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BULLETIN

OF THE

New York State Museum

FREDERICK J. H. MERRILL *Director*

Vol. 6 No. 31

June 1900

15th Report of the state entomologist

ON

INJURIOUS AND OTHER INSECTS

OF THE

STATE OF NEW YORK

1899

By

EPHRAIM PORTER FELT D.Sc.

State entomologist

ALBANY

UNIVERSITY OF THE STATE OF NEW YORK

1900

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15TH REPORT

OF THE

STATE ENTOMOLOGIST

1899

OFFICE OF STATE ENTOMOLOGIST
Albany, 14 Oct. 1899

To the Regents of the University of the State of New York

GENTLEMEN: I have the honor of presenting herewith my report on the injurious and other insects of the state of New York for the year ending Oct. 14, 1899.

General entomologic features. Excessive injuries by the forest tent caterpillar, Clisiocampa disstria Hübn. were even more pronounced in many localities the present season than last year. On account of this insect's appearing in force on many maples adorning roadsides, the outbreak attracted more than the usual amount of attention and induced vigorous efforts in certain communities to prevent serious injuries. The village authorities of Glens Falls, Saratoga Springs, Herkimer and a few other places were obliged to fight the pest at public expense. The closely related apple tree tent caterpillar, Clisiocampa americana Fabr. was unusually destructive, specially in the western part of the state. The appearance of a brood of 17 year cicadas, Cicada septendecim Linn. in the Cayuga lake region excited considerable interest. Some attention, in an incidental way, has been given to the distribution of certain insects believed to be limited to the upper austral life zone. One of the most important results of this work was to show that the 12 spotted asparagus beetle, Crioceris 12-punctata Linn. was much more generally distributed throughout the state than had been supposed. A personal examination of sugar maples in Syracuse, Batavia and Leroy showed that the sugar maple borer, Plagionotus speciosus Say, had

been very destructive, specially in the latter place. A striking instance of the influence of the press was seen in the great interest manifested last summer in the so-called kissing bug, Opsicoetus personatus Linn. a species which had hitherto attracted very little attention.

Elm leaf beetle. The serious injuries inflicted the last few years by this imported insect, Galerucella luteola Müll. indicated the desirability of educating the public more fully concerning the pest. A lecture, describing local conditions and giving the methods of fighting shade tree pests, with special reference to this insect, was delivered before the Troy scientific association March 6. Substantially the same matter was presented before the Albany institute April 4. In addition, a number of short articles giving timely notice of methods of procedure against shade tree pests were published in local papers. Though the city authorities of Troy made no provision for the general spraying of trees along the streets and in the parks, much was accomplished at private expense. W. H. Gordinier, who the preceding season had operated a power spraying outfit, prepared a second and found more calls for his services than he could meet. Wherever spraying was timely and thorough, most excellent results were obtained. It will be found that in infested localities where no provision has been made for general spraying along the streets and in parks, many valuable trees will be sacrificed. In all work against the elm leaf beetle, it has been found necessary to emphasize again and again the supreme importance of timely and thorough work. This is specially true since the public frequently judges of the value of spraying from that which was done by careless or ignorant persons.

Office work. The routine office work has been much heavier than last year. An unusually large number of insects have been received with requests for information concerning them. The inspection of nurseries conducted under the supervision of the commissioner of agriculture has led to frequent calls on this office for the identification of scale and other insects. The entomologist has also been requested to cooperate with that department in some experimental work and has been called on to give advice and to revise a folder giving the formulas for insecticides. The demand for popular information through the agricultural press has been very gratifying and indicates a hearty appreciation of this work among farmers. The number of letters and postal cards written has been greater than in any previous year and amounts to 1559.

The prosecution of certain lines of field work and investigation has been seriously curtailed by the large amount of proof reading incident to carrying through the press in the summer a large general index of 200

pages embracing (as estimated) 38,000 references. Though this has required an enormous amount of labor, it is believed that the office itself will be amply repaid for the work done in the additional facilities for referring to previous reports.

The office is fortunate in possessing two valuable assistants. C. S. Banks, of Oswego N. Y. was graduated from the Oswego normal school in 1896 and has taken two short courses in entomology at Cornell university. In adddition he has studied and collected insects on his own account for some years. Miss Margaret F. Boynton, of Lockport N. Y. was graduated with honors from Cornell university in 1895, held a graduate scholarship there in science during the college year 1896-97 and since then has done considerable work in natural history.

Pressure of other work has prevented the preparation of the usual detailed notices of injurious insects observed during the year. The scientific results of the season, aside from certain notes submitted herewith, will be presented at some future time.

Publications. An effort has been made to send out timely information through the press, so as to be of service in preventing injury from insect attacks. This is of more importance than at first appears, because many complaints are received when it is too late to apply remedial measures. A number of circular letters were prepared and sent to papers in localities where the insects noticed were likely to cause damage. Remedial measures were indicated in this way for the following insects: white-marked tussock moth, Notolophus leucostigma Abb. & Sm., elm leaf beetle, Galerucella luteola Müll., forest tent caterpillar, Clisiocampa disstria Hübn. and the 17 year cicada, Cicada septendecim Linn. Two short bulletins were issued in April and May, one designed to encourage the study of insects and to aid voluntary observers and the other to give popular instructions for controlling insect depredations on shade trees. A popular account of several of the most important shade tree insects, illustrated by three colored plates, has been prepared for the report of the fisheries, forest and game commissioners. A list of the publications of the entomologist, 95 in number, is given as heretofore.

Collection of insects. The additions to the state collection of insects have been greater than in any preceding year. My assistant, Mr Banks, has spent considerable time in the field collecting forms specially desired. The contributions of insects from correspondents have been larger than heretofore. The additions made by the office force have

been mainly to the biologic collection, as it was felt that special attention to this feature was necessary. Some of the newly acquired material has been arranged to form the exhibit noticed below. As there was no assistant last winter, it was impossible to begin the much needed arranging and classifying of the insects in the state collection, and the numerous duties incident to the period of greatest insect activity prevented such work in the summer. A case containing 68 trays, made after the same plans as those used in the United States national museum, has been provided, together with additional shelving, and with this increased space at disposal, it is planned to get the collection in much better shape the coming winter.

Plans have been completed for adding to the state collection and at the same time increasing the interest in insect life. Students in regents high schools are allowed a nominal sum for insects sent to the state entomologist in good condition, provided a certificate of actual attendance is previously filed with him. As the plan was not made public till September 1, it is too early to report results.

The private collection of the late Dr J. A. Lintner is still in the office and should be bought for the museum, as it is composed largely of native forms from all parts of the state, besides containing many unique specimens.

Division library. The reference library of the division is sadly lacking in many valuable works, though every effort has been made to supply deficiencies. Were it not that the entomologist has enjoyed the use of the private library of his predecessor, the literature at his command would have been very limited. Some provision should be made to supply this vital deficiency. As Dr Lintner's library was built up largely to supplement the volumes possessed by the state, its purchase is most urgently recommended.

Exhibition of insects. In my previous report the exhibition of small insect collections at fairs, grange meetings and other places where farmers assemble was recommended. As a beginning, a collection representing one or more of the various stages of over 100 of the more important injurious and beneficial insects was prepared and placed on exhibition at the state fair at Syracuse and also at the Oswego county fair. A catalogue giving briefly the leading characteristics of the various species and outlining the treatment of those injurious, was distributed. The interest manifested indicates the desirability of making adequate provision not only for similar exhibitions at state and county fairs, institutes

and other gatherings, but also for a complete collection of the injurious and beneficial insects, which should be maintained as one of the permanent exhibits of the museum. Such collections are educators of the greatest value to the agriculturist, who in no better manner can become familiar with the habits of the important insect pests he must fight. A more detailed account of the exhibit at Syracuse will be found on subsequent pages.

Voluntary observers. A corps of voluntary observers in entomology was established for the purpose of bringing the entomologist into closer relations with the public and also to facilitate the gathering of information; for the reception of weekly reports during the growing season from all sections of the state could but result in bringing together many important facts. The value of the service will be enhanced as the work continues, for many of the previous records concerning some of our more common injurious insects are remarkable either for their scarcity or vagueness. There are now 43 observers, representing 39 counties. Most of the reports submitted are valuable, while a few could hardly be improved on. As the purpose of the service becomes better understood, it is expected that more effective work will be accomplished. A summary of the work of this organization will be found on subsequent pages.

Entomological society of Albany. The organization of a local entomologic society, though in no way officially connected with the division, is worthy of mention, because it is an effort to quicken a home interest in this important branch of natural history. The society was organized May 19, now has an active membership of 23, and gives promise of awaking considerable interest in insect life. In order to encourage this movement, the facilities of the office are placed at the disposal of the society and its members, provided there is no interference with official duties.

Acknowledgments. The thanks of the entomologist for aid rendered are due to other workers along the same lines, particularly to those connected with the United States department of agriculture, who have most obligingly complied with every request. The hearty support and encouragement given by the regents have done much to make the work of the year successful, and it is with the greatest pleasure that I acknowledge the same.

Respectfully submitted

EPHRAIM PORTER FELT

State entomologist

NOTES ON INJURIOUS INSECTS FOR 1899

Several insects have appeared in unusual numbers or have attacked crops not previously affected by them. The unusual abundance of the milkweed butterfly, Anosia plexippus Linn. may be mentioned, and of the harvest fly, Cicada tibicen Linn. The destructive work on sugar beets of the red-headed flea beetle, Systena frontalis Foerst. is noteworthy. The beetles had evidently bred beside a large field in Syracuse N. Y. where they were found in great numbers at the time of my visit to the locality, and from there had invaded the patch, giving it a brownish, ragged appearance. The pest was quickly conquered by spraying with paris green. In a few places in the central parts of the state, American elms suffered severely from the larvae of a flea beetle, Disonycha triangularis Say, which devoured the lower epidermis of the leaves. In August the foliage of these trees presented the dried, brown appearance so familiar in the Hudson river valley in connection with the attacks of the imported elm leaf beetle, Galerucella luteola Müll. The pea crop on Long Island was ruined in places by the attacks of a plant louse, since named Nectarophora destructor Johns. One grower lost 20 acres and another 14 through the work of this pest. Another insect which attracted much notice last summer was the so-called kissing bug, which in this state must be considered the masked bed bug hunter, Opsicoetus personatus Linn. Undoubtedly some persons were bitten by this insect, but many of the newspaper stories rested on a very slender foundation in fact, at least so far as the identity of the creature was concerned.

Raspberry saw fly. The pale green, spiny larvae of this insect, Monophadnoides rubi Harr. were received from Newark, Wayne co. with the statement by C. H. Stuart that they had been very injurious to raspberry plants. He wrote as follows: "The leaves of the infested patch looked today [June 10] like those of a badly infested currant bush. There is hardly a leaf in the field without several holes in it, and most of the older leaves are eaten to threads." At Oneida, Madison co. two acres were defoliated by this insect, as I was informed by J. T. Thompson. They had occurred in small numbers the preceding season in the latter locality. The badly eaten raspberry leaves received the latter part of May from Mrs H. E. Robinson, of North Nassau, Rensselaer co. had probably suffered from an attack of the same insect, though no larvae were found on those submitted for examination.

Locust borer (Cyllene robiniae Foerst.) Some half dozen of the pretty beetles belonging to this species were received September 20 from J. H. West of Poughkeepsie N. Y., with the information that they had practically destroyed a very handsome young locust tree, which to within two years had been in excellent condition. The attack was first observed in the early fall of 1897. The trunk, about 6 inches in diameter, was full of holes to within 15 or 20 feet from the ground and "the outside was covered with these bugs to the top." The tree was treated with benzine and washed several times with a stream from a hose. Last year no insects were noticed, but for the past few weeks the beetles have been very abundant. Several limbs and one of the two main trunks were so badly riddled with burrows that they broke with their own weight. A portion of the infested tree, which came to hand later, showed that the above account was not an exaggerated one. The interior of the branch, one of the best on the tree, was badly honeycombed with burrows and here and there, where the beetles had emerged, the bark was badly undermined and perforated. The tree had evidently been oviposited on freely, as irregular clusters of ovoid white eggs, about $\frac{1}{8}$ inch long and $\frac{1}{24}$ inch in diameter, were found in cavities beside some burrows, and single eggs, tucked in longitudinal crevices of the young bark, were numerous.

Elm leaf beetle. In Albany, Troy and vicinity this pest, Galerucella luteola Müll. has been as injurious as in preceding years, except where it has been controlled by spraying with arsenites. As it has established itself in force at Worcester Mass. and in a number of towns in the same county, all of which are probably within the transition life zone, it is very likely that in the course of time this beetle will make its way over a much larger portion of the state of New York than it has hitherto been supposed the insect could occupy. But I have yet to learn of its establishing itself in territory in this state outside the upper austral life zone, though it probably will, if it can exist in the places named in Massachusetts. In both Albany and Troy large amounts of arsenate of lead have been used with most excellent results, when the applications have been timely and thorough. W. H. Swift & Co.'s prepared paste was used at the rate of 4 pounds to 200 gallons of water. In Troy over 1500 pounds of this insecticide was applied to the trees, and the person using it was highly pleased with the results, specially as the poison was found in the autumn on fallen leaves last sprayed May 22. Probably an equal amount was used in Albany. Troy furnishes an interesting example of what the elm leaf beetle can do. Its ravages there have been

even worse than in Albany, and yet the city authorities did nothing to check it, except some spraying in public parks. The direct result of severe and general injury to the trees was a great demand for spraying apparatus operated by skilled men. One individual fitted up two power spraying outfits of a most approved type, beginning operations with the first last summer and with the second the present season. He has had more work than he could attend to, and it is to be presumed that he has lost no money in running them.

