, Ridgewood, N. J.*—The borers which have been attacking the leading shoots of your Pines, gradually spreading to the branches, have produced the perfect beetle since their receipt, and as we anticipated, they turn out to be the White Pine Weevil (*Pissodes strobi*, Peck.) At Figure

[Fig. 22.]



Colors—(*a* and *b*) whitish; (*c*) rust-brown and white.

22 it is illustrated in its three stages of larva (*a*), pupa (*b*), and beetle (*c*). We have not known this insect to occur in the West, but it has long been known to be common in the Eastern States. The only practical way of counter-working the injurious work of this weevil, is to cut off the infested shoots and consign them to the flames, while they yet contain the larvæ and before the beetles have escaped. Dr. Fitch,* under the impression that most of the beetles are perfected in the spring, recommends that this work be done in August and September; but as all the beetles had issued from the shoots you sent, by the end of August, we should advise you, so as to be on the safe side, to do such work in July.

*Trans. N. Y. State Agr. Soc. 1857, p. 735.

Unnatural Secretion of Wax—*F. Brewer, Waynesville, Mo.*—The honey bee which has such a profuse waxy formation exuding apparently from the rings of the abdomen, and which you took alive from the entrance of one of your hives, presents a very unusual appearance, and a most remarkable case of wax formation. Mr. J. T. Langstroth, to whom we sent the specimen, suggests that the bee "had a kind of wax dropsy!" The specimen is interesting, and beautifully illustrates the manner in which the ordinary wax of our hives is secreted from the belly of the worker bee, as explained by Hübner, Reaumur, and other writers on the subject.

Raspberry Borer—*F. A. Gates, Massillon, Iowa.*—The borer you describe as having nearly ruined your patch of raspberry bushes, is apparently the common Blackberry and Raspberry borer (*Oberea perspicillata*, Hald.) which in the perfect state is a beetle. The large ochre-yellow moth, with a conspicuous white spot on the front wings, and each of the wings tinged with purple and crossed near the tip by a purplish line, which moth had deposited a large number of eggs on one of the raspberry leaves, was not, as you inferred, the parent of the borer. It is the Senatorial Dryocampa (*Dryocampa senatoria*, Fabr.) The young worms hatching from those eggs would have fed upon the leaves, though the more common food-plant of the species is Oak.

Cocoon of Horn-bug—*A. R. McClutchen, Lafayette, Ga.*—The egg-shaped cocoon formed of excrement and rotten wood glued together, contained the large white larva of some Horn-bug, probably *Lucanus dama*, Fabr.

Insects named.—*J. R. Muhleman, Woodburn, Ills.*—The moth, with the front wings variegated with light and dark brown with a conspicuous dark zigzag line running across the outer third, and with the hind wings of a lustrous coppery reddish brown, is the Pyramidal Amphipyra (*Amphipyra pyramidoides*, Guen). You say you bred it from a grape-feeding larva.

[Fig. 23.]

Colors—Light and dark Brown.

like the one illustrated on page 225 (Fig. 163). We have also the present summer bred the same species of moth from a similar larva feeding on Red Bud, and have found the larva on the Poplar, which makes three distinct plants that it is known to attack. The specific name of the moth probably refers to the pyramidal hump on the 11th segment of the larva. You say you "recollect a similar larva in Europe on apricots, prune trees, etc., producing an analogous moth." Not at all unlikely, for there is a very similar worm common to the whole of Europe, and which feeds on Oak, Willow and Elm, as well as on fruit trees, and produces a very closely allied moth, the *Amphypyra pyramidea* of Linnæus. The other moth of which you send a pencil sketch, and which is of a uniform deep brown, with two oblique white lines running—the inner line entirely, and the outer one but partially—across the fore wings, is *Agnomonia anilis* of Drury, who states that the caterpillar is violet-white with longitudinal rose-colored lines and an elevated brown ridge across segments 4 and 11, and that it feeds on plants of the genus *Chironia*. The chrysalis is enclosed within a few leaves and is covered with a rosy efflorescence. The other pencil figure which you send seems to represent *Limacodes cippus*, Fabr. (See Harris, Inj. Ins., p. 420).

Cecropia Moth Caterpillar—*H. G. Lewelling, High Hill, Mo.*—The gigantic green caterpillar, covered with beautiful yellow, blue and coral-red tubercles, which you find on the leaves of an apple tree, is the larva of the Cecropia Moth (*Attacus cecropia*, Linn.) It is an immense feeder, and we have known it to be so abundant as to greatly injure young Apple and Soft Maple trees, but its occurrence in very large numbers is extremely rare. We shall figure this caterpillar in a future number.

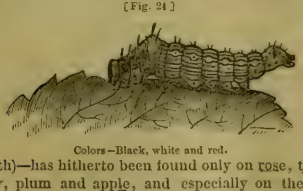
Saml. H. I. Green, Elkart City, Ill.—The large worm found by you descending from an apple tree is the same as the above.

