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THE GRAPE PHYLLOXERA—*Phylloxera vastatrix*.

BY THE EDITOR.

This tiny but formidable foe to the grape vine, which has during the past few years attracted so much attention in Europe and America, has appeared in its worst form, viz., the root-inhabiting type, in Ontario, and is doing a considerable amount of damage in our vineyards. Early this spring the writer received from Mr. A. H. Pettit, of Grimsby, samples of fibrous roots from diseased vines, which had every appearance of being affected by the Phylloxera, but the specimens received were so dried up that if there had been any lice on them they could not be discovered. Request was made for fresh specimens in moist earth, but none were obtained.

On the 19th of July, in company with Mr. J. M. Denton, of London, I visited the vinery of Mr. Richard Stephens, in Westminster, about a mile from London, where we found a number of Concord vines growing in heavy clay soil, which were suffering much from some cause; the foliage had become very yellow and some of the vines appeared to be dying. On examining the roots we could find but few living, and the fibrous roots were covered with the little knotted swellings so characteristic of Phylloxera. On digging around some vines that were less diseased, a number of the lice were discovered on the young, fresh roots, puncturing them, imbibing their juices, and causing disease and death.

On the day following we visited our own vinery, on sandy soil, near London, and detected the same form of disease, but much less pronounced, on Rogers' 15 and some seedlings.

On examining the roots Phylloxera were found in their different stages of egg and larva of various sizes, in comparative abundance. In the case of Mr. Stephens the insects must have been at work for several years to have caused the extent of injury which we saw, but in our own case the invasion is probably a more recent one. We are glad to state that on Mr. Stephens' grounds we found the small mite, *Tyroglyphus phylloxera*, which

feeds upon the Phylloxera and destroys it, associated with the lice and busy in its useful mission.

Since this insect is now known to be at work in Ontario, and probably to a greater extent than we are at present aware of, a condensed account of its life history will probably be interesting to our readers. The figures are from Prof. Riley's excellent reports, and the facts given mainly gleaned from the writings of this and other authors.

Its progress in Europe has been most alarming, inflicting untold losses in the wine making districts. The destruction it has occasioned in France has been so great that it has become a national calamity which the Government has appointed special agents to enquire into; large sums of money have also been offered as prizes to be given to any one who shall discover an efficient remedy for this insect pest. At the same time it has made alarming progress in Portugal, also in Switzerland and some parts of Germany, and among vines under glass in England. It is a native of America, from whence it has doubtless been carried to France; it is common throughout the greater portion of the United States, and in one of its forms in Canada, but our native grape vines seem to endure the attacks of the insect much better than do those of Europe. Recently it has appeared on the Pacific slope in the fertile vineyards of California, where the European varieties are largely cultivated, and hence its introduction there will probably prove disastrous to grape culture.

This insect is found in two different forms: in one instance on the leaf, where it produces greenish red or yellow galls of various shapes and sizes, and is known as the type *Gallaecola*, or gall-inhabiting; in the other and more destructive form, on the root, known as the type *Radicicola*, or root-inhabiting, causing at first swellings on the young rootlets, followed by decay, which gradually extends to the larger roots as the insects congregate upon them. These two forms will for convenience be treated together.

The first reference made to the gall-producing form was by Dr. Fitch in 1854, in the Transactions of the New York State Agricultural Society, where he described it under the name of *Pemphigus vitifoliae*. Early in June there appear upon the vine leaves small globular or cup-shaped galls of varying sizes; a section of one of these is shown at *d*, figure 15; they are of a greenish red or yellow color, with their outer surface somewhat uneven and woolly. Figure 14 represents a leaf badly infested with these galls. On opening one of the freshly formed galls, it will be found to

contain from one to four orange colored lice, many very minute shining,



Fig. 14.

oval, whitish eggs, and usually a considerable number of young lice, not much larger than the eggs and of the same whitish color. Soon the gall becomes over-populated, and the surplus lice wander off through its partly opened mouth on the upper side of the leaf, and establish themselves either on the same leaf or on adjoining young leaves, where the irritation occasioned by their punctures causes the formation of new galls, within

which the lice remain. After a time the older lice die, and the galls which they have inhabited open out and gradually become flattened and almost obliterated; hence it may thus happen that the galls on the older leaves on a vine will be empty, while those on the younger ones are swarming with occupants.

These galls are very common on the Clinton grape and other varieties of the same type, and are also found to a greater or less extent on most other cultivated sorts. They sometimes occur in such abundance as to cause the leaves to turn brown and drop to the ground, and instances are recorded where many vines have been defoliated from this cause. The number of eggs in a single gall will vary from fifty to four or five hundred, according to the size of it; there are several generations of the lice during the season, and they continue to extend the sphere of their operations during the greater part of the summer. Late in the season, as the leaves become less succulent, the lice seek other quarters and many of them find their way to the roots of the vines, and there establish themselves on the smaller rootlets. By the end of September the galls are usually deserted. In figure 15 we have this type of the insect illustrated; *a* shows a front view of the young louse, and *b* a back view of the same; *c* the egg, *d* a section of one of the galls, *e* a swollen tendril; *f*, *g*, *h*, mature egg-bearing gall lice, lateral, dorsal and ventral views; *i*, antenna, and *j* the two-jointed tarsus.