Asparagus beetles (Crioceris asparagi, Linn., C. 12-punctata Linn.) It has been my conviction for some time that the common asparagus beetle was more generally distributed in the state than is shown by previous records. The attention of voluntary observers was called to this insect and specimens were received from several localities. Last spring the 12 spotted form was taken in two or three places about Albany, and this, in connection with its occurrence near Rochester for a number of years, its discovery near Buffalo last year and at East Amherst and Newark the present season would indicate that this form has also attained quite a general distribution. Personal observations have enabled me to locate both of these insects in several places where they have hitherto been unrecorded. Crioceris asparagi is now known to occur in the following localities: Albany county, Albany, Menands; Dutchess county, Poughkeepsie; Erie county, Buffalo, East Amherst; Essex county, Ticonderoga; Genesee county, Batavia, Leroy; Greene county, Athens, Catskill; Livingston county, Geneseo; Madison county, Lebanon, Oneida; Monroe county, Brighton; Oneida county, Maynard, Vernon, Whitesboro; Onondaga county, Syracuse; Ontario county, Geneva; Orange county, Cornwall, Westpoint; Oswego county, Oswego, Oswego Center; Putnam county, Garrisons; Rensselaer county, Troy; Saratoga county, Mechanicville; Ulster county, Kingston; Wayne county, Clyde, Newark; Yates county, Crosby. Crioceris 12-punctata is known to occur in the following localities: Albany county, Albany; Erie county, Buffalo, East Amherst; Genesee county, Batavia, Leroy; Kings county, Brooklyn; Monroe county, Brighton; Onondaga county, Syracuse; Oswego county, Oswego Center; Queens county, Glendale, Richmond Hill; Tompkins county, Ithaca; Wayne county, Newark; Yates county, Crosby. Dr James Fletcher, entomologist of the Central experimental farm of Canada, informs me that both species of asparagus beetles are abundant in the Niagara district and as far back as Hamilton, Ontario.

The common asparagus beetle is probably well distributed over Long Island and the 12 spotted form occurs there. From the records at hand, it appears probable that the common asparagus beetle has established itself in all sections of the state included in the upper austral life zone. The 12 spotted form has been found in as widely separated localities in the western part of the state as the other species, and it will probably invade all territory now occupied by C. asparagi, if it has not done so to a large extent already. As the presence of C. 12-punctata at Glendale and Richmond Hill for at least four years has been known to L. H. Joutel, who kindly gave me these localities and informed me that it was common about Brooklyn, it is very probable that this species has obtained a rather general distribution over, at least the western end of Long Island. Dr L. O. Howard has lately added to the list of localities the following: Chemung county, Elmira; Monroe county, Penfield; Ontario county, Geneva; Suffolk county, Riverhead.

Willow butterfly. The caterpillars of this species, Euvanessa antiopa Linn. have been objects of more complaints than usual and doubtless were more injurious to elms than they had been for some time. The offenders were members of the first brood and were noticed mostly in early June. At Glens Falls, C. L. Williams reports that the caterpillars were widely distributed over the village and were doing some damage. They were received from Rhoda Thompson of Ballston Spa with the complaint that they were doing considerable injury. From Crosby, Yates co. Cyrus Crosby sent examples and said that they were stripping elms. From Port Jervis came a similar complaint by J. M. Dolph regarding a black caterpillar, probably this species, that was defoliating Carolina poplars. The insect was very abundant in Albany and many caterpillars were killed by persons connected with the public parks. This species was also received from Troy, Sandyhill, Palatine Bridge, Chatham, Binghamton N. Y. and Clinton Mass. In each case the abundance of the caterpillars had attracted the sender's attention. They were undoubtedly more abundant than usual and caused considerable injury in many localities, but as they are gregarious in habit damage done by them is much more apparent than that produced by species which feed singly.

Forest tent caterpillar. The ravages of this insect, Clisiocampa disstria Hübn. probably never excited more interest in this state than during the present season. Not only were large numbers of trees

defoliated in many parts of the state, but the pests were present in force on shade trees in the streets of many villages, and by dropping on passers, crawling under foot, occupying piazzas and sides of houses, brought themselves to the attention of many who would otherwise have been indifferent to their presence. The loss suffered through this pest last summer can never be expressed in exact figures, but, when it is remembered that these caterpillars inflicted severe injuries in about half of the counties in the state, in not a few instances defoliating tracts of many acres in extent, it is seen at once that the total damage inflicted must be enormous. Outbreaks of this insect are more or less local, and usually do not last more than two to four years in a place, hence in some sections the pest was much more injurious than in previous years, while in others it was not as abundant. From Otsego county came as distressing reports as from any place. The following is from a letter by Rev. H. U. Swinnerton, of Cherry Valley: "Stopping trains is not a circumstance to what we have here in the way of stopping things with worms. We would stop the progress of the age, if it got across the way our worms were going." He then proceeds to narrate how, because of the abundance of the caterpillars, the train he was aboard was stalled three times between two stations about eight miles apart. Delaware county appears to have suffered very much, as the pest has been in certain localities for the past two years. H. E. Wilford of Andes writes: "We are being devoured . . . by maple worms. Can you give us any assistance?" Dr J. N. Wright of Grand Gorge informed me that the forest worm was making bad work with the maples in his vicinity, and requested information regarding the pest. In many parts of Greene county this insect was very destructive. In Lewis county C. C. Merriam of Lyon Falls writes that the forest worms are worse than he had ever seen them in his life. Many similar expressions could be taken from the letters of correspondents living in other parts of the state. During the latter part of May and in early June a large amount of the correspondence of the office related to this pest. Had it not been for most energetic efforts on the part of both local authorities and private parties, a large proportion of the thousands of sugar maples adorning the village of Saratoga Springs would have been defoliated. So serious was the situation that a special circular was issued and distributed through the village, in order to place in the hands of every person concise directions for controlling the pests. Shade trees in Albany, Schenectady and other cities and towns along the Mohawk river were attacked, and in a number of instances the trees were stripped of leaves. In certain towns 10 cents a

quart was offered for all cocoons collected. As a result, 1350 quarts were bought by the village authorities of Glens Falls, 744 by Saratoga Springs, 450 by Mohawk, and reports of similar action in several other places also came to me.

An examination of trees in infested localities has shown that many egg clusters can not be collected to good advantage as they are frequently found 20 to 50 feet from the ground. But as a large proportion of the eggs occur on twigs within 20 or 30 feet of the ground, something can be accomplished in winter by cutting off the infested twigs where accessible and burning the egg clusters, specially if the trees are not very large. But in the case of good sized maples, it is very doubtful if this could be done to advantage, and even with moderate sized trees there would probably be enough inaccessible egg belts near the top to stock the trees with a host the coming spring. At best, the collection of eggs of this species can hardly be regarded as more than one of several repressive measures, no one of which can be depended on in itself to prevent serious injury. The egg belts can be seen best on a bright day and if there is a little snow, it will be easier to find all cut twigs dropped to the ground. The collection and burning of the eggs is necessary in order to insure thorough work. A long handled pruning hook is of great service in cutting off the infested twigs.

As soon as the presence of the young caterpillars (indicated by the thinness of the foliage of the upper branches) is detected, much can be accomplished by crushing them as they collect on the limbs or by dislodging them with a brush or torch. If the latter is used, care must be exercised not to injure the tree. Many caterpillars can be jarred from the tree by using padded mallets or even violent shaking will cause some to drop. Driving the caterpillars from the trees by jarring or otherwise, must be followed by some means of preventing their ascent. A band of cotton batting eight to 10 inches wide tied tightly in the middle around the trunk and the upper portion turned down over the string and allowed to hang loosely is a difficult obstacle for caterpillars to surmount, so long as it remains dry. Wide bands of paper coated with tar or of sticky fly paper will also prevent the pests from ascending for a time. A band composed of equal parts of lard and sulfur is said to be an effective barrier. In one locality bands of cottolene were used to prevent the caterpillars from climbing trees. When the pests are abundant, it will not do to depend entirely upon shaking and bands, the dropping creatures must be collected on sheets spread under the trees before they are jarred and then killed, or crushed as they collect under the bands. Nothing but

most vigorous methods will protect badly infested trees from severe injury. The masses of caterpillars found on the larger limbs and on the trunk can be crushed in large numbers with a stiff broom or thickly gloved hands. A more agreeable method is to spray these clusters with kerosene emulsion or with whale oil soap solution (one pound to four gallons), or to pour boiling water over them.

This pest can be controlled by spraying with arsenical poisons where the trees are not too large for the apparatus at hand. If the caterpillars are nearly full grown and many are crawling to the sprayed trees from others, it is perfectly possible that all the foliage will be devoured before the pests have eaten enough poison to kill them, but under most conditions there need be little fear of the arsenical spray proving ineffectual if it is properly applied. The cost attendant upon this method will lead people to depend largely on other means.

After the damage has been done, many of the insects are within man's power and can be killed in their cocoons. From about the middle to the last of June thousands of cocoons can be collected with but little labor and if this is done opportunity should be given the beneficial parasites to escape before the cocoons are destroyed. Every healthy female pupa killed means one less egg mass to produce its approximately 150 or 200 hungry caterpillars another season.

It is believed that by fighting this insect in the egg, caterpillar and pupa states our shade trees can be preserved from serious injury. Native birds should be protected in all localities and, specially in forests, they must be our principal allies in subduing this terrible pest. Robins, orioles, chipping sparrows, cat birds, cuckoos, red eyed, white eyed and warbling vireos, cedar birds and nuthatches have been observed feeding on this insect by Caroline G. Soule. E. H. Forbush, ornithologist to the state board of agriculture of Massachusetts has kindly supplied me with the following list of birds observed feeding on forest tent caterpillars: oriole, black billed cuckoo, yellow billed cuckoo, crow, blue jay, redstart, nuthatch, woodthrush, chewink, black and white creeper, red eyed vireo, flicker and scarlet tanager. V. H. Lowe has observed the black capped chickadee feeding on the eggs. Prof. C. M. Weed states that the robin, chipping sparrow, yellow bird and English sparrow feed on the moths.

17 year cicada. Considerable interest was manifested in the appearance in the western part of the state of brood 19 of Cicada septendecim Linn. The following list of localities, incomplete though it be, is given as a matter of record. Cayuga county: the cicada

was reported very abundant at Union Springs by J. Jay Barden and as present at Auburn by Joseph Foord. Much damage was said to have been caused in the former locality, but later this report was modified as the injury proved to be less than was at first supposed. Livingston county: W. R. Houston reported the cicada to be in numbers at Geneseo, present at Groveland and very abundant at Avon. Monroe county: Lewis Hooker found it at Rochester and M. S. Baxter sent in specimens from Penfield. Onondaga county: Miss A. M. Armstrong found it in large numbers at Syracuse. Yates county: Cyrus Crosby reported the cicada present in greater or less numbers at Dresden, Bellona, Long Point and Mays Mill.

Drepanosiphum acerifolii Thos. The drouth, specially in the western part of the state, has apparently been very favorable to this beautiful species. At Onondaga Valley, Syracuse, in early September many maple leaves had fallen, those in the upper portions of the trees were badly curled and much honeydew was seen on the foliage. The trees proved to be badly infested with this plant louse, which was doubtless at least partly responsible for the bad condition of the trees. At Batavia many infested maples were seen but the injury was not so great as at Syracuse. The work of this species was also observed at Amsterdam and in Albany, but it was doing less damage in the latter place. A few Syrphid larvae were found on the infested trees.

Experiments with arsenical poisons. Comparative experiments with a few of the more important arsenical poisons were conducted last spring in connection with field observations. Vigorous elm leaf beetles, Galerucella luteola Müll., were collected May 4 and 10 placed in each of six breeding cages. All were provided with twigs of English elm bearing tender leaves. The ends of the twigs were placed in small bottles of water in order to keep the foliage fresh. All were treated alike, except that the leaves in cages no. 1–5 were thoroughly sprayed with poisons as given in the table below. An atomizer was used for spraying and whenever it was found necessary to renew the leaves, because of their wilted condition, the foliage was treated as at first and the spray allowed to dry before the fresh food was placed in the cage. This prevented any disturbance in feeding owing to the leaves being wet. In starting the experiment, the sprayed leaves were placed in the cages wet because that would be their condition after spraying outdoors, though in most cases the water would evaporate much more quickly than in the cages.