How Cut-worms originate—*Thos. W. Gordon, Georgetown, Ohio.*—You ask how our common cut-worms originate. They are produced from eggs deposited by obscure colored owlet moths belonging to several different genera, and for fuller information on the subject we refer you to the First Annual Report of the Junior Editor, where the history of twelve different species is detailed.

Red-humped Caterpillars on Apple and Pear—*D. W. Kauffman, Des Moines, Iowa.*—What you are irreverently pleased to term "a lot of ugly disgusting worms," but what we consider as one of the most gorgeously dressed caterpillars that God has created, is known as the "Red-humped Prominent" and produces a brownish yellow moth, called in English "the Trim Prominent" (scientifically *Notodonta concinna*). Do pray, Mr. Kauffman, for the future take a careful look at the wonderful Works of the Great Author of Nature, before you again slander and malign them, and call that "ugly and disgusting" which is in reality a perfect gem of insect beauty. Look at the brilliant coral-red head of your larva, and the hump on the middle of its back of the same lovely color! Did you ever see a string of coral beads, on the fair white neck of a young lady, show to greater perfection than do these bright red parts, among the delicate black, yellow and white lines traced lengthways by the finger of Almighty God along the rest of its body? Surely such artistically arranged colors can not be "disgusting" to any properly trained eye! But these worms are "ugly" forsooth! They are at most only about 1¼ inch long—they have no sting—no irritating hairs or prickles such as have the larvæ of a very few of our rarer moths—and they will not even bite, however much you may please to irritate and torment them. Surely a grown man ought not to fancy that so harmless a creature as this is hateful or formidable! But they ate all the leaves off one of your young pear-trees! Very well! They had just as good a right to do so as you have to sit down to your dinner, consuming vegetables and fruits that would otherwise have fed a host of beautiful creations which the vulgar denominate "bugs." God made this lovely green world for the pleasure and benefit not of man alone, but of the multitudinous hosts of the inferior animals. True, we have a right to destroy these inferior animals, when they interfere with our wants and wishes; and so we have a right to take the life even of our brother man, when our own life, and even in certain cases when our property merely, is jeoparded by him. "Kill and be killed" is the great law of Nature, from one end of the Animal Kingdom to the other. But when we are compelled to kill, let us always do it in a merciful and not in a wanton and cruel spirit; and especially, even when we are obliged in self-defence, or for purely scientific purposes, to take the life of some of these little miracles of perfection that the poet calls "winged flowers," let us not add insult to injury and slander them as "disgusting," when even Solomon in all his glory was not arrayed like the very meanest of them!

The Red-humped Prominent—of which we herewith represent the three stages (Figs. 24 larva; 25 pupa, and

[Fig. 24.]



Colors—Black, white and red.

26 moth)—has hitherto been found only on rose, thorn, cherry, plum and apple, and especially on the last. Your finding it on pear, which is very closely allied to the apple, and yet is inimical to the life of several insects commonly found on apple, is a new fact. The species is not very common in the Valley of the Mississippi; but when it does occur, it occurs in great numbers, because the mother-moth deposits a very large number of eggs upon a single leaf. As these larvæ are gregarious throughout their entire existence, and do not scatter over the whole tree, as do many others that occur on our fruit trees—some of which wander off from the very earliest stage in their larval life, and others, as for example the common Tent Caterpillar (*Clisiocampa americana*), only toward the latter part of their existence in the larval state—they can always be easily destroyed. For ourselves, we never feel the least fear or scruple at crushing hundreds of any of these caterpillars in our naked hands; any one, however, that is more nice than we are can put on a pair of stout buckskin gloves before he commences the squashing process. But although we do not hesitate to squash any kind of caterpillar bare-handed, we by no means advise any one to try this operation, either upon the Colorado Potato Bug or upon any of the Blister-beetles. For all these last-named insects are more or less poisonous, and we have known a young girl make her hands very sore by crushing with her naked fingers a lot of the Ash-gray Blister-beetles, that were infesting some English beans.

[Fig. 25.]

Color—Brown.

[Fig 26.]

Color—Brownish-yellow.

Insects named—*T. W. G., Georgetown, Ohio.*—The yellowish-green worm with an immense reddish-brown head with two yellow spots upon it, is the larva of the Tityrus Skipper (*Eudamus tityrus*, Fabr.) a brown butterfly with a semi-transparent yellow band across the front wings, and the hind wings each produced into a short rounded tail behind. This worm is most commonly found on Honey Locust, though it also feeds on the common Black Locust, on the Wistaria and on the False Indigo, (*Amorpha fruticosa.*) The dusky-brown tree-hopper with a long yellow spot each side and a horn-like projection from the fore part of its body is the Two-spotted Tree-hopper (*Thelia bimaculata*, Fabr.) which likewise occurs on Locust. The pale yellow and black worms all huddled together on the leaf of a Grape-vine are the larva of the American Procris (*Procris Americana*, Boisd.) If you have Harris's work on Injurious Insects you can find in it figures of all three of these species.