When on the roots the lice subsist also by suction, and their punctures result in abnormal swellings on the young rootlets, as shown at *a* in figure

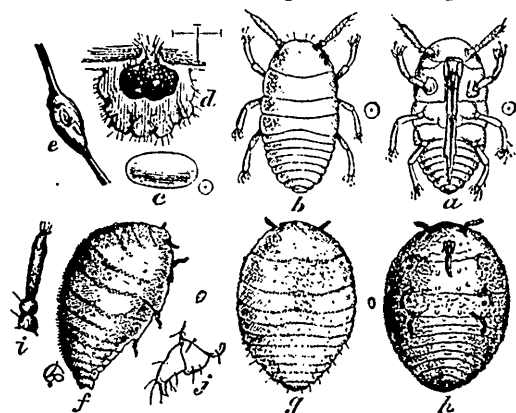


Fig. 15.

In figure 16 we have the root-inhabiting type, *Radiciola*, illustrated; *a*, roots of Clinton vine, showing swellings; *b*, young louse as it appears when hibernating; *c*, *d*, antenna and leg of same; *e*, *f*, *g*, represent the more mature lice. It is also further illustrated in fig. 17, where *a* shows a healthy root, *b* one on which the lice are working, *c* root which is decaying and has been deserted by them; *d d d* indicates how the lice are found on the larger roots;

e, female pupa seen from above, *f* the same from below; *g*, winged female, dorsal view; *h*, the same, ventral view; *i*, the antenna of the winged insect; *j*, wingless female laying eggs on the roots, while *k* indicates how the punctures of the lice cause the larger roots to rot. Most of these figures are highly magnified; the short lines or dots at the side showing the natural size.

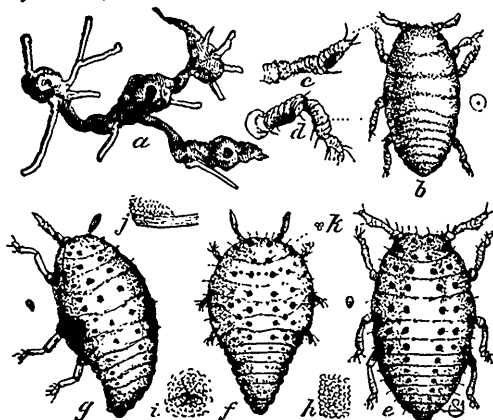


Fig. 16.

16. These eventually decay, and this decay is not confined to the swollen portions, but involves the adjacent tissue, and thus the insects are induced to betake themselves to fresh portions of the living roots, until at last the larger ones become involved, and they too literally waste away.

During the first year of the insect's presence the outward manifestations

of the disease are very slight, although the fibrous roots may at this time be covered with the little swellings; but if the attack is severe, the second year the leaves assume a sickly yellowish cast, and the usual vigorous yearly growth of cane is much reduced. Eventually the vine usually dies,

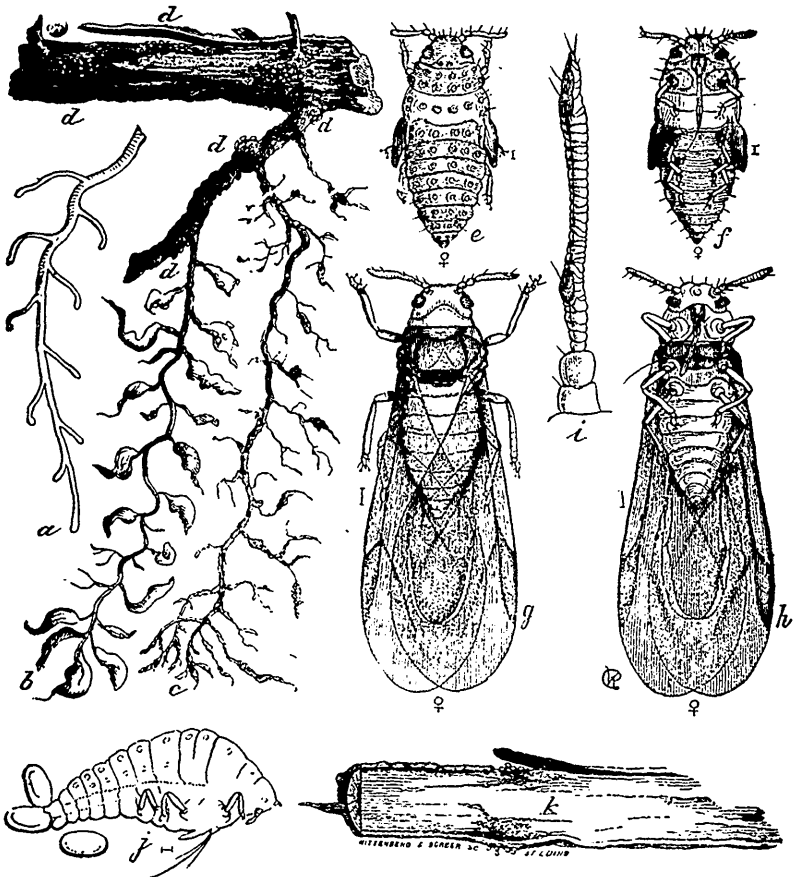


Fig. 17.