EXPERIMENTS WITH

DATE	PARIS GREEN, 1 LB. to 100 GAL. 35 GR. TO 2 QTS (1)	LONDON PURPLE, 1 LB. TO 100 GAL. 35 GR. TO 2 QTS (2)	PARAGRENE, 1 LB. TO 100 GAL. 35 GR. TO 2 QTS (3)
1899 My 4	Leaves sprayed about 4.45 p. m.	Leaves sprayed about 4.45 p. m.	Leaves sprayed about 4.45 p. m.
5	A number of holes have already been eaten in the leaves.	Beetles apparently have eaten nothing.	A few beetles on the leaves but no signs of feeding.
6	Beetles have fed quite a little, spray nearly dry.	Beetles have not fed so much as in no. 1, leaves wet with spray.	Beetles have fed little, spray nearly dry.
7	Beetles feeding freely, one on its back and just alive, spray has dried.	Beetles have apparently fed but little, 2 dead, spray has dried.	Beetles fed some, spray dry. Leaves eaten less than in either no. 1 or 2.
8	Beetles feeding rather freely, 1 dead.	3 dead, but little eaten apparently.	1 dead, leaves apparently eaten but little.
3.55 p.m.	More foliage was eaten than in other cages with poisoned leaves. 1 nearly dead, but 8 found. Fresh leaves supplied.	Very little of the old foliage eaten, beetles possibly may have died from other causes than poison. Fresh leaves supplied.	Old leaves eaten but little. Fresh leaves supplied.
9	Considerable eaten, 2 dead, 1 nearly so.	Beetles feeding considerably.	Considerable eaten.
10 1.30 p.m.	4 dead, remainder feeding freely.	2 dead, others feeding freely.	3 dead, others still feeding.
11	1 dead, remaining one on leaf.	1 nearly dead.	2 dead, 3 nearly so.
12	1 dead.	3 dead.	4 dead.
13			
14			
15			
16			
17			
18			

ELM LEAF BEETLE

LEAD ARSENATE, 11 OZ. LEAD ACETATE, 4 OZ. SODA ARSENATE TO 40 GAL. 60 GR. LEAD ACETATE, 22 GR. SODA ARSENATE TO 2 QTS (4)	LEAD ARSENATE, 11 OZ. LEAD ACETATE, 4 OZ. SODA ARSENATE TO 80 GAL. 30 GR. LEAD ACETATE, 11 GR. SODA ARSENATE TO 2 QTS (5)	CHECK CAGE FREE FROM POISON (6)
Leaves sprayed about 4.45 p. m.	Leaves sprayed about 4.45 p.m.	Leaves sprayed about 4.45 p. m.
Leaves eaten about as much as in no. 5. Most of the beetles on the leaves.	A little more feeding has been done than in no. 1 and more beetles are on the leaves.	The beetles ate considerably more than any on poisoned leaves. As the sprayed foliage is still wet, this has probably discouraged feeding.
Beetles feeding considerably. 1 lot of eggs, spray dry.	Beetles feeding considerably (not quite as much as in no. 4), leaves still wet in places.	Beetles feeding readily. Have eaten considerably more than in other lots.
Beetles feeding readily, 3 loose eggs on bottom of jar.	Beetles feeding considerably (little less than in no. 4), spray has dried.	Beetles feeding much more than those on poisoned foliage.
Leaves eaten considerably, rather dry. Old leaves removed and examination shows that they have been eaten but little. Fresh leaves supplied.	Leaves eaten considerably, food becoming dry. Fresh leaves supplied. An examination of the foliage shows that a relatively small proportion of the old was eaten.	Leaves much more eaten than those poisoned.
Considerable eaten.	Beetles have eaten more than in no. 1–4.	Beetles eating much more than in no. 1–5.
1 dead, others on foliage, which has wilted. Leaves eaten considerably, fresh supplied at 4 p. m.	Beetles have eaten considerable. Fresh food supplied at 4 p. m.	Beetles eating much more than in no. 1–4 and rather more than no. 5. But 9 beetles, fresh food supplied at 3.15, 3 egg clusters containing about 60 eggs found.
Leaves eaten considerably, beetles all on the foliage.	2 nearly dead, others feeding some.	Beetles feeding some on fresh foliage.
1 dead, others appear sick. Considerable eaten,	3 dead, 3 nearly so, others feeding.	Beetles feeding freely, 1 cluster of eggs.
2 dead, 2 nearly so. Leaves eaten considerably. Fresh food supplied at 5 p. m.	2 dead, 1 nearly so. Foliage apparently not eaten much. Fresh food supplied at 5 p. m., but 3 beetles.	
1 dead, 2 nearly so. Leaves eaten some at 3.30 p. m.	1 dead, 1 apparently sick, but little feeding at 3.30 p. m.	
2 dead.	1 nearly dead.	
1 dead.	1 dead.	1 dead. Food in bad condition, as they had received no fresh leaves since the 10th.
	Last one sickly.	
1 practically dead.	1 dead.	

The above record shows that arsenate of lead is slower in action than either of the other poisons and that in this experiment the smaller amount of the arsenate was fully as effective as the larger. Examinations showed that apparently more of the foliage was eaten in no. 5 than in no. 4, and if that be the case, the apparent anomaly may be explained, as the beetles in no. 5 probably got a fatal dose as soon as those in no. 4, in spite of the fact that in no. 4 the poison was double strength. Though the arsenate of lead operates more slowly, it was clearly shown by last summer's experience in the field that when the application was thorough and timely, shade trees suffered very little from attacks by the elm leaf beetle, and as this poison remains an indefinite time on the foliage it can hardly be surpassed as a substance for controlling such an insect as this elm pest, which feeds for a considerable part of the growing season.

The following record of an experiment with nearly full grown forest tent caterpillars shows that this species can be controlled with a poisonous spray even when the caterpillars are full grown. It also illustrates the effective, though somewhat slower action of arsenate of lead.

EXPERIMENTS WITH FOREST TENT CATERPILLAR

1899 June 6	Five caterpillars were put in a jar with maple leaves sprayed with 1 lb. paris green to 200 gal. water.	Five caterpillars were put in a jar with leaves sprayed with 4 oz. soda arsenate and 11 oz. lead acetate to 160 gal.
8	2 dead, 1 apparently dying, leaves comparatively fresh. Caterpillars have fed considerably.	1 nearly dead, caterpillars have fed only a little.
9	1 lively, 1 spun up, 1 nearly dead, leaves much wilted.	1 dead, leaves much wilted.
10	Freshly sprayed leaves were supplied.	1 spun up. Freshly sprayed leaves were supplied.
12	2 dead.	1 dead, 1 lively, 1 spun up.
	Moth never emerged.	Moths never emerged.

Some maple trees in Albany badly infested with forest tent caterpillars were sprayed on May 22 with W. H. Swift & Co.'s preparation of arsenate of lead and on the 27th dead caterpillars were abundant on the trees and around the base of the trunks, a striking illustration of the effectiveness of this poison. Further, I have elm leaves which were last sprayed May 22 and on October 25, after they had fallen, the poison was found in considerable quantity on them, showing the adhesiveness of the preparation.

VOLUNTARY ENTOMOLOGIC SERVICE OF NEW YORK STATE

The establishment of this service was the result of the conviction that the office should be brought into closer relations with the public it is designed to serve, and that, if properly managed, such an organization would result in bringing together much valuable information. It was the aim not only to obtain facts of immediate value, that is, those relating to the destructiveness of a pest, its occurrence in numbers, etc. but also to begin records which in the course of time would prove of great service in determining to some extent the causes governing the distribution of insects and their relative abundance, or effecting changes in habit.

A circular letter was prepared in the winter months and sent to parties in all sections of the state. It outlined the work as follows:

To all interested in entomology:

New York state with its enormous and varied agricultural interests suffers immense losses yearly from the depredations of insects. Its large area renders it impossible for one man, or even a moderate force of men, to observe properly the many insects within its borders, and warn the inhabitants of threatened loss by their attacks. In order to bring this office into closer relations with the public and render it of greater practical value, it is desired to establish an auxiliary force of voluntary observers who will serve without pay, and send short reports to the state entomologist weekly during the growing season and less frequently at other times. Though few entomologists will be able to take up this work, many valuable facts regarding the relative abundance of insects, the extent of their depredations, the effect of climate, soil and altitude, the distribution and spread of insect pests, etc., may be collected from all sections of the state. As necessity arises, directions will be issued in regard to what insects should be looked for and where the observations should be made.

Voluntary observers will be appointed by the regents on the recommendation of the state entomologist, and will receive copies of future state entomologic publications. Each person will be given due credit in these publications for all his observations and contributions of specimens, and in the course of a year should learn many valuable facts, as all inquiries for further information concerning an insect or in regard to its identity will be cheerfully answered. Those wishing to join in this volunteer service are respectfully requested to communicate at once with the undersigned, and, as an earnest of what may be expected in the future, to send in a few of their more important observations on insects of last year. All observations should be recorded, as they are always of value, and the absence of records is difficult to supply in later years. Soon after the appointments are made, appropriate stationery will be sent to those selected.

The plan offers present correspondents the advantage that it will systemize their work and increase the interest of all in the important study of applied or economic entomology. If the recipient of this communication does not care to undertake personal observations, he is requested to place it in the hands of one who will be interested in taking part in the service.

It was the intention to have approximately one observer in each county, though it was by no means expected that every county would be represented. From the list of applicants, the appointment of 39 persons representing 33 counties was recommended April 19. This number was augmented by the subsequent appointment of eight others and in turn was reduced by the resignation of four. One resigned on the receipt of the stationery, on account of its appearing too official. Another was forced to give up the work before its inception, because of a severe illness, and two others found themselves unable to comply with the requirements from pressure of other duties. On May 16 a circular letter with copies of bulletin 26 was mailed to 42 observers. The following extracts from the letter are given to show the general scope of the work:

To voluntary observers :

It is not expected that many will have time to prepare long reports. I desire specially to gather in brief form the observations and experiences of practical men with insects. Under no circumstances, omit the weekly report during the growing season, for even negative results have value. It is most desirable that the reports should be regular and received in Albany about the same time, so that they may be collated and the more valuable facts made known. For this reason each observer is urged to mail his report every Wednesday or Thursday in order that it may be received at the office on Friday of each week. 10 stamped envelops, with paper, are sent herewith and more will be supplied as needed.

The matter of more general interest in the reports will be brought together in brief form and supplied to agricultural papers, each observer receiving full credit for his work. For the most part, give attention to species of economic importance, such as those injuring plants of value, annoying live stock or proving a nuisance in the household. Inquiries regarding insects will be welcomed and answered as fully as practicable. In most cases the reports will be more valuable if accompanied by specimens of the insect or its work, preferably both. Useful hints for collecting and observing insects will be found in *Museum bulletin 26*, mailed under separate cover. The species mentioned under " Distribution of insects " are of special interest and should receive close observation from every fruit grower and farmer.

Finally, do not become discouraged if at first there appears little that is new or of interest, but record what is seen, because one object of this organization is to ascertain actual facts regarding insect life. In time the eye will become trained and many things, hitherto unnoticed, will be observed, and much of this will be of considerable value not only to the

scientist and the public, but to the observer. Though the appointments were unfortunately delayed longer than was desired, it is a decided advantage to begin such work when there is plenty to see.

In work of this nature it is difficult to make definite statements regarding the value of the service. There are now 43 observers on the list, representing 39 counties. If we summarize the work to Saturday, August 12, since which date there has been relatively little to report on account of the dry weather and the natural partial cessation of insect activities, a total of 200 reports have been received, a little over 15 for each of the 13 weeks, or an average for each observer, if we deduct the names of those who for some cause have failed to send in one report, of five each. On looking over the record it will be found that three observers have submitted but one report during the season; four, two reports; four, three reports; and six, four reports. Though these numbers are low for a period of 13 weeks, it must be remembered that this is a voluntary service on the part of the individual and in some instances was undertaken simply to help on what was regarded as a good work. During this period some have been ill, others have changed their plans and have found themselves away from home much more than was expected in the early spring. A few have sent in reports only when they saw something, and I have been assured from certain localities that no injurious insects had proved troublesome. While an entomologist, who had the training and the leisure to look for insects, would find much of interest, the case is by no means the same when a busy man undertakes the task with little or no previous training. Though a number have sent in relatively few reports, others have been most faithful and have proved themselves valuable agents. During this period, two observers sent in 11 reports; two, 10; and three, nine. As is well known to naturalists, the value of the report lies in its contents and not in its length. In this respect, most of the reports have averaged very well, while those of a few observers could hardly be improved. Abridged summaries of the reports received from the voluntary observers have been printed weekly in the *Country gentleman*, published at Albany, and almost weekly in the *New York farmer*, published at Port Jervis. Copies of the earlier summaries were sent to several other agricultural papers having a circulation in New York state, but, as they did not care to use the matter, no more were sent to them.

In summarizing, it will be interesting to see how the establishment of the organization has accomplished the desired ends. The correspondence of the office has been very much larger the present season than in any since my connection with it. Some of the increase was undoubtedly due

to other causes, but a considerable proportion, aside from correspondence with the observers themselves, I attribute to the activity of the voluntary observers in advising others where to apply for information. One man has been particularly active in this respect. It has been a source of gratification to note that almost every outbreak of injurious insects in the state has at some time or other been brought to my notice through the voluntary observers, even though my first knowledge of it may have come through other channels. I must add that in every instance the reports of these agents have been conservative and trustworthy, so far as I know. Toward the latter part of the summer the observers got hold of the idea much better than earlier, and the later reports have maintained a higher average. It is yet early to state much as to the value of the reports in settling questions regarding influences affecting insects. That can be determined only by observations extending through a series of years. But from what is at hand, it seems very probable that our expectations in that respect will not be disappointed.

For some reason or other, nothing was heard from three persons after they had been appointed voluntary observers. They are F. Johnson, Westfield, Chautauqua co., R. R. Livingston, Cheviot, Columbia co., and F. B. Lester, Westport, Essex co. Summaries of the reports received from the other observers are given below.