Gold Gilt-beetle—*Dr. W. H. Martin, Pinckney, Mich.*—The brilliant beetle, resplendent in a full suit of green and gold and about half an inch long, which you find devouring the leaves of the common Dogsbane (*Apocynum androsæmifolium*), is the Gilt Gold-beetle (*Chrysochus auratus*). It is very common everywhere in the West upon this plant in the perfect beetle state, but as its larva is never met with there, it most probably during the larval state feeds underground upon the roots either of this or of some other plant. Your finding the beetle upon another species of the same genus of plants (*Ap. cannabinum*) is, we believe, a new fact.

The Trumpet Grape-gall—*D. McClaine, Piermont, N. Y.*—The reddish-brown, elongate-conical galls about one-third of an inch long, growing in considerable numbers from the leaf of a wild grape-vine, and which we represent at Figure 27, have long been

[Fig. 27.]

Color—Crimson.

known to us, and are described in our manuscripts under the name of the Trumpet Grape-gall (*Vitis lituus*). Like the other three grape-galls which we have figured, one of them in number 12 and the other two in number 6 of our first Volume, (pages 106, 107 and 247,) it is made by a Gall-gnat (*Cecidomyia*)—thus further exemplifying the truth of the general law, that when one species of any particular gall-making genus of insects is found to inhabit a particular genus of plants, many more species of the same gall-making genus can generally be met with on the same genus of plants. Specimens of this same Trumpet Grape-gall, said to occur on the Isabella grape-vine, were received by us three years ago from J. H. Foster, of Pennsylvania, as noticed in the *Practical Entomologist*, I. p. 101. We have seen very similar galls on a wild grape which we took for the Frost Grape (*V. cordifolia*). Two years ago, a very similar kind of gall, said to grow on the "Texas Mustang Grape-vine," were received by us from M. W. Phillips, of Mississippi. These last, however, differed in being green (not brown), and in growing in bunches of three or four (not promiscuously) on the leaf. (See *Pract. Entom.* II. p. 102). Several galls resembling yours and made like yours by Gall-gnats, one of which has been described by Osten Sacken as the Blood-red Hickory Gall (*Sanguinolenta*), and is of nearly the same crimson color as the Trumpet Grape-gall, occur on the leaves of different species of Hickory; and we are acquainted with two such galls that grow on Hackberry leaves.

Grape-berry Moth—*H. C. Barnard, M. D., Charleston, Ill.*—The worms which you sent, and which are injuring your grapes by boring into the berries, are the larvæ of the Grape-berry Moth (*Penthina vitivorana*, Pack.) of which we gave an illustrated account, with suggestions for its prevention, in our first volume, pp. 177-9.

Oak Pruner—*T. J. Plumb, Madison, Wis.*—Your insect is the common Oak Pruner (*Elaphidion putator*, Peck), of which you will find an account in Harris's Treatise on Injurious Insects, p. 98.

Potato Bugs—*Wm. R. Shelmire, Toughkinamon, Pa.*—The blister-beetle which infests your potatoes so grievously and also your tomato vines, is, as you suppose, the very same Striped Blister-beetle (*Lytta vittata*) which we gave an account of in No. 2 of our 1st volume, page 24, where a figure of the insect will be found. In Central Illinois, in the year 1868, we heard of an entire field of potatoes being utterly destroyed by this species in a single day. The tomato being so closely allied to the potato, it is not at all strange that you find this little pest to like it about as well as the potato, seeing that most of the Blister-beetles are pretty miscellaneous feeders. Your statement that it prefers other varieties of potato to the Mercer, or Neshannock as we call it out West, corresponds with the fact which we published in the passage just now referred to, namely, that it prefers other varieties of potato to the Peachblow. It would be a curious enquiry which of the two it would take, if it were absolutely restricted to Mercers and Peachblows. The only approved remedy against all the different kinds of potato-eating Blister-beetles, which are no less than five in number—namely, the Striped, the Ash-gray, the Black-rat, the Black, and the Margined Blister-beetle—is to drive them to leeward with brush into some dry hay or straw previously prepared for their reception, and then to set fire to the dry stuff and burn them all up.

The whitish 16-legged larva, nearly an inch in length and with its head and the first ring of its body mahogany brown, which you found burrowing in a potato stalk, is unknown to us. All that we can at present say is, that it would have produced some kind of moth if it had lived to maturity. As you suggest, it is quite different from the common Stalk Borer infesting the potato, which we figured and described on page 22 of our first volume, this last larva being distinctly striped lengthwise with black. If you had packed this larva of yours according to our printed directions, in a small tight tin box along with a little of its natural food, it would have doubtless reached us in good health, and we could have probably bred it sooner or later to the moth state. As it was, you packed it along with a small morsel of potato stalk and a very large allowance of cotton wool, in a pasteboard box. Consequently, long before the three days expired, which it takes Uncle Sam to travel from Pennsylvania to Illinois, the poor unfortunate larva had perished, partly of starvation but principally of drought. If you had replaced the cotton wool by pieces of potato stalks, retaining the pasteboard box, the insect might perhaps have reached us alive; but the cotton wool effectually did its business. You might as well pack a trout in dry sand and expect it to live and flourish, as pack the inhabitant of a juicy potato stalk in dry cotton wool, and believe that it will not give up the ghost in a very short time.