but before this takes place, the lice having little or no healthy tissue to work on, leave the dying vine and seek for food elsewhere, either wandering underground among the interlacing roots of adjacent vines, or crawling over the surface of the ground in search of more congenial quarters.

During the winter many of them remain torpid, and at that season assume a dull brownish color, so like that of the roots to which they are attached, that they are difficult to discover. They have then the appearance shown at *b* in figure 16. With the renewal of growth in the spring, the young lice cast their coats, rapidly increase in size, and appear as shown at *e*, *f*, *g*, in the figure; soon they begin to deposit eggs, these eggs hatch, and the young shortly become also egg-laying mothers like the first, and like them also remain wingless. After several generations of these egg-bearing lice have been produced, a number of individuals about the middle of summer acquire wings. These also are all females, and they issue from the ground, and rising in the air, fly or are carried with the wind to neighboring vineyards, where they deposit eggs on the underside of the leaves among their downy hairs, beneath the loosened bark of the branches and trunk, or in crevices of the ground about the base of the vine. Occasionally individual root lice abandon their underground habits and form galls on the leaves.

The complete life history of this insect is extremely interesting and curious, and those desirous of further information as to the different modifications of form assumed by the insect in the course of its development, will find them given with much minuteness of detail in the 5th, 6th, 7th and 8th Reports on the Insects of Missouri, by C. V. Riley.

Remedies: This is an extremely difficult insect to subdue, and various means for the purpose have been suggested, none of which appear to be entirely satisfactory. Flooding the vineyards where practicable seems to be more successful than any other measure, but the submergence must be total and prolonged to the extent of from twenty-five to thirty days; it should be undertaken in September or October, when it is said that the root lice will be drowned, and the vines come out uninjured.

Bisulphide of carbon is claimed by some to be an efficient remedy; it is introduced into the soil by means of an augur with a hollow shank, into which this liquid is poured; several holes are made about each vine, and two or three ounces of the liquid poured into each hole. Being extremely offensive in odor and very volatile, its vapor permeates the soil in every direction, and is said to kill the lice without injuring the vines. This substance should be handled with caution, as its vapor is very inflammable and explosive. Carbolic acid mixed with water, in the proportion of one part of acid to fifty or one hundred parts of water, has also been used with advantage, poured into two or three holes made around the base of

each vine with an iron bar to the depth of a foot or more. Soot is also recommended, to be strewed around the vines.

It is stated that the insect is less injurious to vines grown on sandy soil ; also to those grown on lands impregnated with salt.

Since large numbers of these insects, both winged and wingless, are known to crawl over the surface of the ground in August and September, it has been suggested to sprinkle the ground about the vines at this period with quicklime, ashes, sulphur, salt or other substances destructive to insect life. The application of fertilizers rich in potash and ammonia have been found useful, such as ashes mixed with stable manure or sal-ammoniac.

A simple remedy for the gall-inhabiting type is to pluck the leaves as soon as they show signs of the galls, and destroy them.

Several species of predaceous insects prey on this louse.

A black species of Thrips with white fringed wings deposits its eggs within the gall, which, when hatched, produce larvæ of a blood red color, which play sad havoc among the lice. The larva of a Syrphus fly, *Pipiza radicum*, which feeds on the root louse of the apple, see figure 18, has also been found attacking the Phylloxera. Another useful friend is a small mite, *Tyroglyphus phylloxera*, P. & R., see fig. 19, which attacks and destroys the lice, and associated with this is sometimes found another species, *Hoplophora arctata*

Riley, of a very curious form, reminding one of a mussel. The lice are also preyed on by the larva of a Scymnus, a small dull colored lady bird ; also by several other species of the lady-bird family, and by the larvæ of lace-wing flies.

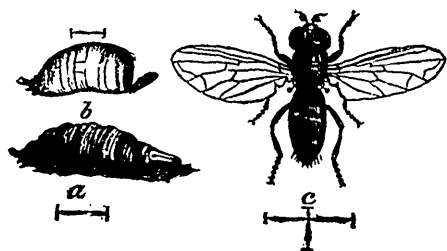


Fig. 18.

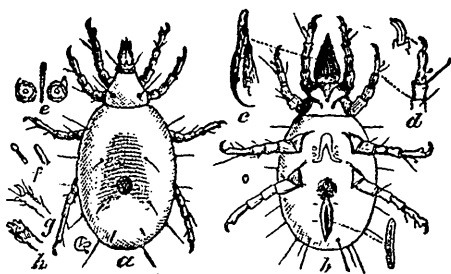


Fig. 19.