Summaries of reports

The names inserted in brackets indicate determinations by the entomologist. The others are presumably correct except where questioned. The dates given after the records are those of the reception of the reports, and are from one to three days later than the writing of the report.

Albany county (E. T. Schoonmaker, Cedarhill)—Cicada [C. tibicen] has appeared in limited numbers. Imported cabbage worms [Pieris rapae] numerous and destructive. July 17. Katydids have appeared this week, cicadas are more numerous. Aug. 8. Second brood of Colorado potato beetles [Doryphora 10-lineata] have appeared in limited numbers. Plant lice are doing considerable injury to elm leaves. Aug. 21. Harvest fly [Cicada tibicen] is still heard. Fall web worms [Hyphantria cunea] are plenty and doing some damage. Striped black walnut caterpillar [?Datana species] is causing some injury. Sep. 5.

Broome county (J. Mace Smith, Binghamton)—Apple tree tent caterpillar [Clisiocampa americana] is exceedingly abundant

and has done very much damage where the trees have been left to themselves. Forest tent caterpillar [Clisiocampa disstria] relatively scarce. In a few instances the leaves of currant bushes are nearly destroyed by plant lice [Myzus ribis]. June 3. Apple tree tent caterpillars have spun their cocoons. The birds have been very industriously destroying them, specially the wax wing, which more than all others seemed to have no other business on hand. Willow butterfly larvae, Euvanessa antiopa, have done some damage to elms and have stripped leaves from single limbs but in no case more. June 19. Potato beetles [Doryphora 10-lineata] are fewer in number than for years and are consequently doing less damage. Squash bug [Anasa tristis] and striped cucumber beetle [Diabrotica vittata] have been less injurious than usual. July 7. Since July 15 I have found many egg masses of the apple tree tent caterpillar and of the forest tent caterpillar that had been destroyed by insects, but have been unable to find the one doing it. The caterpillar of the cabbage butterfly [Pieris rapae] is as destructive as ever. Aug. 8.

Cayuga county (Joseph Foord & Sons, Auburn)—Cicadas [Cicada septendecim] are here in our vicinity. They were discovered June 5. [On this latter date J. Jay Barden reported the same insect in vast numbers at Union Springs] June 9. Larvae of [Schizura unicornis] are attacking plum trees in this vicinity. Aug. 29.

Columbia county (G. T. Powell, Ghent)—There has been an entire absence of pear psylla [P. pyricola] in my orchard, though I have been obliged to fight it for the past 10 years, losing 700 trees and 10 crops of fruit. Apple tree tent caterpillar [Clisiocampa americana] is not so numerous as usual; spraying with arsenic is very effectual. Apple aphis [Aphis mali] is serious on young trees but can be controlled by spraying with kerosene and water. The bud moth [Tmetocera ocellana] is the worst pest of the season. Pear midge [Diplosis pyrivora] is found in every Lawrence pear. We send men into these trees and cut off the pears and burn them. May 24. Apple aphis is persistent on young trees, cherry aphis [Myzus cerasi] is developing. Forest tent caterpillars [Clisiocampa disstria] have shown a wonderful increase in the past week. They are infesting the maples specially, but are numerous on elm, larch, apple, pear, oak and ash trees. June 6. Striped squash beetle [Diabrotica vittata] has made havoc with squashes, melons and cucumbers. An application of lime and

arsenic has served to keep them off the leaves but they go into the ground and attack the stalk. Squash bugs [Anasa tristis] are also abundant. Four lined leaf bug [Poecilocapsus lineatus] is doing much damage to currants, specially to young plants. June 15. Wire worms have been very destructive the past two weeks to cabbage and cauliflower. No evidence of second brood of pear psylla or of the currant worm [Pteronus ribesii]. White arsenic has been more effective in spraying than paris green. July 1. The pear psylla has begun to appear. The first brood was very light, scarcely an adult to be found, but the dry weather has been favorable to the hatching of every egg. The trees have been sprayed with 8% of kerosene, but as the insects are covered each with a globule of honeydew, the insecticide is very ineffective. If dry weather continues, the pear crop will be ruined. July 5. Timely and heavy showers have done much to check the pear psylla; spraying with kerosene emulsion, 1 to 15, is more effective immediately after a rain. Apple aphis is persistent. Lady bugs very abundant. Fall web worm [Hyphantria cunea] is now working. July 14. Fall web worm begins to show its work on fruit and forest trees. Apple aphis is very persistent, injuring many trees. July 28. A few late caterpillars [possibly Clisiocampa disstria, though more likely Datana ministra or Schizura concinna] are found on the apple trees. Apple aphis still persistent. Aug. 12. Borers [probably Saperda candida] unusually numerous and active in apple and quince trees. Large numbers of eggs have been deposited and as many as 30 young larvae have been taken from a tree. Aug. 17.

Delaware county (F. M. Simpson, Delhi)—Forest tent caterpillar [Clisiocampa disstria] in the sugar maples and causing much injury. They attack trees set out last year and completely defoliate them. Old trees suffer very much. The caterpillars begin in the upper branches and denude the limbs. Some trees have been protected by shaking the caterpillars from them and fair results have been obtained by spraying with paris green and water. May 25. Forest tent caterpillar still working havoc in this village and vicinity. June 2. I find that the groves of maples where the trees were partly defoliated by the forest tent caterpillar are completely destitute of leaves, while the foliage is still green on trees that were not attacked. Sep. 30.

Dutchess county (H. D. Lewis, Annandale)—Cold weather has somewhat checked insect activity, but even taking this into consideration,

there appears to be a short crop of injurious insects. Apple tree tent caterpillars [Clisiocampa americana] are not up to the average, and those seen appear to be less active. May 9. A few elm leaf beetles [Galerucella luteola] have made their appearance in the southern part of the township. Insect pests very scarce. May 27. Work of forest tent caterpillars [Clisiocampa disstria] not seen. Aphids are appearing somewhat, specially the black cherry aphis [Myzus cerasi]. Potato beetles [Doryphora 10-lineata] not abundant. June 2. A decided increase in plant lice of all kinds, in spite of the dry weather. One attack by forest tent caterpillars on about 10 or 12 trees has been brought to my attention. Potato beetles more numerous. Rose bugs [Macrodactylus subspinosus] very numerous. Currant worms [Pteronus ribesii] abundant. June 16. Apple aphis still increasing in numbers and doing considerable injury to recently set trees and in some cases to the new growth of mature trees. June 30. A few trees in this section badly affected by elm leaf beetle. The pest is not so bad as two or three years ago but worse than last year. Work of the codling moth [Carpocapsa pomonella] is beginning to show. I am satisfied that if orchards were persistently sprayed and all wormy fruit destroyed this pest would be much reduced. July 29.

(Ruth Sherwood, Fishkill)—Apple aphis [Aphis mali] present in numbers. Grape vine flea beetle [Haltica chalybea] is doing much injury by eating out the buds. May 20. The foliage of forest and fruit trees shows no injury from insects. Grape vine flea beetles inflicting much injury on young apples. Horse flies [Tabanidae] very annoying to cows. June 10.

(Franklin A. Taber, Poughkeepsie)—Cold, dry weather has been unfavorable for many insects. A few apple tree tent caterpillars [Clisiocampa americana] and currant worms [Pteronus ribesii] have appeared. Black flea beetles [Epitrix cucumeris] have appeared on early potatoes. No Colorado potato beetles [Doryphora 10-lineata] in sight, not even an old one. A few aphids on sour cherries. Larvae of grape vine flea beetle [Haltica chalybea] attacking grape leaves, most numerous next to the woods on the north side of the vineyard. May 25. This season has been marked by fewer insect pests than for years. There was a late crop of potato beetles which did little damage. An insect has been working in the stems of potato vines. Aug. 11.

Erie county (M. F. Adams, Buffalo)—The syringa borer, Podosesia syringae, was found three years ago infesting and badly

injuring several hundred young ash trees. It was found that while the young larvae could be dug out, it was more practicable to kill the older ones by injecting carbon bisulfid in the burrows and sealing the holes with soap, or else using small pieces of potassium cyanid in place of the carbon bisulfid. This work can be done to best advantage in the fall or early spring. The carbon bisulfid injures the wood to some extent. May 24. Apple tree tent caterpillar [Clisiocampa americana] very abundant in the vicinity of Buffalo, but there are no signs of the presence of the forest tent caterpillar [Clisiocampa disstria]. Young larvae of the white-marked tussock moth [Notolophus leucostigma] were observed issuing from the egg May 29, and on the same date young of the apple tree bark louse [Mytilaspis pomorum] were crawling in great numbers on the limbs of apple trees. On this date a fully developed Agrilus anxius was removed from a birch tree and it was found that great numbers had pupated, though a few were still in the larval stage. On May 26 Saperda moesta was bred from Populus balsamifera; on May 30 Neoclytus erythrocephalus was reared from the dead branch of a beech tree. June 1. The work of Saperda tridentata, Magdalis armicollis and M. barbita on about 1500 elms is described, and the results obtained by cutting and burning the infested wood in the early spring were found to be very satisfactory. The beetles commenced to emerge May 16. June 10. Adults of Agrilus anxius began to issue from dry wood June 4. Many dead trees affected by this insect have been cut and burned and an effort is being made to preserve others by painting them with a mixture of resin and linseed oil (not boiled) in the proportion of about 5 pounds of resin to 1 quart of oil. In the summer of 1897 the birch trees were badly affected by an aphid [Callipterus betulaecolens Fitch] and many leaves dropped as a result. In 1898 the attack was renewed, but the pest was nearly destroyed by the larvae of the two spotted lady bug, Adalia bipunctata. The birch aphis has made its appearance the present season, but is being checked by the lady bug. The Canada fly or sand fly, as the creatures are known here, are stone flies, caddice flies and May flies. On June 1 the stone flies and caddice flies were noticed in great numbers; on the 14th the first May fly was seen. These insects breed on the Canada side of the Niagara river opposite Buffalo and are then carried across the stream by the prevailing winds. June 16. Larvae of the white-marked tussock moth [Notolophus leu-

costigma] are much less abundant than last year. In most cases where injury is being done, the cause is neglect to remove the egg masses. The larvae of Prionoxystus robiniae and those of Cyllene robiniae have destroyed nearly all the honey locust trees in the city, and on June 29 an adult of the former species was taken. June 30. Neoclytus erythrocephalus was observed July 4 ovipositing on a dying tree, Tilia americana. Phytoptus quadripes was so numerous on silver maple as to cause many leaves to wither and fall. The young larvae of Prionoxystus robiniae were found the same day in great numbers boring in the bark of oak trees, and adults of Saperda candida were taken on mountain ash (Pyrus sorbus) and on Paul's thorn (Crataegus oxyacantha var. paulii); this insect has nearly destroyed these trees in Buffalo. July 2 the larvae and pupae of Cryptorhynchus lapathi were taken from a Carolina poplar; and more recently the same stages were secured in Salix babylonica. The adults have been taken on Salix alba. White-marked tussock moth [Notolophus leucostigma] is now in the pupal state, no adults having been seen. July 13. Many Carolina poplars are being destroyed by Cryptorhynchus lapathi. Larvae of Agrilus anxius were found in the pupal cells July 14; young larvae about ¼ inch long were found July 19 feeding in the cambium layer, and had then traveled some distance. On investigating the cases of human injury attributed to the bite of the "kissing bug", it was learned that there were a number of sufferers and that examples of Opsicoetus personatus were readily found in the localities where most of the people were bitten. Adults of Saperda calcarata began to emerge from Populus monilifera July 18. This species is very destructive to the cottonwood and has been taken from other poplars. July 21. One prominent physician took four specimens of Opsicoetus personatus in his house. Every case which has come under my observation, since my last report, has been correct as regards the sting; the persons whom I have seen relate that they were bitten at night. White-marked tussock moth caterpillars [Notolophus leucostigma] have nearly all spun up and a number of egg masses have been deposited. From 85 to 90% of the whole brood has been destroyed by parasites, Pimpla inquisitor being the principal parasite; the next a Chalcis, which I believe to be C. ovata, with Pimpla conquisitor and a Tachina fly ranking after in importance. July 28. Agrilus anxius has been found thoroughly infesting black

birch, Betula lenta and the yellow birch, Betula lutea. From one spot 14 birches could be seen, two living, 12 dead. Examination of the dead trees showed the mines running in endless confusion, often crossing and recrossing, as in the white birch. I could not observe the discoloration, as in the white birch, which is possibly due to the bark of these trees being somewhat red in color. In Forest Lawn cemetery are about 50 dead and dying trees, as the result of the work of this insect. Aug. 9.

(J. U. Metz, East Amherst) — Up to date, I have seen but one Colorado potato beetle [Doryphora 10-lineata]. The asparagus beetle is on hand early. This beetle is new to me, as we were never bothered till this year. May 23. [Examples of both Crioceris asparagi and C. 12-punctata were received from Mr Metz May 31.] No injury by forest tent caterpillar observed. Apple tree tent caterpillars not numerous. June 17. Much damage is being done by the Hessian fly [Cecidomyia destructor]. Many fields are deteriorating daily. June 20. In my own fields, sown Sep. 9, I estimate that one fifth is down, in some fields sown in August one half to nine tenths are down as the result of the work of the Hessian fly. Even fields sown the latter part of September have some fly in them. July 3.