Blood-sucking Cone-nose—*G. W. C., Alton, Ill.*—Yes, the bug which by its "bite" caused your nephew's arm to swell so badly, is the above insect, which was figured in AMERICAN ENTOMOLOGIST, Vol. I. p. 88, (Fig. 74.) The fact that for a year after the bite the child's arm would swell in the same place, whenever he was unwell, is singular. Your observations about the perfect winged Bug preying on the common Bed-bug are new, but corroborate our inference that, in the larval and pupal states, this species probably sucks the juices of other insects.

Wooly slug-like worm on Apple—*H. A. Green, Atco, N. J.*—The slug-like worm found on a young apple tree, and which is covered above with thickly set, long, but evenly shorn light-brown hairs, these hairs generally meeting and forming a sort of ridge along the back and along each side, is the larva of the Rabbit Moth (*Lagoa opercularis*, Sm. and Abb.) This moth is cream-colored with thick wooly body and legs, and with the basal portion of its front wings covered with curly wool which is marked more or less with rusty black. The generic name which comes from the Greek, signifies of, or belonging to, a rabbit, and was given by Dr. Harris on account of the short, squat form and smooth fur of the larva. The species is not likely to be troublesome, for it has long been considered a rare insect; though we received it last year from a correspondent in the East, who stated that he had met with it in very considerable numbers on one of his apple-trees.

And now Mr. Green, you deserve a good scolding! As often as we have remonstrated against sending insects folded loose in a letter, you persist in committing the same offense. Here is a choice and rare larva, which we should have been much pleased to have reared, and you send it all the way from New Jersey to St. Louis, folded loose in a letter, in the vain hope that it would reach us alive. Well, by some miracle or other it was not entirely squelched by Uncle Sam's canceling stamps, but it had been so effectually squeezed in the mail bags that life was past recovery. And when we ponder, Sir, over the torture and lingering death which you caused the poor creature by your careless packing, we feel strongly inclined to report you to the "Society for the Prevention of Cruelty to Animals" and have you suffer the highest penalty of the law. The only way we can think of, for you to exonerate yourself from prosecution for such a heinous crime, is to bribe us to keep "mum" by sending us another specimen properly packed!

✓ **A Water-Bug.**—*W. V. Smith, Brooklyn, N. Y.*—The brown-colored and very slender Bug, almost three inches long, including the slender bristle-like tail that projects from its hinder extremity, and with long slender legs, is the *Ranatra fusca* of Beauvois. An almost exactly identical species occurs in Europe, which is known as *Ranatra linearis*. This insect belongs to the same *Nepa* Family of the Half-winged Bugs (*Hcteroptera*) as the Gigantic Belostoma, of which we gave a figure on page 249 of our last number. This entire Family inhabits the water, though they are all provided with wings by means of which they are enabled to fly from pond to pond; and they are all of them Cannibals, their front legs being metamorphosed into arms to seize their prey with. Your insect is very common out West in shallow sluggish pieces of water. We have never met with any in running brooks, which, as you say, is the situation in which your specimen was found.

Goldenrod Galls—*G. W. C., Alton, Ill.*—The round, pithy galls which you find on the stems of the Goldenrod (Solidago,) each containing a maggot in the centre, are formed by a two-winged fly *Trypeta* (*Acinia*) *solidaginis*, Fitch. The "bushy bunch of leaves" at the extremity of the same plant is, as you rightly suppose, a gall; but it is made by a Gall-gnat (*Cecidomyia solidaginis*, Lœw), and not by the same Gall-fly which produces the round gall.

Oak-leaf Gall—*B. H. Broadnox, Pickens' Sta., Miss.*—You send us a spherical but somewhat depressed gall on the leaf of the Black Jack Oak (*Quercus nigra*), about the size of a small pea, but several of them often running together into an irregular mass; its under surface pale green and flattened, with a central nipple, its upper surface dark blood-red or crimson, much rounded, and often divided by slender grooves into from 12 to 20 four-five-or six-sided compartments, like the back of a tortoise. This gall was described in 1864 under the name of the Oak-pill Gall (*Q. pilulæ*) by the Senior Editor. The specimens you sent contained the larva of a Gall-fly (*Cynips*), and the Senior Editor, from the fact of his having actually bred certain Guest Gall-flies from this gall, when he published his description, supposed the gall to be the work of some unknown gall-making Gall-fly. Subsequently, however, he became aware that the real gall-maker was not a Gall-fly (*Cynips*), but a Gall-gnat (*Cecidomyia*), and that the very same gall had been briefly described, but not named, by Osten Sacken in the year 1862 as the production of a Gall-gnat. Up to this period this was the first published case of a Gall-fly living as a guest in a gall made by a Gall-gnat; but several other such cases have since been discovered. The true gall-making larva of this Oak-pill Gall, which larva, as already stated, produces not a Gall-fly, but a Gall-gnat, is orange-colored, with a very small pointed head and a clove-shaped "breast-bone;" (see our figure 86 *a*, Vol. I, No. 6;) on the other hand, the larva of the Gall-fly that inhabits this gall as a guest is whitish, sometimes with a dark stomach, and has a large round whitish head with long robust horny black jaws, which in the living insect may often be seen to open and shut in a vicious manner. The former does not develop to its full size till about the time of the fall of the leaf; when it leaves the gall and is supposed to go under ground and come out the next summer in the perfect fly state, ready to deposit its eggs upon the next year's crop of oak-leaves. On the other hand, the larva of the Guest Gall-fly does not leave this gall till it assumes the perfect or winged state.