To guard against its introduction into new vineyards, the roots of young vines should be carefully examined before planting, and if knots and lice are found upon them, these latter may be destroyed by immersing the roots in hot soap suds or tobacco water.

Our native American vines are found to withstand the attacks of this insect much better than do those of European origin, hence by grafting the more susceptible varieties on these hardier sorts, the ill effects produced by the lice may in some measure be counteracted. The roots recommended to use as stocks are those of Concord, Clinton, Herbe-
mont, Cunningham, Norton's Virginia, Rentz, Cynthiana, and Taylor. The Clinton, one of the varieties recommended, is particularly liable to the attacks of the gall-producing type of Phylloxera, but the lice are seldom found to any great extent on its roots, and the vine is so vigorous a grower that a slight attack would not produce any perceptible effects.

“EUDAEMONIA JEHOVAH”—A REVIEW.

BY A. R. GROTE.

The describer of species has accomplished his task when he has given the proper Latin names, but it depends largely on the one who catalogues the species, whether these names pass into use or not. In the work of preparing a “New Check List of North American Moths,” I have gone over much of the literature bearing on the subject, and the following reflections have presented themselves to me.

In the first place, I have been actuated by a sincere desire to meet the views of the anti-Hübnerists, and avoid the use of old or objectionable names. Professor Riley has brought forward objections to the resuscitation of forgotten or neglected names, and others have written with the same object in view. I found, however, to my surprise, I must confess, that the best Catalogue, that of Staudinger, did not hesitate to introduce names out of use for almost a century; and this merely because they were a very little older than the name in common use. So prominent an insect as *Papilio Podalirius*, is made to appear as *P. Simon*. And in the “Preface,” the necessity for placing the synonymy on a firm basis is given as a reason for enforcing the rule of priority so rigidly. If this can be

done in Europe, where there exists so large an Entomological public, why should it not be done here, where that public is so limited? For instance, in the genus *Catocala*, I have reinstated *Grynea* of Cramer; but I hardly think that, before my paper appeared, the insect had any name at all in collections, or that the name of *nuptul*, which I rejected, was used to any extent. Outside of the difficulty of deciding what constitutes a name "in use," I think the science is yet so young with us, that no names have been used so much that their abandonment could lead to any confusion or trouble of moment. Certainly if such changes can be made in an important European Catalogue like Staudinger's, there can be no reason for the American Systematist being at all troubled at finding himself obliged to make them. And with the use of Hübner's genera, I find that proportionately more of such names are used by Staudinger than in the older lists of Boisduval, Heydenreich, Gueneé or the English writers, except, perhaps, Stephens. To the writers of the "Brooklyn Check List," I would, in fact, recommend the study of Staudinger's Preface. These writers profess, indeed, much veneration for Staudinger, and the writers whom they somewhat vaguely term "Continental Authors," and it is really worth while to ascertain fully what Staudinger says on this and kindred topics in his "Preface." I think that we can adopt this "Preface" as giving excellent judgment on all, or most of the moot points in nomenclature, and be guided by it. The practice of giving a specific name only once in a Family is discussed on page xviii of the "Preface." This is properly condemned, but it is rightly insisted upon that in two related genera the same specific name should not be used. And where a change has been made for this reason, the new name should be respected even if the species thus re-named should be removed to a quite different genus from the one under which it originally appeared, and where it was re-named to avoid a duplication of the first specific name. Thus I should keep *Puritana* Rob., instead of bringing into use again the original name for the species which was a duplication at the time.

I would, finally, modify the law of priority and not recognize such names as the one proposed by Mr. Strecker at the head of this article. There is only one objection to such names, that they offend the ears of many who are interested in the object they designate. On fair, "common sense" grounds, they should be rejected. And they have no excuse for appearing, since names are more plentiful than species. In the present case, the species should be catalogued under the name *Streckeri*, and no

reference be made to the original name, which has been used by Mr. Strecker "in vain."

It is not here a question of Orthodoxy, but of taste and decency. While great sacrifices are to be made to secure a stable nomenclature by the enforcement of the law of priority, there is a point where the proposer of objectionable names should meet with a check. Under cover of priority there is no telling how far we might be led, were we obliged to adopt any names that might be proposed. But no student is obliged to use names which appear to him disadvantageous to the comprehension of his subject or the general welfare of his science. The more he is interested about the fact and the less about names and rules, the better. At least he will not trouble himself to use an objectionable term for the sake of priority. And this is the strong point of the anti-Hübnerists. And it would be legitimate were it not shown that Hübner's names are mainly objected to from their being neglected, or insufficiently founded; there can be no reason, where they are well founded, for their further neglect, since their use makes but little trouble at present and what we need is a stable nomenclature. To attain this we must exhaust the application of names at present in literature.

PREPARATORY STAGES OF HOMOPTERA LUNATA, DRURY.