Fulton county (C. E. Childs, Mayfield)—Bumble bees more abundant on apple trees than for some years before. Apple tree tent caterpillars [Clisiocampa americana] seem to be infested with something which causes them to dry up and die before reaching maturity. No Colorado potato beetles [Doryphora 10-lineata] observed. May 22. Apple tree tent caterpillars have done some damage in this county and town. Forest tent caterpillars [Clisiocampa disstria] not doing much damage. In the village three large trees were nearly stripped of leaves. The trees were badly infested with borers [probably Plagionotus speciosus]. May 31. Colorado potato beetles not present in so great numbers as in previous years. Apple tree tent caterpillars have spun their cocoons. Forest tent caterpillars have been destructive in scattered localities. One lot in the mountains of about 30 acres was stripped of foliage. June 29. Locusts [probably Cicada tibicen] more numerous than in years. Grasshoppers more plenty than in seven years. Much damage has been done by forest tent caterpillar. Colorado potato beetles are giving much trouble now. July 25. Grasshoppers excessively abundant in some sections of the town. Aug. 7. Grasshoppers numerous in parts of the town and damaging crops somewhat. Aug. 9. Moths of the forest tent

caterpillar are flying in vast numbers; buckwheat in bloom is covered with them. Grasshoppers injuring crops some and rendering pastures and meadows bare. Aug. 22. In gathering up a bundle of corn, a man was stung on the arm by a larva [Automeris io, the io caterpillar]. The injured limb swelled, stiffened, was much inflamed and pained considerably for two days. Larva of [Philampelus pandorus] was taken on a raspberry bush. Aug. 28.

Genesee county (J. F. Rose, South Byron)—Last year was called a tent caterpillar [Clisiocampa americana] year, but it must have been a seeding for this. Where they have been controlled each year, they are easily taken care of this season. Many let them increase along the highway on seedling apples and wild cherries. Canker worm numerous in places where it has been in past years. Honest spraying controls them, but many farmers neglect this till the trees are brown and the worms large. Those who used wire traps either did not get them on in time or the females laid their eggs in the fall. A few pear psyllas [P. pyricola] found, but they have not seemed to develop. Common asparagus beetle [Crioceris asparagi] already noticed by one grower. Currant worms [Pteronus ribesii] appeared as usual, but were quickly killed by spraying with arsenite of lime and bordeaux mixture. May 20. Apple tree tent caterpillars never so bad before. For the past 10 days they have been crawling everywhere. Some of the largest orchards show hardly a green leaf as the result of canker worm attack. One grower used 1¾ pounds of green arsenite to 150 gallons of water in combination with bordeaux mixture and failed to kill the nearly grown canker worms. Pear psylla is very numerous this year and orchards are in bad condition, the small crop is dropping. There are two to 10 psyllas on the stem of each pear and the new growth is badly infested. I thought I could control it, but today am doubtful. I watched it closely and did thorough work before the mature insect appeared, used 10% kerosene oil (tried 15% on trees but the foliage was injured). As checks drenched some trees five times but mother insects are numerous today. Forest tent caterpillar [Clisiocampa disstria] is said to be stripping forests infested last year. June 6. Work of the forest tent caterpillar is not yet as serious as last year. Colorado potato beetles [Doryphora 10-lineata] are scarce. Squash bugs [Anasa tristis] and striped cucumber beetles [Diabrotica vittata] are as abundant as usual. June 22. Find a few nests of the fall web worm [Hyphantria cunea]. Farmers complain very little of potato beetles. Forest tent caterpillars have not caused one-

fourth the damage of former years. July 25. Potato beetles not abundant. Fall web worm still rare. Aug. 8. Codling moth [Carpocapsa pomonella] has worked in Bartlett pears the worst I ever knew it to do. Well sprayed trees will not average one third perfect fruit. Potato beetles giving no trouble. Aug. 22.

Greene county (O. Q. Flint, Athens)—Within the past week forest tent caterpillars [Clisiocampa disstria] have become quite noticeable in river towns like Athens, Catskill, Saugerties; something quite unusual. Apple tree tent caterpillars [Clisioc ampa americana] are crawling about preparatory to spinning cocoons. June 3. Elm leaf beetle [Galerucella luteola] is doing considerable injury. Few tent caterpillars of either species are seen at present. June 8. Work of elm leaf beetle becoming very noticeable. Last year a number of elms in Athens were killed by this insect. June 23. Cocoons of the forest tent caterpillar are comparatively few at Hensonville, according to Mr Tremain Bloodgood, though the year before they were very abundant. Two or three miles distant, where the pests did not occur in numbers the previous year, cocoons are very abundant. Elms in Athens generally affected by the work of the elm leaf beetle. Fall web worm [Hyphantria cunea] attacking pear. July 1. The work of the forest tent caterpillar is very evident in the towns of Windham and Jewett. On examining the cocoons, there was no evidence of the moths having issued, on the contrary most of them had been parasitized. The people in that locality observed an absence of the moths, as compared with the preceding season. The elm leaf beetle does not appear to be present in the county back any distance from the river. The striped cucumber beetle [Diabrotica vittata] is said to be relatively scarce. July 22. In taking a drive to west of Middleburg, passing through portions of Greene, Albany and Schoharie counties, the work of the forest tent caterpillar was generally manifest in the mountains. A second brood of elm leaf beetles has appeared. Aug. 4. Striped cucumber beetle is said to have been scarce the last two years, specially so the present season. Aug. 26. Fall web worm present but not doing much injury. Grasshoppers fewer than usual. Sep. 2. Fall web worm has been working on pear trees to quite an extent. Pear psylla [P. pyricola] has been very injurious and difficult to control. Elms still badly affected by elm leaf beetle. Sep. 16. Pear psylla has been doing considerable harm in this section. [Pseudococcus aceris] is abundant on falling maple leaves. Sep. 20.

Herkimer county (G. S. Graves, Newport)—Forest tent caterpillars [Clisiocampa disstria] abundant on some small trees, 3 or 4 bushels have already been killed by hand. May 22. Trees are being defoliated about five miles from the village, in a locality where the caterpillars have been allowed to increase unmolested for the past two years. I have tried to watch the birds in caterpillar infested trees and have observed but two species which seemed to be feeding on them, the kingbird and the yellowbird. It seems as if some of the chippies or groundbirds ate them, but I have only indirect evidence. May 31. Forest tent caterpillar is not as noticeable as a week ago. Colorado potato beetles [Doryphora 10-lineata] are appearing, June 1 being the date they were first noticed. June 8. Forest tent caterpillars very plentiful in the woods. The injury to apple trees from both species of tent caterpillar, is in my opinion less than last year. Rose beetles [Macrodactylus subspinosus] injuring hydrangeas and rose bushes. Elms in the village affected to some extent by a beetle [Disonycha triangularis]. June 20. Rose beetle doing considerable damage to bushes. A large per cent of forest tent caterpillars spinning up in the leaves on the trees, apparently relatively few compared with the abundance of the caterpillars. There is also evidence of parasitic attack on this pest, as some of the cocoons have holes in the side. Lettuce badly affected by [Thrips tabaci]. June 27. Forest tent caterpillars have nearly disappeared. June 29. On June 26 the village board of Mohawk passed a resolution to pay 10c a quart for cocoons of the forest tent caterpillar collected in the village, and had by July 1 paid $45 for 450 quarts of cocoons. Moths of forest tent caterpillar very plentiful about electric lights during the fore part of the week. At 9.30 one evening I counted nearly 50 toads within a radius of 20 feet from one electric light, but was unable to see that they ate any of the moths of the forest tent caterpillar. July 10. Larvae of a beetle [Disonycha triangularis] are injuring elms to some extent. Find a few forest tent caterpillar cocoons on the small trees where I had attempted to kill all the larvae, but so far no egg belts. July 14. Potato beetles are not troublesome. Have seen little of the codling moth [Carpocapsa pomonella] on small apples. July 24. Egg belts of forest tent caterpillar appear relatively scarce when compared with the previous abundance of the larvae. Aug. 8. Parasites appear to have done much in this vicinity toward preventing the maturing of many forest tent caterpillar moths. Aug. 15. Butterflies of cabbage worm [Pieris rapae] abundant about fields. Aug. 24.

Jefferson county (George Staplin jr, Mannsville) — On April 25 apple tree tent caterpillars [Clisiocampa americana] began to hatch and now some trees are nearly stripped. Canker worms scarce. Texas or horn fly [Haematobia serrata] appeared May 12. Colorado potato beetles [Doryphora 10-lineata] not abundant. May beetles are very scarce and but few white grubs are to be found. May 24. Forest tent caterpillars [Clisiocampa disstria] are quite numerous on maples in Ellisburg, though they have not done much damage, but have been very injurious in Rutland, Watertown and some other sections. Curculios [?Conotrachelus nenuphar] are working on pears, also a few bud worms. Grasshoppers are reported very plenty in some localities. Texas fly and potato beetles about as usual. Canker worms not very plenty, spittle insects abundant. June 13. Yellow-necked apple tree worm [Datana ministra] and the fall web worm [Hyphantria cunea] appearing in young orchards. Rose leaf hopper [?Typhlocyba rosae] has been very destructive. Egg belts of apple tree tent caterpillar are numerous. July 26. Fall web worms appearing in small numbers, potato beetles not troublesome at present. Aug. 5.

Livingston county (W. R. Houston, Geneseo) — Apple tree tent caterpillars [Clisiocampa americana] have become a most serious pest in this section, 23 nests were counted on one tree. I find that spraying the trees with paris green, 8 ounces to 50 gallons of water, is a good remedy. Apple aphis [Aphis mali] is doing some injury to young trees. The asparagus beetle [Crioceris asparagi] has become a bad pest. May 17. 17 year cicada [C. septendecim] has appeared in this vicinity, and is present in large numbers. June 1. In this section, 17 year cicadas are all around in localities here and there; they are reported to be present at Groveland and Avon. Aphids on rose, apple, peach and currant have been worse than for 10 years. Cherry aphis [Myzus cerasi] is doing much damage. Forest tent caterpillars [Clisiocampa disstria] are doing little damage here in town, but are reported to be very abundant and destructive in Dansville. June 12. The rose worm [Monostegia rosae] has proved very destructive the present season. Whole plots of lettuce have been ruined by [Thrips tabaci]. June 17. Several cases of insect sting or bite have come to my attention in this vicinity, all being attributed to the work of the "kissing bug". July 17.

Madison county (C. A. Owen, Munnsville)—The lime tree winter moth [Erannis tiliaria] has nearly defoliated an orchard of

several acres in extent. Forest tent caterpillar [Clisiocampa disstria] nearly stripped the maples, but has now about disappeared. June 15. An occasional complaint is made of the work of tomato worms [Phlegethontius celeus]. Aug. 11.

Monroe county (Lewis Hooker, Rochester) — Pear psylla, P. pyricola, is quite thick in some of the Duchess pear orchards, and in some cases this insect is doing considerable harm. Canker worms, which in previous years were troublesome, have gradually disappeared, though in some localities they have been reported in large numbers. Apple tree tent caterpillars [Clisiocampa americana] generally present and in some orchards completely covering the trees. Forest tent caterpillars [Clisiocampa disstria] present in some sections, specially on chestnut trees. Bud moth [Tmetocera ocellana] and case bearers appear to be as numerous as in previous years and in some instances are hurting the trees. No signs of the codling moth [Carpocapsa pomonella] yet. May 24. Potato beetles not very plentiful. Apple tree tent caterpillars are very numerous in some sections of the county Adult pear psyllas may be found in small numbers. Plum curculio [Conotrachelus nenuphar] appears to be present in relatively small numbers. June 2. Canker worms have done considerable injury in this vicinity the past week, and in neglected orchards trees have been completely stripped. Black flea beetle [Epitrix cucumeris] present in large numbers on potatoes. Cut leaved birches of East avenue suffering from the attacks of a borer [possibly Agrilus anxius]. Green fruit worms [Xylina species] present in pear and apple orchards in large numbers and are doing great damage. Asparagus beetle [Crioceris asparagi] is troubling growers greatly. A colony of 17 year cicadas [Cicada septendecim] occurs on our place. June 6 Larvae of grape vine flea beetle [Haltica chalybea] present on grape leaves but doing little damage. No quince curculios [Conotrachelus crataegi] have been seen this year. New York plum scale [Lecanium prunastri] are very numerous in the egg state on German prune and Bradshaw plum orchards. June 14. Some Kieffer pear trees are badly infested with the scurfy bark louse, Chionaspis furfurus. Colorado potato beetle [Doryphora 10-lineata] has not appeared. Rose beetles [Macrodactylus subspinosus] are proving destructive to roses. Raspberry cane girdler [Oberea bimaculata] is working in blackberry beds. June 22. Aphis [Myzus ribis] on currant is very abundant. The currant worm

has appeared in considerable numbers on gooseberries. Plum scales [Lecanium prunastri] have hatched and are now on the under side of the leaves of the infested trees. June 30. Second brood of pear psylla is not numerous. Plum scale has done little injury. July 20. A large number of maples in Rochester are suffering from the attacks of the sugar maple borer [Plagionotus speciosus]. The infested trees have very scanty foliage this year and are gradually dying. Oct. 1.