Hitherto, this gall has only been met with upon Black Oak (*Q. tinctoria*), and Red Oak (*Q. rubra*), upon which trees in certain seasons it swarms so prodigiously, that almost every leaf bears at least half a dozen of them, and some leaves are studded all over with them. Your finding it upon the Black Jack Oak is a new fact, but it is quite in accordance with the general rule, because that Oak belongs to the same great group of the genus *Quercus* as the Red and Black Oaks, and because there is no known Oak-gall that occurs indiscriminately upon certain species belonging to the White Oak group and upon certain other species belonging to the group of the Red and Black Oaks. Botanically, these two groups of Oaks differ in this very notable character, that while it requires two years to perfect the acorn of the Red and Black Oak group, the acorn of the White Oak group is perfected from the blossom in a single season. There is a very closely allied gall, the Symmetrical Oak-leaf Gall of Osten Sacken, also produced by a Gall-gnat, which scarcely differs from yours except in the lower surface being as much rounded and of the same crimson color as the upper surface. It is very satisfactory that this gall also occurs on a species belonging to the Red and Black Oaks—namely, the Spanish Oak (*Q. falcata*).

Humble Bees—*Charles S. Davis, Decatur, Ill.*—There are about fifty distinct species of Bumble or Humble Bees found in North America, of which rather more than half the number occur in the United States, including our new possessions in Alaska. In the immediate neighborhood of Rock Island we have taken about ten different species. The species differ notably in the amount of yellow markings, but have all of them the same general appearance; they differ also in size.

As with all other social insects, there are three distinct forms in every species of Humble Bee, like the drones (or males), the queens (or perfectly fertile females) and the workers (or partially fertile females) among the honey-bees. Among the Humble-bees, it is only the queens or large females that live through the winter and start fresh nests in the spring; the workers or small females always die in the fall. These last, for the most part, only differ from the queens in being about two-thirds their size. It is the queens alone that are seen in early spring flying round apple blossoms, etc., the workers not being born till later in the year.

The specimens you send are genuine Humble-bees—workers—and belong all of them to our commonest species in the U. S., the Pennsylvania Humble-bee (*Bombus pennsylvanicus*. De Geer). This kind makes its nest in the ground; and there were probably several of their nests in your hay-field, which your hay-making operations disturbed. Hence they attacked your teams, as a hive of honey-bees will fight if you disturb them. You state yourself that they troubled you a good deal while making hay, and say nothing about their disturbing your teams at any other time or in any other place. No doubt if you had let them alone, they would have let you and your horses alone. You must not blame them for fighting for their families. We presume you would do the same if our Indian friends were to make an onslaught upon your household gods.

With the exception of a few solitary bees (belonging to the genera *Halictus* and *Andrena*), which are known as "Sweat-bees," and having a taste for human sweat often get under folks's shirts in the hot summer weather and sting if roughly handled, there is no kind of Bee or Wasp that does not let man severely alone, if man will be good enough to do the same by him. And what is true of man, is equally true of the different animals domesticated by man.

As with all Bees and Wasps, including the Honey-bee, the males of all the Humble-bees have got no sting at all. In the case of certain species, the male Humble-bee haunts flowers for the sake of the honey and pollen found therein; in the case of other species, they fly idly about till they die of starvation, as we have observed to be the practice of the male of your species. In no case, however, does any male Humble-bee, or indeed any male Bee or Wasp belonging to any species, gather up provisions for the nest. Like the red Indians, the males are too chivalrous to work themselves, and it is upon the females that all the labor of providing for the family devolves.

Insects for sale—*H. M. G., Chicago, Ill.*—Yes, we understand that the extensive collection of N. A. Lepidoptera, belonging to Mr. Geo. M. Peck, is for sale as a whole, or in part. It has been represented to us as being one of the finest private collections in the country. Mr. Peck's address is 129 Maiden Lane, New York.