BY G. H. FRENCH, CARBONDALE, ILL.

EGG.—Diameter, .03 inch. Globular in shape, slightly flattened at the base, the apex having a punctured space but no depression; a series of longitudinal ridges from near the base, 20 of which reach the apical space. As these ridges are the same distance apart, there are between those reaching the apex several shorter ones, the number not noted. The depressions between the ridges show slight punctures. Color pale green. Duration of this period 5 days.

YOUNG LARVA.—Length .15 inch, slender, 12 legs, the first and

second pair of pro-legs mere points. A looper in motion. Color of the middle of the body from joint 2 to 11 pale dull yellow, with a slight leaden hue; head, joint 1 and the anal joint slightly reddish, these parts lacking the leaden hue. All the feet pale. Hairs arising from piliferous spots gray. Head about one third broader than the body. Duration of this period 3 days.

After 1st Moulting.—Length .20 inch. The whole of the dorsum pale green with traces of lines only on the thoracic and the posterior segments. On the sides two prominent reddish brown lines separated by a narrow green one. There is a very faint reddish subdorsal line. None of the piliferous spots are prominent except the posterior pair of the dorsal on joint 4, which are slightly enlarged and black. Head pale reddish brown mottled with darker. The first and second pairs of pro-legs a little more prominent. The larvæ are very active. Duration of this period 3 days.

After 2nd Moulting.—Length .55 inch. The general color of the dorsum is pale grayish green tinged with brown at the extremities. Dorsal line composed of two greenish white lines with a narrow space of the ground color between. Subdorsal line dull white. On the sides are three stripes separated by narrow white lines. The middle stripe is blackish brown considerably tinged with green on joints 4 and 5, and containing the stigmata. The other two stripes are paler with more green. The general color of head is brown, the stripes of the body extending irregularly over it, though considerably mottled. Feet pale brown. Piliferous spots black, the posterior dorsal pair of joint 4 prominent in color, a little so in elevation. Part of hairs from piliferous spots black, part brown. Venter gray with black spots in the middle of the joints. Duration of this period 4 days.

After 3rd Moulting.—Length .75 inch. The dorsal space is in three distinct stripes, separated by two white lines. The dorsal or central stripe has an imperfect faint dorsal line, the rest of the stripe being pale mottled with brownish. The stripe between this and the subdorsal is brown mottled with greenish. The sides striped much as in the last period, the stripes separated by white lines. The upper of the three is like the dorsal stripe, pale inclining to carneous; the second or stigmatal is like the one in the dorsal space. The stripes are a little darker on the thoracic joints than elsewhere. Piliferous spots black, the posterior dorsal pair of joint 4 prominent as before. The articulations or incisures of the joints in the

middle of the body incline to yellow. The brown and pale brown mottlings of the head, though irregular, seem to follow in a measure the stripes of the body in arrangement. Pro-legs concolorous with the body, thoracic paler. Venter dull white, black in the middle of the joints. Hairs black. Duration of this period, 3 days.

After 4th Moulting.—Length 1.05 inches. Marked and colored very much as during the preceding period. Piliferous spots less prominent, except the posterior pair of joint 4. Each one of these contains a white dot with a similar dot in its front. Joint 11 a little raised with the posterior pair of spots tubercular. Duration of this period 3 days.

After 5th Moulting.—Length 1.35 inches. The plan of marking of the insect has not changed, but the colors are so modified that the caterpillar has a yellowish brown appearance with a decided chrome yellow tint at the intersection of joints 4 and 5. The piliferous spots are black, but from joint 4 back each is accompanied by a small white spot. In general the piliferous spots have grown less prominent, the posterior on joint 4 about the same, those on joint 11 a little more elevated. The dorsal stripe is a little irregular in outline at the intersection of the joints, consisting of one or more expansions and contractions. The difference in color of the stripes seems to be due to the difference in shade of the brown dots of which the stripes are composed, the yellowish green ground color being about the same. Venter about the shade of the pale stripes, the middle of each joint being brownish black tinged with wine color, these spots being connected.

Mature Larva.—Length 1.45 inches. Width of head .12 inch, of middle of body .18. Head flat, sloping; ocelli 6; in shape and number of ocelli resembling larvæ of *Catocalæ*. Marked very much as at the beginning of this period, three stripes on the dorsum and three on each side, alternating light and dark, but these are less distinct, approaching a uniform brownish drab; the white spots also less distinct. The first and second pro-legs are about half the length of the others. Venter a little paler than above, with an elliptical reddish brown spot in the centre of each joint. Legs and palpi concolorous with the body, jaws dark brown. Duration of this period 13 days.