Oneida county (Jeanette C. Miller, Aldercreek)—Colorado potato beetles [Doryphora 10-lineata] very numerous. Apple tree tent caterpillars [Clisiocampa americana] have been very abundant. The cherry Tortrix [Cacoecia cerasivorana] has spun its nests in almost every roadside bush and is very abundant. June 20. Young grasshoppers are very numerous. There is a second crop of both potato beetles and currant worms [Pteronus ribesii]. July 6. The two last named insects are diminishing in numbers. In Otsego county I saw a large sugar bush of many acres in extent entirely stripped by forest tent caterpillar [Clisiocampa disstria] of upper leaves; only a few lower branches had any foliage remaining. I heard that there were many similar acres. July 26. Fall web worm [Hyphantria cunea] numerous on cherry and maple trees. Aug. 8 Grasshoppers and other insects pleasingly scarce. Aug. 15. [Lithocolletis aceriella] working in maple leaves to some extent. Sep. 11.

Onondaga county (Miss A. M. Armstrong, Belle Isle)—Where not destroyed, apple tree tent caterpillars [Clisiocampa americana] have eaten every green leaf and bud. Small measuring worms, probably canker worms, are proving very destructive to apple trees. May 18. The work of canker worms is more general than was supposed last week. May 27. Apple trees attacked by canker worms completely stripped of foliage. June 2. Potato beetles becoming very numerous. Striped cucumber beetle [Diabrotica vittata] destroying squash, pumpkin, melon and cucumber vines. June 9. Canker worms have now buried themselves to a depth of about 2 inches in the soil about the trees. At Oakwood cemetery the 17 year cicada [C. septendecim] is present in large numbers, but is doing little damage. Many sparrows were busy feeding on the cicadas. At Onondaga Valley, Syracuse, much the same condition prevailed. Larvae of grape vine flea beetle [Haltica chalybea] abundant on grape vines, and considerable damage by them is reported from Baldwinsville. The wheat midge [Diplosis

tritici] and the Hessian fly [Cecidomyia destructor] are working in the wheat. June 16. The cicadas about Syracuse have done some damage, causing the tips of twigs to wilt and die. 10% of the wheat stalks are infested with Hessian fly, and 4% with the wheat midge. Grape vine flea beetle larvae have disappeared. June 23. Potato beetle still numerous. Wheat midge and Hessian fly are at work yet. Apple tree tent caterpillar moths have nearly all emerged. Hundreds of small, whitish butterflies [Pieris rapae] are flying about. Green-headed horseflies and the large black fly [Tabanus atratus] are abundant. House flies are not so numerous as usual. July 1. Wheat midge and Hessian fly are still found in wheat fields. Horseflies have appeared in large numbers and are very annoying to stock. July 7. Colorado potato beetle [Doryphora 10-lineata] is abundant and destructive. Golden tortoise beetles are present on morning-glory vines. White-marked tussock caterpillars [Notolophus leucostigma] are on horse-chestnut trees, but not abundant. July 15. Cabbage worms appearing, but not abundant. White-marked tussock caterpillars have spun their cocoons. July 22. Dog day cicadas [Cicada tibicen] are more numerous than usual. Egg belts of apple tree tent caterpillar are quite abundant. Codling moth is possibly a little more abundant than in former years. Spined soldier bugs are destroying many potato beetles. Fall web worms [Hyphantria cunea] are more numerous than usual. Aug. 12. Milkweed butterfly [Anosia plexippus] was quite numerous for a few days, more so than usual. The harvest fly [Cicada tibicen] was more abundant than I have known it to be before. Grape vine leaf hopper [Typhlocyba ?vitis] very plentiful. Oct. 2.

Ontario county (J. Jay Barden, Stanley)—Apple tree tent caterpillars [Clisiocampa americana] appeared April 13 on crab-apple buds, and bud moths [Tmetocera ocellana] were found at work on April 22 and cigar case bearers [Coleophora fletcherella] had begun to move. The bud moth has been very bad in unsprayed orchards, but seems to have been controlled by spraying before the buds opened. Forest tent caterpillars [Clisiocampa disstria] are more numerous than ever before, their work being plainly apparent in the tops of sugar maples. An orchard of about 50 trees looks as if swept by fire, the result of canker worm attack. May 31. Very little has been seen of the potato beetle. Many complain of the work of the four lined leaf bug [Poecilocapsus lineatus]. Larvae of the eight spotted forester [Alypia octomaculata]

have been defoliating grape vines. At Union Springs, Cayuga county, the 17 year cicada [C. septendecim] is present in enormous numbers and is apparently doing much damage. Currant stem girdler [Janus integer] is very bad about Stanley. June 20. Eggs of cicada unhatched. Young of San José scale [Aspidiotus perniciosus] appeared for the first time June 17 in small numbers, the morning of June 18 there were many more and on June 19 the tree was swarming with them. I was unable to find the young of Mytilaspis pomorum moving about, though they were numerous under the old scales. Currant stem girdler has become very prevalent in Ontario, Yates and Cayuga counties and is doing much damage. July 20.

Orange county (J. M. Dolph, Port Jervis) — Cherry tree aphis [Myzus cerasi] more abundant than usual. Currant bushes are badly affected by plant lice [Myzus ribis]. The greater abundance of insect eating birds the past two or three years apparently accounts for the lack of injurious insects. May 20. A black caterpillar [Euvanessa antiopa] appeared on Carolina poplars in considerable numbers. Have seen no forest tent caterpillars [Clisiocampa disstria]. May 27. Recent rains have reduced the numbers of plant lice. Cucumber flea beetle [Epitrix cucumeris] is destructive to cucumbers and tomatoes. June 2. Apple tree tent caterpillars [Clisiocampa americana] have been almost entirely absent. Cabbage butterfly [Pieris rapae] has been somewhat more plentiful than usual. Striped squash beetle, Diabrotica vittata, has done considerable damage in gardens, while the cucumber flea beetle has been perhaps the worst pest for gardeners. July 24.

Orleans county (Virgil Bogue, Albion)—Canker worms are not as destructive as last year, owing largely to their being controlled by spraying. Green fruit worms are more injurious than last year. White grubs and wire worms have worked but little. May beetles were more abundant than usual. Overwintered honey bees are doing splendidly, though not many have swarmed. Crimson clover has apparently increased the number of bumble bees. June 6. The season in this vicinity is the most nearly free from insect depredations of any that I have observed. Aug. 22. Woolly apple aphis [Schizoneura lanigera] is quite prevalent in some orchards. Sep. 18.

Oswego county (C. B. Cook, Oswego Center)—The bud moth [Tmetocera ocellana], cigar case bearer [Coleophora fletcherella] and apple tree tent caterpillar [Clisiocampa

americana] are quite numerous. The pear psylla [P. pyricola] is doing much damage. Colorado potato beetles [Doryphora 10-lineata] are awaiting the appearance of the plants. May 31. Green aphis has been quite bad on fruit trees, specially apple. Cucumber flea beetle [Epitrix cucumeris] has been very destructive to tomatoes and is doing some injury to potatoes. June 7. Attacks of currant saw fly [Pteronus ribesii] have been comparatively light. Green fruit worms [Xylina species] cause considerable complaint. Plum curculio [Conotrachelus nenuphar] is unusually bad. Forest tent caterpillar [Clisiocampa disstria] has been inflicting some injury on both fruit and forest trees. June 14. Green aphis is very bad in places Striped cucumber beetles [Diabrotica vittata] have made their appearance the past week for the first time this season. June 21. Potato beetle inflicting little injury. June 27. White grubs are doing considerable harm in newly set strawberry beds. Stalk borer [Hydroecia nitela] occurs in small numbers in potato vines. Both codling moth [Carpocapsa pomonella] and plum curculio are unusually abundant. July 22. Fall web worms [Hyphantria cunea] are very scarce, cabbage worms are rather bad. Tomato worms [Phlegethontius celeus] are found occasionally, but are not causing much damage. Aug. 9. Considerable damage has been done by the second brood of the codling moth. Found a few asparagus beetle [Crioceris asparagi] larvae. White grubs are still destructive to young strawberry plants. Potato beetle remaining in numbers unusually late. Peach tree borer [Sanninoidea exitiosa] doing considerable damage. Sep. 20.

Queens county (C. L. Allen, Floral Park).—Colorado potato beetles [Doryphora 10-lineata] are just beginning to appear, all of two weeks later than usual; the vines were fully eight inches high before the first beetle was noticed. Cabbage butterfly, Pieris rapae, is now plentiful. The cabbage looper, Plusia brassicae, has not appeared. The asparagus beetle [Crioceris asparagi] is a most serious pest and never before was so plentiful. May 31. Apple tree aphis [A. mali] is very bad in young orchards. June 5. Potatoes badly infested with the cucumber flea beetle [Epitrix cucumeris] and unless we have rain at once the crop will be ruined. June 8. Potato beetle is now very troublesome. June 22. An aphis [Nectarophora destructor Johns.] has destroyed the pea crop in this section. One market gardener lost 20 acres, another 14, not a pea was picked from either. Potato beetle was never before so

destructive. July 5. Potato beetle still very injurious. Aug. 8. The striped cut worm [Carneades tessellata] has been very injurious. It eats almost any green thing, specially cabbage and cauliflower plants. I have seen in one field hundreds of plants cut completely off, or so nearly so that the tops dropped to the ground. From around one plant 20 of these destructive pests were dug out. Sep. 18.

Rensselaer county (W. C. Hitchcock, Cropseyville) — Grasshoppers [Schistocerca rubiginosa and probably others] are very abundant. May 24. Forest tent caterpillar [Clisiocampa disstria] is numerous in several localities. Elm leaf beetle [Galerucella luteola] is abundant; the Baltimore oriole is feeding on it. June 18.

Rockland county (S. B. Huested, Blauvelt) — Apple tree tent caterpillars [Clisiocampa americana] are comparatively rare. Pear midge [Diplosis pyrivora] is one of our worst enemies and has done its work. We notice an absence of birds, robins, etc. being fewer than usual. May 20. Work of the elm leaf beetle [Galerucella luteola] is less serious than usual. No Colorado potato beetles [Doryphora 10-lineata] seen. June 3. Cherry and apple aphids are plenty. Potato beetles appearing. Potato flea beetle [Epitrix cucumeris] does much damage. June 16. Rose beetles [Macrodactylus subspinosus] are present but not in large numbers. They appear to manifest a decided preference for the blossoms of tulip trees and it has been recommended to plant them in an orchard as a preventive of injury by this insect. June 24. Fall web worm [Hyphantria cunea] has appeared, but no great damage is done by it. Aug. 12.

St Lawrence county (Mary B. Sherman, Ogdensburg)—Forest tent caterpillars [Clisiocampa disstria] were first noticed about eight weeks ago on the small smooth branches of the younger apple trees. They are now about the size of a small pencil and about 1½ inches long, though there are still many young ones. Everything is infested, but as maples are abundant, the trees have not yet suffered severely. The forerunner of our shad fly [May fly] has appeared within the past two days. This we call the fish fly. The worst shad fly day is usually about June 5. Currant aphis [Myzus ribis] present in numbers. Currant worms [Pteronus ribesii] are as numerous as usual. June 3. A new currant worm [Diastictis ribearia, the currant span worm] has appeared within 10 days in many gardens in

town. It is unaffected by hellebore. Forest tent caterpillars are not quite so numerous. Many of the apple trees are almost leafless in the country, [the work of Clisiocampa americana] while trees in the city are covered with caterpillars, though the foliage has not suffered very severely. Many small caterpillars are to be seen on the maple trees. The shad flies have appeared, but a south wind has taken most of them to the Canadian shore. June 8. Apple tree tent caterpillar [Clisiocampa americana] has been a very serious pest in the country. June 15. [Schizoneura americana] is abundant on elms, forming white, cottony masses. June 22. White grubs are unusually destructive to strawberry plants. Currant worms more troublesome than common. July 6. The raspberry cane girdler [Oberea bimaculata] has commenced its work, but is not nearly so troublesome as last year, when about half our bushes were killed. Picking and burning infested shoots has proved effective in controlling this pest. Egg belts of the forest tent caterpillar are beginning to be found; the moths are still numerous. July 14. Eggs of forest tent caterpillar are very numerous; on one small twig 9 inches long three egg belts were found. July 28. Cabbage butterflies [Pieris rapae] are abundant and causing great complaint. The two spotted tree hopper [Enchenopa binotata] is proving very destructive to the bittersweet. The tomato worm [Phlegethontius celeus] is more abundant than usual. Aug. 16. The large number of orange or dark brown and black butterflies [milkweed butterfly, Anosia plexippus] is appalling. They cling in masses as large as a two quart pail to maples and there are thousands flying about. They are very abundant in gardens. There are many complaints of the poultry mite which appears to be more troublesome than usual. A number of cut leaved birches have died [possibly the work of Agrilus anxius]. Sep. 1.

Saratoga county (Rhoda Thompson, Ballston Spa) — Apple tree and forest tent caterpillars have been fought with fire with tolerable success. Rose leaf hopper [Typhlocyba rosae] has been very abundant and injurious. May 25. Currant worm [Pteronus ribesii] is at work as usual. Larvae of grape vine plume moth [Oxyptilus periscelidactylus] are webbing up the tender tips. White grubs are destructive to all sorts of tender plants, tomatoes, cauliflowers, carnations, etc. Where fought early and persistently, the forest tent caterpillar [Clisiocampa disstria] has not inflicted much damage. June 2. Striped cucumber beetle [Diabrotica vittata] is devouring melon and squash vines, asters and dahlias.