Can Land be insured against Cut-worms and other Insects!—*A. Willis, Columbia, Mo.*—In answer to your queries, we regret to say that we know of no kind of preparation which you can apply to your clover land, so as to insure the nursery stock you intend planting upon it next spring, against the depredations of insects. The habits of these lilliputian foes are so diverse, and we have to fight them in so many different ways, that it is impossible to apply any particular remedy or preventive that will affect them all. We think that the best thing you can do, is to keep the land plowed clean until you wish to use it. It was formerly supposed that a clean summer and fall fallow would insure the crops planted the following spring, against the attacks of Cut-worms. But since we have shown that some of these worms, which are so injurious in May and June, are produced from eggs deposited the same spring,* and that all Cut-worms do not hatch the year before they attain their growth, it follows that this clean fallow will be but a partial prevention of their attacks.

* See Missouri Ent. Rep., pp. 72-3, and *Amer. Entomologist*, Vol. I, p. 188.

Beetles named—*T. W. Hoyt, Jr.*—Your golden beetles are *Cassida aurichalcea*, Fabr. (See Vol. I, Fig. 177.) The beetle with blue-black wing-covers and rufous head, thorax, legs and antennæ, which "made a sort of crackling noise and emitted smoke which smelt like sulphur from the hind part of his body," is one of our common Bombardier beetles, *Brachinus Americanus*, Lec. Upon one occasion, when we were collecting insects and—as often happens—saw at the same moment two rapidly running beetles, both of which we were desirous to capture, we thoughtlessly put one of the two, which happened to be a Bombardier, between our lips, so as to hold him securely while we caught and disposed of the other one. Forthwith he fired away the customary discharge of blue smoke from his tail; and the next instant our lips felt as if a bottle of the strongest Aquafortis had been emptied upon them. But we were not to be fooled thus. The more he blazed away the tighter we held him; and after a copious discharge of saliva from our mouth, the disagreeable sensation passed off in some five minutes, without any further unpleasant results.

Royal Horned-Caterpillar—*W. C. Holmes, Platteburg, Mo.*—The immense horned worm you send, is the species which was illustrated in the colored plate to our first volume.

M. G. Kern, Supt. Lafayette Park, St. Louis, Mo.—The worm you found on Lilac is the same Royal Horned-Caterpillar. The fact of its occurring on Lilac is, we believe, entirely new to science.

Parsnip Caterpillar—*T. W. Hoyt, Jr., St. Louis, Mo.*—The worms found on Parsnip, which are green, marked with transverse black stripes and yellow dots, and which protrude from the first segment, when disturbed, two orange-colored strong-smelling processes, are the larvæ of our most common black swallow-tail butterfly, *Papilio asterias*, Cram.

Bad packing—*Dr. W. W. Butterfield, Indianapolis, Ind.*—Owing to your bad packing, the glass vial, containing the "aquatic insects," broke in Uncle Sam's mail-bags, and not a solitary bug of the whole lot reached us. We only hope that none of them crawled into some young lady's love-letters, while they were rampaging round among the postal matter.

Insects named—*C. P. Faulkner, Bridgeport, Conn.*—No. 1 is not *Necrophorus americanus*, Oliv., which is a much larger and handsomer insect with the elevated middle part of the thorax looking like red sealing-wax, but *N. marginatus*, Fabr. Both have similar burying habits. No. 2 is *Creophilus villosus*, Grav.—usually found under small pieces of carrion, where it preys upon carrion-eating insects. We have noticed the allied *Listotrophus cingulatus*, Grav., which haunts cowdungs, fly off from its favorite abode with a large *Hister* in its mouth. No. 3 is *Coccinella bipunctata*, Linn. No. 4 is not *Melanotus communis*, Schönh, but *M. incertus*, Lec. The two are very closely allied, but *incertus* is on the average a considerably larger species. No. 5 is *Scarites subterraneus*, Fabr. We have dug up many of this species from the burrows of the large southern Dung-beetle, *Copris carolina*, Linn., and believe that it lays its eggs there and in other such situations, and that its larva lives upon dung-feeding larvæ. No. 6 is *Uloma impressa*, Melsh., very abundant in all its stages under decaying bark in the woods. This species was formerly confounded with *U. culinaris* of Europe, which, as the name denotes, haunts kitchens. No. 7 is *Ips fasciatus*, Oliv.—The *Elater* family is a very difficult one, very numerously represented in the U. S.; and it is impossible to identify your species from your description, which neither specifies the size nor includes a single generic character.