Chrysalis.—Length .80 inch, depth of thorax .25 inch; basal abdominal depression very slight. Depth of 4th abdominal joint .27 inch, from this gradually tapering to the end; the wing cases covering five joints in front, the legs and antennæ cases extending the same distance as the

wings. The tip of abdomen coarsely furrowed and punctured, terminating in two long hooks with several shorter ones arising from the corrugated surface a little way from these. These hooks are fastened in a button or piece of silk of considerable extent at the posterior end of the cocoon; the latter being composed of leaves fastened together, with or without being attached to the box, but not lined on the inside except the space of silk already mentioned. Anterior portion of chrysalis a little produced at the head, no particular organ projecting prominently. Color brown, not very dark, moderately glaucous. Duration of this period 18 days.

This gives a total time from depositing the egg to the imago of 52 days. I should say, however, that this season was very wet during the months of May and June, and after passing the 5th moult there were several days during which little food was taken and some of the larvæ died, they appearing to be affected by the wet weather. I should say further that the notes as to time of moult were taken from a few of the more healthy larvæ, several of them being more protracted in their time than the one given. The 13 brought through all their stages had periods as follows :

1	a period of	52	days.	2	a period of	55	days.
2	"	56	"	1	"	57	"
1	"	59	"	1	"	60	"
2	"	61	"	1	"	62	"
1	"	65	"	1	"	70	"

The eggs were deposited April 30th, and the first moth hatched June 21st, the last July 10th. During former years I have found the larvæ of this species on willow and other bushes, and had them spin up the last of September and come out as moths the fore part of November. In other instances they passed the winter as chrysalids. From all the data given I should judge that there are from two to three broods during a season, according as the eggs are deposited by the early or late moths. All that I have wintered over hibernated in the pupa state, which is probably the usual if not the only method of hibernation.

On page 89 of vol. 9 of the CANADIAN ENTOMOLOGIST (1877) Mr. A. R. Grote mentions Mr. Hill, of Albany, N. Y., as authority for a statement that *Edusa* and *Lunata* are possibly sexes of one species. On page 174 of the same volume, Mr. Thomas E. Bean, of Galena, Ill., gives the result of some observations on specimens in his collection going to show that not only the two referred to, but *Saundersii*, should be included as well in

one species, those having white on the wings the males, and *Lunata* the female. On page 228 of the same volume, Mr. Bean again refers to the same subject, giving some additional evidence from observation of the imagines, going to show the correctness of the position taken. Since that time many have regarded the question as settled, though I find in the Check List recently published by the Brooklyn Entomological Society, the three names stand as three species, with *Nigricans* between *Saundersii* and *Lunata*.

The result of my rearing fully confirms all Mr. Bean claimed, as the following will show. From the one brood of eggs deposited by a single moth, form *Lunata*, *Lunata*, *Saundersii* and *Edusa* were obtained, and the forms were hatched in the following order: Numbers 1, 3, 9, 12 and 13 were *Lunata*; Nos. 2, 5, 6, 7 and 10 were *Edusa*; Nos. 4, 8 and 11 were *Saundersii*. As an evidence of sex the frenulum was examined in each specimen, and in all the *Lunata* it was double, but single in both the other forms.

This settles the question beyond any doubt, and reduces two of the forms to sexual varieties. I have not the works containing the original descriptions by me, and can not say for that reason which name has the priority, but shall leave that question to some one who has access to these works.

Knowing this species to be a general feeder from having reared it on maple and willow before, no effort was made to test its range of food plants, but it was fed most of the time on plum leaves.

ON A RECENT SPECULATION AS TO RANK IN INSECTA.

BY A. R. GROTE.

The reader will have noticed, in the June number of the CANADIAN ENTOMOLOGIST, a paper on the "Physiological Arrangement of Insects." The author there places the *Orthoptera* first in this list, owing to the presence of auditory organs and well developed eyes. The "arrangement" which follows is exceedingly "mixed," but the object of the present remarks is to point out that the author mistakes when he considers the presence of sense-organs as the crucial test of rank. And for this

reason, that, within the different Sub-orders, there is great variation in this respect. For instance, in the *Pyralidæ* we have forms almost identical, such as *Chryseudenton* and *Cataclysta*, which differ by the absence or presence of simple eyes. I do not wish to follow out the argument at length; the environment seems to effect comparatively easily the sense organs; Cave-insects are frequently blind. Again the Challenger Expedition brought up from the depths an eyeless Crustacean—*Willemoesia*, named for the distinguished naturalist, Dr. Willemoes-Suhm, who, unfortunately for science, died before the "Challenger" returned to her English dock. But insects are now "arranged" by their physiological characters, though certainly with very different results from those attained by Mr. A. H. Swinton. The whole structure and proportionate parts are taken into consideration, and little can be said against the observations, partly original, brought together by Dr. Packard in his "Guide." And Mr. Swinton himself speaks of Dr. Scudder's observations of rank in the Butterflies, not based on "sense organs," and which seems to us so full and satisfactory. The observations on the "Ghost-moth" are an echo of Dr. Packard's remarkable paper, in which the resemblance of *Hepialus* to the Neuropterous genus *Polystichoetes* was fully discussed. That the *Bombycidæ* afford instances of synthesis has been shown by this distinguished pupil of the elder Agassiz, who had so remarkable an ability for perceiving and weighing analogies and affinities in animals. The question of rank in insects goes hand in hand with that of the origin of the diverse forms. We fear that Mr. Swinton has but very partially examined the subject and that his suggestions as to sense-organs are not based on proper physiological studies. Not without a certain shudder can we read the author's glib disposal of the question of rank in *Hexapoda*. And his use of sense organs to determine rank is open to the objection that it is not thorough; that some members of his highest groups will fall into the lowest, and thus utterly forsake their "physiological associates" by reason of a sudden failing of ears and eyes. "As far as I can learn" is hardly to be expected as the basis of observations seriously advanced; yet with these words our author disposes of "the species of Hymenoptera, Neuroptera and Diptera." There is only one way to accumulate facts upon this subject, and that is to trace the changes in related forms, to take the dissecting needle in hand and to take down the numerous memoirs already extant upon the subject and thoroughly master their contents.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF
SCIENCE.