Rose beetle [Macrodactylus subspinosus] is very common on roses, grape vines and spiraeas, and is causing some damage. Larvae of willow butterfly [Euvanessa antiopa] are attacking elms. Forest tent caterpillars [Clisiocampa disstria] are still to be found. June 16. Rose beetles are devouring everything, compelling hand picking to save roses and other cherished plants. June 24. Light-loving grape vine beetle [Anomala lucicola] is abundant. Caterpillars of the black swallow-tail [Papilio polyxenes] are feeding on carrots and caraway. July 7. The two beetles [Lucanus dama and Pelidnota punctata] were found in the decaying stump of a maple tree. July 28.

Schenectady county (John Bigsbee, Scotia)—Bud worm [Tmetocera ocellana] very abundant in one large apple orchard. June 6.

Seneca county (J. F. Hunt, Kendaia)—Apple tree tent caterpillar [Clisiocampa americana] has almost defoliated some young orchards and materially injured the crop on older trees. Grape vine flea beetle [Haltica chalybea] is relatively scarce the present season. Raspberry saw fly larvae [Monophadnoides rubi] have not appeared this season, though they did much damage in the past. Colorado potato beetles [Doryphora 10-lineata] are just making their appearance, much later and less abundant than usual. Plum curculios [Conotrachelus nenuphar] have begun their work on apricots, but do not seem as abundant as usual. May 25. Forest tent caterpillar [Clisiocampa disstria] has been very injurious to fruit trees, mostly to the cherry. Plum curculios have appeared in abundance; 55 were secured from an apricot tree and 140 from a plum tree, almost all found on one side of the orchard near a ravine where there are a number of elm trees. Some of the large plum orchards in the southern end of the county are infested to an unusual extent with the plum curculio. Raspberry saw fly is beginning to work, but is not as bad as in former years. Potato beetles are beginning to be numerous. June 2. Hessian fly [Cecidomyia destructor] is doing much damage to early-sown wheat all through the county. Rose slugs numerous. June 10. Hessian fly is doing much damage in some pieces of wheat, while others are comparatively free. June 30. It is estimated that 25% of the wheat crop has been injured by the Hessian fly. Potato beetles not as plentiful as some years. July 20. It is found that there is little shrunken wheat and that the work of the Hessian fly was not as bad as reported. Some of the injury was caused by dry weather. Aug. 9.

Steuben county (Levi Gardner, Atlanta)—Apple tree tent caterpillar [Clisiocampa americana] is about one fourth as abundant as usual. There are not enough forest tent caterpillars [Clisiocampa disstria] to cause any harm. There are a few currant worms [Pteronus ribesii]. Colorado potato beetles [Doryphora 10-lineata] have appeared. June 1. Plum curculio [Conotrachelus nenuphar] has been more destructive than usual. Potato beetles are comparatively harmless, cucumber flea beetles [Epitrix cucumeris] injuring potatoes much worse than usual. June 30. Codling moth [Carpocapsa pomonella] is possibly a little more abundant than in preceding years. July 27.

Suffolk county (W. B. Dupree, Centerport)—The only insect injuring crops in this section is the potato beetle, and it is easily kept in control with paris green. July 6. Foliage of hop vines badly damaged by the caterpillars of [Polygonia interrogationis]. Rose beetles [Macrodactylus subspinosus] in small numbers are skeletonizing the leaves of chestnuts. Aug. 14. Fall web worm [Hyphantria cunea] is causing noticeable injury to trees, as apple, oak and chestnut. Spotted grape vine beetle [Pelidnota punctata] scarce on wild grape. Io caterpillar [Automeris io] is found in small numbers on locust trees. Multitudes of black blister beetles [Epicauta pennsylvanica] cover golden rod. Aug. 31.

Tompkins county (C. E. Chapman, Peruville)—Apple tree tent caterpillars [Clisiocampa americana] are not numerous and do not seem to strip trees as usual. No potato beetles to be seen, though early potatoes are up. May 23 Forest tent caterpillar [Clisiocampa disstria] is denuding many of our forests and in places they are on fruit trees. Potato beetles now active and plenty. Cucumber flea beetle [Epitrix cucumeris] attacking potatoes and red raspberries. June 13. Corn at Ithaca was attacked to some extent by a worm, probably a species of Crambus. June 14.

Ulster county (G. S. Clarke, Milton)—Currant worms [Pteronus ribesii] are plenty. A few aphids may be found on apple, cherry, peach and currant foliage. May 27. Cherry aphis [Myzus cerasi] is doing some damage. Apple tree tent caterpillar [Clisiocampa americana] is not abundant, and there are no signs of injury to maple trees by the forest tent caterpillar [Clisiocampa disstria]. Currant aphis [Myzus ribis] is unusually abundant. June 2.

Aphids have increased some on cherry and currants and the apple aphis [Aphis mali] is doing some damage. No potato beetles have been seen. The second brood of currant worms has not appeared. June 10. A few fall web worms [Hyphantria cunea] have appeared. July 1. Apple aphis is persistent on young trees, where it is doing some damage. July 10. Apple aphis still on some trees. July 22. Apple aphis has nearly all disappeared. Aug. 5.

Warren county (C. L. Williams, Glens Falls) — Forest tent caterpillars [Clisiocampa disstria] have done much damage in this place. They are now eating voraciously on hard maple, white elm, basswood and apple trees. At this date there are many caterpillars not half grown. A few caterpillars have apparently got their growth, but none have begun to spin up, so far as observed. June 3. Forest tent caterpillars are beginning to spin their cocoons; it was first observed on June 3. Many shade trees, hard maples, elms and basswood have been entirely defoliated. Damage has also been done in the villages of South Glens Falls, Saratoga county, and Sandyhill and Fort Edward, Wash ington county. June 9. Forest tent caterpillars are about through eating and are spinning up very rapidly. Multitudes of cocoons are spun among the leaves on which the caterpillars feed. Caterpillars of the willow butterfly [Euvanessa antiopa] are quite widely distributed over the village and in South Glens Falls. June 14. Moths of the forest tent caterpillars are beginning to appear. The board of trustees of Glens Falls advertized on June 17 to pay a bounty of 10c a quart for the cocoons. Up to date there have been collected and destroyed 585 quarts of cocoons. The cocoons of the forest tent caterpillar are parasitized by several ichneumon flies. A Podisus spinosus was found among the cocoons of this insect. June 22. On June 26, the last cocoon was received, making a total of 1350 quarts destroyed at a cost of $135. June 30. Young corn is being attacked by the stalk borer [Hydroecia nitela]. July 12. Some little damage is being done to corn by the stalk borer; one farmer reports one stalk in five infested on new land, but no injury on old land. I have also found it working on old land. July 21. The stalk borer seems to be working in isolated places here and there. Aug. 3.

Washington county (H. L. Beadle, West Cambridge)—Canker worms have been comparatively scarce till this spring, a few may be found on nearly every tree that has not been sprayed. Apple tree tent caterpillars [Clisiocampa americana] are not very plenty. May

9. Trees about six miles north are nearly defoliated by forest tent caterpillars [Clisiocampa disstria] though there are scarcely any in the immediate vicinity. Horn fly [Haematobia serrata] is present in large numbers. Many orchards are literally covered with the scurfy bark louse [Chionaspis furfurus]. June 3. Colorado potato beetles are abundant and doing much damage. Grasshoppers are very numerous. July 7. Grasshoppers are doing much damage to oats. July 31. White grubs are plentiful in old meadows and hoed crops. Aug. 12.

Wayne county (C. H. Stuart, Newark)—Both species of asparagus beetles [Crioceris asparagi, C. 12-punctata] occur here. The work of the wheat midge [?Diplosis tritici] was extremely bad last year. Apple tree tent caterpillars [Clisiocampa americana] are doing great damage; we have found it necessary to send men with ladders to kill them by hand. May 20. Apple tree tent caterpillars are now full grown and seeking places to spin up. June 2. Larvae of apple tree tent caterpillars have disappeared, but forest tent caterpillars [Clisiocampa disstria] are nearly as abundant on walks as the other species have been. June 7. Larvae of raspberry saw fly [Monophadnoides rubi] are doing much damage, the leaves of the infested patch looked today like those of a badly infested currant bush. There is hardly a leaf in the field without several holes in it, and most of the older ones are eaten to threads. June 12. Work of the fly [Cecidomyia destructor] is very bad in wheat, a great amount of it being down. July 11. There is no evidence of work by the wheat midge, the clover midge [Cecidomyia leguminicola] and the onion thrips [Thrips tabaci]. The 12 spotted asparagus beetle seems to have disappeared. Nearly one third of the wheat is down and the damage may be perhaps one fourth of the entire yield, the result of Hessian fly work. It was specially bad on early-sown fields. July 25. A small green larva [subsequently identified by Mr Chittenden as the red banded leaf roller Lophoderus triferana] was found eating the green pop corn; it has attacked about 27% of the ears and 37% of the corn on the ear is destroyed. Sep. 19

Yates county (C. R. Crosby, Crosby)—Grape vine flea beetles [Haltica chalybea], though nearly as abundant as last season, have not done the damage they did last year, as growers knew what to expect and caught them as soon as they appeared. The warm weather lessened their destructiveness by bringing the foliage out faster. No

growers in this section used the paris green spray, as they seem to have little faith in its effectiveness. The beetles made their appearance about April 23 or 24. Both the apple tree and the forest tent caterpillars [Clisiocampa americana, C. disstria] are much more common than last year. In a peach orchard of 500 trees I counted more than two nests to each tree. The caterpillars of the gartered plume moth [Oxyptilus periscelidactylus] are webbing together the leaves of the terminal shoots. Leaves of some varieties of currants are badly curled by plant lice [Myzus ribis]. Currant worm [Pteronus ribesii] is very abundant on gooseberry. [Pyrausta futilalis Led.] was very abundant last year on dogbane [Apocynum androsaemifolium] and almost destroyed the weed. May 24. Click beetles numerous in quince blossoms. Many trees in a grove of maples are partly girdled by borers [Plagionotus speciosus], though they appear perfectly healthy in other respects. Lygus pratensis is very numerous on grape vines. Larvae of the grape vine flea beetle are beginning to appear. One house was overrun with the grain weevil [Calandra granaria]. Nymphs of [Leptoterna dolobrata] are abundant in grass. June 2. Crambids have become common. June beetles are a great nuisance at all kinds of evening meetings. On June 7 an adult of the round headed borer [Saperda candida] came to light. There is great complaint about squash beetles. June 9. Larch saw fly larvae [Lygaeonematus erichsonii] are doing considerable damage to larch trees. The same insect was injurious about four years ago. Caterpillars of the willow butterfly [Euvanessa antiopa] have nearly stripped some elms in the neighborhood. The 17 year cicada [Cicada septendecim] is reported to be present in great numbers near Dresden. June 16. The 12 spotted asparagus beetle [Crioceris 12-punctata] is by far the most numerous on wild plants. June 17 a visit to the farm of Calvin Haston near Dresden showed that the 17 year cicadas were apparently doing considerable damage in vineyards and young apple orchards, and more than half the branches of the vines were dead. On one small apple tree I counted eight females ovipositing at one time on three feet of branch. On one leaf of witch hazel 18 and on another 20 pupal skins were found. The adults were thickest in the orchard, where I gathered a pint without moving. The first chambers found were under a rail fence, while one was found in grass in the orchard. They were most abundant in the woods under dead leaves; many were built through the leaves and were four or five inches long. Some were capped and

others open. Only one lot was found in the woods uncovered by leaves, this occuring in a spot where a brush heap had been burned the preceding year, and here 30 or 40 chambers were found. The insects have also appeared at Balona, Mays Mill and Long point. At the last place they are reported as destroying two large vineyards. Caterpillars of the black swallowtail [Papilio polyxenes] are eating down young celery. June 23.

EXHIBITION OF INSECTS AT AGRICULTURAL GATHERINGS

The opportunities agriculturists have of visiting museums to study insect pests are necessarily limited, and not every farmer finds time to look through the many bulletins and other publications so freely distributed, or, if one has a few hours, the desirable article can not always be found. After all, the true way to learn is to see the creatures themselves, preferably living but much better dead than not at all, and to inspect their work. The observations of most growers are usually confined to the field and are limited to the destructive stage, the round of life being but partly understood. It is believed that a properly arranged biologic collection, representing the various stages of the principal insect pests, their work and any peculiarities they possess, will do much to increase the interest in insects, and should promote their more general study in the field, thus leading to their better control. As museums are few and widely scattered, one way to bring about this very desirable end is found in carrying small exhibits to places where the classes to be benefited assemble, viz: agricultural fairs, farmers' institutes, grange meetings and similar gatherings.

The interest manifested in the initial exhibit prepared for the state fair, held at Syracuse, Sep. 4–9 and subsequently shown at the Oswego county fair, held at Oswego Falls, Sep. 12–15 demonstrates the value of this work. The collection, contained in 12 glass covered cases, each 3x16x19 inches, consisted of over 100 species of the more injurious and more beneficial insects. The cases were arranged on a special table and were surrounded most of the time by a group deeply interested in learning about the common pests they had been obliged to fight so long. At the state fair nearly 2000 descriptive catalogues were distributed to those showing marked interest in the collection, and this number represents only a small proportion of those who looked at the collection, for

many, knowing little or nothing of its nature, were content with a glance or two. At the Oswego county fair the interest was if anything more marked. There was in constant attendance at each fair a member of the official force for the purpose of answering questions and explaining the more important features of the collection. Thus information was disseminated through the examination of insects and their work and by personal explanations, and all was supplemented by the distribution of a small catalogue giving in brief form the more striking characteristics of the insect and in a word outlining the method of keeping it in check.