Beetle named—*Wade Keyes, Florence, Ala.*—Your Beetle is *Colopteron* [*Lycus*] *terminale*, Say, and is tolerably common, occurring on a variety of different plants. The larva, which is clay-yellow prettily spotted with black, and very closely resembles the wingless female of the European genus *Drilus* as figured by Westwood (Introd. I, p. 247, fig. 13), occurs under prostrate logs, where it no doubt feeds upon the numerous larvæ that are found in such situations We have bred this beetle through all its stages, and upon one occasion, having determined to preserve a pupa of this species as a cabinet specimen, we pinned it through the thorax with a very fine No. 8 pin. Directly after we had done this, we changed our mind, removed the pin, and replaced the pupa in the breeding-jar. A week or two afterwards this very same pupa developed into a perfect specimen of the beetle; thus showing how tenacious of life some insects are. If a lamb was run through the breast with a sword, and then left to shift for itself, it would not be very apt to develop into a perfect full-grown sheep. LeConte in his Catalogue, but not in his edition of Say's *Entomology*, considers *terminale* Say as a mere variety of *reticulatum* Fabr., which has across the middle of its wing-cases an additional black band, but is otherwise undistinguishable. We have captured hundreds of both forms, and as we have never met with any intermediate grade, we incline with Say to think *terminale* a true species. It would be interesting to know whether or not *reticulatum* differs in its larval and pupal stages from *terminale*.

Moth named—*W. G. Barton, Salem Mass.*—The moth which you describe as having the front wings pink edged at tip with yellow, is probably *Alaria florida*, Guen. This insect expands about one and a quarter inches, and you will find an account of its larva by Mr. W. Saunders in the *Canadian Entomologist*, Vol. II, page 6, or in Dr. Fitch's twelfth Report. It feeds on the Evening Primrose (*Œnothera.*)

Worm boring into Cucumber—*G. W. C., Alton, Ill.*—The pale worm which enters and bores into your cucumbers, and which is nearly of the same color as the inside of that vegetable, produces a very strikingly marked moth of a yellowish-brown color, with an iris-colored reflection, the front wings having an irregular semi-transparent dull yellow spot, not reaching their front edge, and constricted at their lower edge, and the hind wings having their inner two-thirds of this same semi-transparent yellow. The moth is new to us, and during a recent trip East we found no Entomologist who could identify it. It belongs to the genus *Phakellura*, and is evidently Cramer's *nitidalis*, though the larva is said by Guenée to feed on potatoes. We have found this worm quite common in southerly latitudes the present year, boring into melons, both musk and water. A very similar worm, which however we have not yet bred to the moth state, has been this autumn exceedingly destructive to the cucumbers near Rock Island, in Northern Illinois. In company with this, but in smaller numbers, we have also met with a rather smaller worm, of a pale light yellow color and dotted with black very much like the larva of the Currant Worm Moth. (See Figure 8, *aa* in this Number). We have not yet reared this last to the moth state, but hope to do so before long. Of course, in a northerly latitude, insects do not develop as cariy in the year as they do further South.

O. L. Barler, Alton, Ill.—The worms which have ruined so many of your Nutmeg Melons by boring into them, and causing them to rot, are the same species spoken of above.

E. S. Smith, Pevely, Mo.—The worm boring into your Crook-neck and Hubbard squashes is the same species.

Caterpillar of the Io Moth—*Mrs. Tildesley, West Baden Springs, Orange Co., Ind.*—The grass-green worm found on Locust, with a conspicuous white and lilac-colored line along each side, and covered with numerous tufts of yellowish-green prickles, is the larva of the Io Moth (*Saturnia Io*, Sm. and Abb.) The moth receives its name from two conspicuous eye-spots on the hind wings, in allusion to the ancient Greek heroine Io, who, as the fable went, was jealously guarded by the hundred-eyed Argus. The sexes differ very greatly from each other, the general color of the ♂ being deep yellow, while that of the ♀ is purple-brown; though the same pattern is observable in both. The caterpillar is capable of stinging with its spines.

Worms on Cherry and on White Beech—*D. B. Waite, Springwater, N. Y.*—The worm that is "playing foul with your cherry trees" had spun himself up before he reached us; but from a peep that we got at him through a rent in the cocoon, he appears to be different from anything known to us. The other larva that usually feeds on beech, but will also eat grape leaves, was also spun up; and as we have no beech near us and are almost entirely unacquainted with the insects that infest that tree, we thought it useless to disturb him; more especially as, if the cocoon was cut open, the larva would most probably die, and by nursing the cocoon carefully through the winter we hope to breed the moth from it next summer. If we succeed next year in rearing the moths from either or both of your two cocoons, we will take care to advise you immediately what they are.

Apple-tree worms—*H. K. Vickroy, Champaign, Ill.*—The small green 16-legged larvæ, nearly half an inch long and with a broad dark brown stripe on each side extending the whole length of their backs, which you find doing considerable damage to the Apple-tree, belong to a new and hitherto undescribed species. These larvæ were first communicated to us by A. C. Hammond of Warsaw, Ill., early in Sept. 1868; and subsequently at the Illinois State Fair specimens were shown to us by W. T. Nelson, of Wilmington, Ill. At the latter end of May, 1869, we bred the moth from them; and a full account of the species, illustrated by figures, will be published in the Second Annual Report of the Senior Editor. The mode in which this larva operates on the apple-tree is by tying together the leaves with silken cords, forming a mass of considerable size inside which it lives gregariously, skeletonizing the leaves that it has thus appropriated and filling them with its gunpowder-like excrement. It was so abundant in 1868 near Warsaw and Quincy as nearly to strip many trees, especially in young orchards that were in an unthrifty condition. It is quite different from the Rascal Leaf-Crumpler (*Phycita nebulo*, Walsh), which lives all the time in a little black horn-like case, whereas this larva carries no house on its back. And moreover the Leaf-Crumpler is solitary in its habits, whereas this species lives in communities of several dozen during its entire larval life. As to the moths produced from these two larvæ, they are as different from each other as a goat is from a sheep. To distinguish our species from the Rascal Leaf-crumpler, we may call it in English "Hammond's Leaf-tyer" (*Acrobasis Hammondi*, n. sp.)