THIRTY-FIRST MEETING,

To be Held at Montreal, Canada, August, 1882.

The Thirty-first Meeting of the Association will be held at Montreal, Canada, commencing at 10 o'clock, a. m., on Wednesday, the 23rd of August, 1882; under the presidency of J. W. Dawson, LL. D., F. R. S., Principal of McGill University, Montreal.

The headquarters of the Association will be at McGill University, where members will register as soon as possible after arrival. The hotel headquarters will be at the Windsor.

The offices of the Local Committee and of the Permanent Secretary will be at the University. The General Sessions and the meetings of the Sections and Committees will all be held in the University buildings. The particular rooms will be designated on the programme for Wednesday.

Members expecting to attend the meeting are particularly requested to notify the Local Secretaries at the earliest moment possible.

The address of the Permanent Secretary will be Salem, Mass., until August 17th; after that time and until the meeting has adjourned, his address will be Windsor Hotel, Montreal, Canada.

OFFICERS OF THE MONTREAL MEETING.

President—J. W. Dawson, of Montreal.

Vice-Presidents :

- A. Mathematics and Astronomy—Wm. Harkness, of Washington.
- B. Physics—T. C. Mendenhall, of Columbus.
- C. Chemistry—H. C. Bolton, of Hartford.
- D. Mechanical Science—W. P. Trowbridge, of New Haven.
- E. Geology and Geography—E. T. Cox, of San Francisco.
- F. Biology—W. H. Dall, of Washington.
- G. Histology and Microscopy—A. H. Tuttle, of Columbus.
- H. Anthropology—Daniel Wilson, of Toronto.
- I. Economic Science, and Statistics—E. B. Elliott, of Washington.

Permanent Secretary—F. W. Putnam, of Cambridge.

General Secretary—William Saunders, of London, Ontario.

Assistant General Secretary—J. R. Eastman, of Washington.

Secretaries of the Sections :

- A. Mathematics and Astronomy—H. T. Eddy, of Cincinnati.
- B. Physics—Chas. S. Hastings, of Baltimore.
- C. Chemistry—Alfred Springer, of Cincinnati.
- D. Mechanical Science—Chas. B. Dudley, of Altoona.
- E. Geology and Geography—C. E. Dutton, of Washington.
- F. Biology—Charles S. Minot, of Boston.
- G. Histology and Microscopy—Robert Brown, jr., of Cincinnati.
- H. Anthropology—Otis T. Mason, of Washington.
- I. Economic Science, and Statistics—F. B. Hough, of Lowville.

Treasurer—William S. Vaux, of Philadelphia.

The Annual Meeting of the Society for the Promotion of Agricultural Science will be held at the rooms of the Natural History Society, Montreal, on August 21st and 22nd. The American Forestry Congress will be held at the same time in Forestry Chambers, opposite St. Lawrence Hall.

OUR ANNUAL MEETING.

By the kind permission of the Hon. S. C. Wood, the Commissioner of Agriculture for the Province of Ontario, the Annual Meeting of the Entomological Society of the Province of Ontario will be held at Montreal during the first week of the meeting of the American Association for the Advancement of Science. The meeting will be held at the rooms of the Montreal Natural History Society, on Thursday afternoon, August 24, at 3 o'clock. It is expected that there will be a large attendance of those interested in Entomology.

A meeting of the Council of the Society will be held on Thursday morning at eleven o'clock, at the residence of the Vice-President of the Society, Mr. J. G. Bowles.

CORRESPONDENCE.

DROSOPHILA AMPELOPHILA.

DEAR SIR,—

In a letter recently received from Mr. S. W. Williston, of New Haven, Ct., he says, in relation to the above insect: "I would call your attention

to the 'two branched bristles' of the head. You will find that they are inserted in the third (last) joint of the antennæ, and correspond to the 'plumose arista' of the common house-fly, for example. They are found in all our species of *Drosophilidæ*."

G. J. BOWLES.

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DROSOPHILA AMPELOPHILA, LOEW.