Stinging larvæ—*J. C. Falls, New Albany, Ind.*—The lepidopterous larvæ which you send are those of the Saddleback-moth (*Empretia stimulea*, Clemens), a species which has derived its English name from the saddle-like dark spot on the middle of its back. The two scientific names are derived respectively from a Greek word which means "to burn," and a Latin word which signifies "a goad." We shall shortly publish an article on "Stinging Larvæ," giving figures and descriptions of the very few that possess this peculiar power, so that our readers—and especially our fair readers, whose hands may be presumed to be more delicate and susceptible than those of us rough bearish men-fellows—may take due warning and govern themselves accordingly. Our own experience is that these larvæ produce no effect whatever on the palm of the hand, but if any of their sprangling prickles touch the back of the hand, or any other part of the body where the skin is not hardened and horny, then the result is about the same as if the same part had been stung by nettles.

Lappet Caterpillar on Apple-tree—*William Stark, Louisiana, Mo.*—We regret to say that the first caterpillar you sent was so rotten and stank so badly, that we were glad to fling it away the moment the box containing it was opened. The second "ugly wooly worm" found high up on a Rome Beauty Apple-tree, and which was broad and perfectly flat below, with fleshy, lappet-like appendages at its sides, was the larva of the American Lappet Moth (*Gastropacha Americana*, Sm. & Abb.) which you may find figured on page 377 of Harris's Injurious Insects. The species is rather rare, and there is but little risk of its undue multiplication.

Spined Spider—*G. W. Kinney, Snow Hill, Mo.*—The odd-looking angular spider, of a shiny mahogany brown, with the upper part of the abdomen yellow, and with two immense spines or thorns projecting from behind, and other smaller ones from above, is *Epeira spinea*, Hentz. It was subsequently described as found sparingly near Murphysboro, in South Illinois, by *Vespa* (Cyrus Thomas?) in the *Prairie Farmer* for 1861 (Vol. 23, page 169), under the name of *Epeira* (*Gasteracantha*) *spinicauda*. Near Rock Island, in North Illinois, it is by no means uncommon.

T. W. Gordon, Georgetown, Ohio.—The spider sent by you is the same species spoken of above in answer to Mr. Kinney.

Dangerous looking—*Dr. M. M. Kenzie, Centreville, Mo.*—The "dangerous looking" hairy ant-like insect of a black color with the forehead, upper part of thorax and two broad bands on the abdomen of a deep rufous, is ♀ *Mutilla coccinea*, Linn. The ♂ is somewhat smaller and has wings. This insect belongs to the Digger Wasps, and the sting of ♀ is said to be exceedingly severe.

Bag-worms again—*T. C. Tipton, Williamsport, Ohio.*—The worms which are literally eating up your Cedar trees are the common Bag-worm, which we have already frequently referred to under this head. We shall publish an article on this insect in our next number. *The Tomato-worm cannot sting!* The common House-fly breeds in stable manure. We shall give its natural history whenever we can spare the space.

Large water beetle—*S. E. Munford, Princeton, Ind.*—In our answer to you last month, we should have mentioned that the water-beetle you sent was ♀, and that in the ♂ the wing-covers, instead of having longitudinal impressed lines, are perfectly smooth, with the exception of the normal rows of fine punctures. Thos. Say, who was the first to describe this species, was not acquainted with the ♂.

Beetles under dead Fish—*T. Ferrell, Frankfort, Ohio.*—The large beetles with round, deep brown wing-cases and yellow thorax with a central dark spot, which you found under a dead fish, are *Silpha* (*Necrophila*) *peltata*, Catesby. They feed on all kinds of carrion.

ERRATA IN VOL. 1, NO. 12.—Page III, column 2, line 36, for "*Brachyrynchus*" read "*Brachyrhyncus*." Page VII, column 2, line 1, for "Stinging" read "Stinking." Page 235, column 1, line 3 from bottom, for "169, [2]" read "174, [2]." Page 242, column 1, line 18, for "*Musea*" read "*Musca*." Page 250, column 1, line 12 from bottom, for "*Therydopteryx*" read "*Thyridopteryx*." Same page, column 2, line 7 from bottom, for "Cartwell" read "Hartwell." Page 251, column 1, line 18, for "Welsh" read "Melsh."

☞ Several answers that should have appeared in the present number, must unavoidably lie over till our next issue.

☞ Our acknowledgements and notices of new works have also been crowded out of this number.