DEAR SIR,—

In the autumn of 1879 I bred and recognized numerous specimens of *Drosophila ampelophila*, Lw., at New Haven, from decaying pears, labelled specimens bearing date of Oct. 30. Since then I have observed them in August, September and October in the greatest abundance in Massachusetts and Connecticut. Perfectly sound fruit I have never known to be attacked by them, but the slightest indication of fermentation attracts them in great numbers, and about heaps of cider refuse I have seen them in clouds. Species of the family may be easily mistaken for one another, but by aid of Mr. Bowles' accurate figure of the wing, and by the presence in the male, on the tips of the anterior metatarsi above, of a minute but conspicuous black tubercle, the present Fermenting Fruit Fly may be with certainty distinguished. Loew apparently had some knowledge of its habits in giving it the name *ampelos*. As regards its distribution he says (Cent. II., 99): "*Drosophila ampelophila* in Europae regionibus meridianis frequentissima nec Europae mediae plane aliena etiam in meridianis Africae partibus habitat." The question is an interesting one: In which continent is it a native? The European *D. confusa*, as well as *cellaris* and *aceti*, appears to have very similar habits; doubtless other of our American species will be found to infest fruit.

S. W. WILLISTON.

New Haven, 28th July, 1882.

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LARVÆ OF PAPILIO THOAS.

DEAR SIR,—

For several years past I have seen a few specimens of *Papilio thoas* in this locality, in the month of August, but in poor condition; this year they appeared as early as the middle of June. I have just found for the first time the larvæ in my garden feeding on *Dictamnus fraxinella*. There are two broods—one quite small, and the other three quarters grown.

G. H. VAN WAGENEN.

Rye, Westchester Co., N. Y., July 17th, 1882.

ON CAPIS, GROTE.

DEAR SIR,—

Mr. Grote's reply to my remarks on *Capis* contains a statement which requires correction. He says: "Every student ought to know that in the Deltoids the eyes are always naked, the tibiæ unarmed." The latter part of the sentence is correct, but as a very fair proportion of the *Deltoideæ* have lashed eyes—Mr. Grote, himself, having described three genera with that character—the remainder of it is rather new and surprising, and contains information which all students are excusable for not having previously known. Generic descriptions should always be complete. *Capis* is said to be like *Sisyrrhypena*; that genus is described as *Crambiform*. Before it is possible to know what *Capis* is like, we must go through *Sisyrrhypena*, hunt up what *Crambiform* is, and graft on that the difference between *Capis* and *Sisyrrhypena*! I do not consider my "Remarks on *Capis*" answered by Mr. Grote's reply. I am obliged to Mr. Grote for his offers of assistance.

JOHN B. SMITH.

BOOK NOTICES.

The Hessian Fly—Its ravages, habits, enemies and means of preventing its increase, by A. S. Packard, jr., M. D.; being Bulletin No. 4 of the Department of the Interior, U. S. Entomological Commission, 8vo., pp. 43, illustrated by two plates containing many figures, one woodcut and a map: being a synopsis of all that has been published in reference to this destructive insect, with such additional facts as the members of the Commission have been able to collect.

A Treatise on the Insects Injurious to Fruit and Fruit Trees in California. By Matthew Cooke, chief executive Horticultural officer; 8vo., pp. 72.

This useful pamphlet treats of the Codlin Moth, which has now taken up its permanent residence in California, making apple and pear growing in some sections very uncertain; the Pear Slug, the Red Spider, the Tent

Caterpillar, Currant Borer, and several species of Scale Insects which attack the apple, pear, peach, plum, orange, etc., illustrated by a number of wood-cuts. It appears that our California friends are now seriously affected by insect pests, from most of which they had until of late been free. The fruit interests of this State are so highly important that very active measures are being taken to keep these insect pests within bounds, and an Act has been passed by the State compelling the general adoption of such remedial measures as shall from time to time be found of value. We shall watch with interest the effect of such legislation, and sincerely hope that it may result in a marked abatement of the evils complained of.

Revised Check List of North American Birds, with a Dictionary of the Etymology, Orthography and Orthoepy of the Scientific Names. By Dr. Elliot Coues; 1ge. 8vo. Estes & Lauriat, Boston.

Such a book from such a pen cannot fail to come into the hands of a great many Ornithologists, and the circulation of so valuable a work will greatly tend to render this much neglected part of the science more widely studied and understood. The first part of the book is devoted to notes and general explanations on Etymology, Orthography and Orthoepy. The second part contains the Revised Check List proper, and on the latter part of each page the names divided into syllables and marked for pronunciation and accentuation, with copious notes on the derivation. In regard to the nomenclature, the author has in many instances in this work taken a stand opposed to that of some eminent Ornithologists of the present day, which is much to be regretted in view of the desirability of uniformity in this matter.

The printing is excellent and done on fine heavy paper, and the proofs have evidently been most carefully read, altogether forming a very attractive volume and a valuable addition to the Ornithologist's library.

—W. E. S.

ERRATA.—In our last issue, page 120, on 2nd, 11th and 12th lines, for "*Serion*" read *Sinon*.