The following extracts will give an idea of the interest taken in this new departure:

This exhibit, which is made under the auspices of the University of the State of New York, is attracting much attention, both from the mere sight-seeker and from the practical farmer. Mr G. W. J. Angell, who is in charge of the greater New York exhibit in Machinery hall . . . said:

"I trust that this exhibit of insects is but an entering wedge, and will be greatly enlarged at future state fairs. The heavy annual loss to the farmers and lumbermen of our state from the depredations of insect enemies runs high into the millions. The ability to differentiate between those creatures which are injurious and those directly or indirectly beneficial, and how best to prevent the ravages of the former, is as necessary to the successful farmer as the knowledge of the comparative values and the use of modern agricultural machinery. An insect, which today from its rarity is comparatively harmless to crops, may next year, from a sudden increase in its numbers, become a most destructive pest, and only by a knowledge of its life history and of the critical stage in its development, when the proper insecticides are most potent, can the threatened danger be averted.

The handy little pocket catalogue of the present exhibit . . . gives descriptions of some 75 of the commoner injurious insects with the proper remedies to be used against their attacks, and is one of the most valuable features of the exhibit. Some of the insects which are directly beneficial are also noted, such as the various silk worms, both native and exotic, and the bees which carry pollen from flower to flower, without whose labors many of our most valuable plants would become extinct."—*Evening herald*, Syracuse, 7 Sep.

A new and valuable exhibit in Floral hall was a collection of 82 noxious and beneficial insects . . . probably the first attempt to bring the latest results of entomological science before the people at a state fair. The specimens were admirably arranged in cases, showing their successive changes and samples of their work on bark, wood and leaves. They were constantly surrounded by observers, many drawn perhaps by the star of the season, the kissing bug, Opsicoetus personatus, but many fruit and shade tree growers were specially delighted with this opportunity to study the life history of pests whose ravages have been so sorely felt. The value of economic entomology can not better be made known than by thus bringing such exhibits before the people We trust that it may become a regular feature of future fairs. The exhibit has

already been asked for by the Oswego county fair. A neat little vest pocket catalogue of 28 pages briefly describes the insects, with treatment, which is worthy of careful preservation and study.—*Country gentleman*, 14 Sep. p.738

Another evidence of the value of the collection as an educator is found in the more recent request from F. E. Dawley, director of farmers institutes, that these insects be exhibited at a number of institutes in connection with a lecture. The catalogue is republished below in order to give a fuller idea of the scope and character of the exhibit.

FRUIT TREE INSECTS

1 **Apple tree tent caterpillar** (Clisiocampa americana). Conspicuous web tents in forks of apple and cherry trees contain hairy caterpillars with a white stripe along the back. Cocoons spun the last of May, the light brown moths flying in June. Eggs, in belts encircling the smaller twigs, remain unhatched till spring.

Treatment: remove and destroy eggs or young in nests. Spray foliage of infested trees with poison in early spring.

2 **Cigar case bearer** (Coleophora fletcherella). Small caterpillars in cigar shaped cases feeding on buds and foliage of apple.

Treatment: spray infested trees with poison in early spring.

3 **Pistol case bearer** (Coleophora malivorella). Small caterpillars in pistol shaped cases feeding on the young leaves and opening flowers of the apple.

Treatment: spray infested trees with the poison in early spring.

4 **Apple leaf Bucculatrix** (Bucculatrix pomifoliella). White, ribbed cocoons about ¼ in. long may be seen in clusters on smaller limbs of infested trees. The small larvae mine the leaves and later feed externally.

Treatment: spray infested foliage with poison in early June.

5 **Rose beetle** (Macrodactylus subspinosus). Greenish yellow beetles about ⅜ in. long appear in swarms in May and attack the foliage of various trees and vines.

Treatment: spray beetles with ½ pound whale oil soap to 1 gal. water, dust vines with ashes, etc.; handpicking.

6 **Apple tree borer** (Saperda candida). "Sawdust" or diseased bark and beneath the latter, legless, white, round headed borers. The brown beetles, striped with white, about 1 in. long, occur from June to August.

Treatment: protect base of tree with wire netting. Dig out the young borers in the fall. Cut and burn badly infested trees.

7 **Pear midge** (Diplosis pyrivora). Dwarfed, deformed fruit drops early, and within occur thick bodied, pale yellow maggots.

Treatment: destroy infested fruit.

8 **Peach bark borer** (Scolytus rugulosus). Bark of affected trees punctured with many small, circular holes, made by brownish black beetles less than 1/8 in. long. Inner portions of bark and sap wood filled with burrows.

Treatment: burn badly infested trees. Apply carbolic soap wash to trunks and limbs in early spring.

9 **Pear blight beetle** (Xyleborus dispar). Bark of affected trees punctured with many small, circular holes made by dark brown beetles about 1/8 in. long. Inner portions of bark and sap wood filled with burrows.

Treatment: burn badly infested trees.

10 **17 year cicada** (Cicada septendecim). Slit and broken twigs with wilting leaves are characteristic work of this insect, but unless the trees are small not much damage is done.

Prevention: avoid setting out trees in last few years before cicadas are due.

11 **Apple tree bark louse** (Mytilaspis pomorum). Bark infested with brownish scales shaped like oyster shells. Occurs on many other trees. Winter passed as white eggs under old scales, the young appearing about June 1.

Treatment: spray young with kerosene emulsion or whale oil soap solution.

12 **Scurfy bark louse** (Chionaspis furfurus). The whitish, scurfy scales occur on the bark of fruit trees. The purplish eggs remain under old scales all winter, the young appearing about June 1.

Treatment: spray young with kerosene emulsion or whale oil soap.

13 **San José scale** (Aspidiotus perniciosus). A small circular scale not readily seen unless very abundant. Infests many trees and shrubs. The specimens show variations in the appearance of the scales and how it may be disseminated by budding. Young appear from early June till cold weather.

Treatment: destroy badly infested trees, specially if young, and spray others thoroughly with kerosene emulsion or whale oil soap solution. Fumigate with gas.

14 **English oyster scale** (Aspidiotus ostreaeformis). Resembles San José scale in appearance and like it infests fruit trees. Occurs in several localities in this state and should be guarded against.

Treatment: spray infested trees with kerosene emulsion or whale oil soap solution. Fumigate with gas.

15 **Putnam's scale** (Aspidiotus ancylus). Resembles the two preceding species, but is less injurious. Attacks various trees.

Treatment: same as preceding.

SMALL FRUIT AND VINE INSECTS

16 **Currant worm** (Pteronus ribesii). Greenish, black-dotted saw fly larvae feeding on currant leaves in May, the common currant worm.

Treatment: spray with hellebore or poison.

17 **Currant span worm** (Diastictis ribearia). Yellowish, black-dotted span worms feeding on leaves in May and June.

Treatment: spraying with poison, or handpicking.

18 **Currant stem borers** (Sesia tipuliformis, Janus integer, Tenthredo rufopectus). The caterpillars boring in the woody stems are sesians. The maggots working in the tender tips may be either those of Janus or Tenthredo.

Treatment: burn stems infested with sesians and the wilting tips infested by the others.

19 **Raspberry gouty gall beetle** (Agrilus ruficollis). Irregular swellings on canes are produced by larvae of this pest.

Treatment: cut and burn infested canes during winter or early spring.

20 **Light-loving grape vine beetle** (Anomala lucicola). Brownish or black beetles about ⅜ in. long, resembling a small June beetle.

Treatment: dust vines with lime. Collect and destroy beetles.

21 **Spotted grape vine beetle** (Pelidnota punctata). Brown, black-spotted beetles about 1 in. long, resembling a June beetle.

Treatment: handpicking.

22 **Grape vine flea beetle** (Haltica chalybea). Greenish or blue beetles about ⅛ in. long, feeding on buds, or brownish, black dotted larvae about ½ in. long, skeletonizing leaves.

Treatment: spray with poison, using a large amount on buds, less for young on leaves.

23 **Grape vine plume moth** (Oxyptilus periscelidactylus). Small, greenish, hairy caterpillars webbing together terminal leaves.

Treatment: pick and destroy infested tips.

24 **Eight spotted forester** (Alypia octomaculata). Reddish, black-ringed caterpillars about ½ in. long feeding on grape vine and Virginia creeper in spring.

Treatment: handpicking; spray with poison.

25 **White flower cricket** (Oecanthus niveus) Series of punctures in twigs of various kinds are made by this insect for the reception of its eggs. Injury is usually too little to call for remedial measures, specially as the insects are predaceous and therefore beneficial.

SHADE TREE PESTS

26 **White-marked tussock moth** (Notolophus leucostigma). Beautiful caterpillars having three black plumes, four yellow or white tufts, a coral red head, and body marked with black and yellow. Defoliate horse chestnut, elm and other shade trees. Winter passed in white, frothy egg masses, the caterpillars hatching the latter part of May and spinning up about a month later, the moths appearing in July. Two broods about New York city, but one farther north.

Treatment: destroy eggs or spray foliage of infested trees with poison.

27 **Forest tent caterpillar: maple worm** (Clisiocampa disstria). Foliage of maple and fruit trees eaten in May and June by hairy blue-headed caterpillars with silvery dots along the back. Cocoons spun in June, the brown moth flying in July. Eggs in belts encircling smaller twigs, remain unhatched till spring.

Treatment: destroy eggs; kill the caterpillars when massed on trunk and limbs; spray foliage of infested trees with poison; collect and destroy cocoons.

28 **Pigeon Tremex** (Tremex columba). Adults frequently known as "horn tails", are usually found in July around diseased and dying tree trunks. The young borers occur near the surface, but full grown ones may make their way to the center of even large trees. Not usually very injurious.

Treatment: cut and burn badly infested trees.

29 **Lunate long sting** (Thalessa lunator). Brownish, wasp-like insects with yellow markings and a slender ovipositor or "tail" 2 to 4 in. long. Frequenting elms and maples infested by the pigeon

Tremex and occasionally found with the ovipositor stuck in the wood. The white legless grubs attach themselves to the borers and suck their life out. *This insect should* therefore *be protected.*

30 **Cottony maple tree scale insect** (Pulvinaria innumerabilis). Under side of smaller limbs sometimes festooned with this cottony insect, though more frequently it occurs in small masses. Young appear in July.

Treatment: spray young with kerosene emulsion or whale oil soap solution. Brush or scrape off and destroy old scales.

31 **Sugar maple borer** (Plagionotus speciosus). Diseased or loose bark and exposed dead wood indicate the work of this pest. The grubs frequently cause serious injury by running transverse burrows just beneath the bark. The stout, black beetles, about 1 in. long with bright yellow markings, occur from June to August.

Treatment: burn badly infested trees. Dig out the young borers in the fall. Protect trees with carbolic soap wash from June to August.

32 **Maple tree pruner** (Elaphidion villosum). Small limbs of maple, oak and other trees nearly eaten off by an insect and dropping in September, usually contain the burrows of this species.

Treatment: collect infested limbs on the ground and burn before spring.

33 **Elm leaf beetle** (Galerucella luteola). Irregular round holes eaten in young foliage followed by the grubs gnawing the under portions of the leaves, which then dry and turn brown. The yellowish, black-striped beetles, about ¼ in. long, appear in early spring and lay eggs in May. The grubs feed in June, changing to yellow pupae the latter part of the month. A second brood occurs in July and extends into September. Known in this state only on Long Island and in the Hudson river valley.

Treatment: spray foliage of infested trees with poison, which *must be applied* to *under surface* of the leaf in order to kill the grubs. Kill larvae and pupae on and near trunks of the trees.

34 **Elm bark louse** (Gossyparia ulmi). Adult females in June appear like clusters of small lichens on the under side of the smaller limbs of European elms. Young emerge in July.

Treatment: spray with kerosene emulsion or whale oil soap solution.

35 **Elm borer** (Saperda tridentata). Diseased or dead bark, and in inner portions white, flattened, legless grubs, which frequently

cause considerable injury. Beetles appear from early May till latter part of June.

Treatment: cut and burn badly infested trees. Protect valuable trees with carbolic soap wash during May and June.

36 **Elm snout beetle** (Magdalis barbita). Thick, fleshy, legless grubs working in inner bark of elm. Follows attack by the elm borer and occasionally is very abundant.

Treatment: burn badly infested trees and keep others vigorous.

37 **Fall web worm** (Hyphantria cunea). Web tents in July and August inclosing leaves on the tips of branches, the eaten foliage turning brown. Attacks many trees.

Treatment: destroy webs and their inhabitants or spray foliage of affected limbs with poison.

38 **Bag worm** (Thyridopteryx ephemeraeformis). Defoliated evergreens and other trees are found infested with curious cocoons or bags containing caterpillars in late summer and fall. Occur in vicinity of New York city.

Treatment: collect and destroy bag worms or spray with poison.

39 **Leopard moth** (Zeuzera pyrina). Whitish, black-spotted caterpillar making large burrows in various trees. A bad pest about New York city.

Treatment: dig out young borers. Kill others with carbon bisulfid. Burn badly infested trees.

40 **Bronze birch borer** (Agrilus anxius). If injured bark is examined, a slender flat-headed grub will be found running burrows in all directions in the inner portions. White and other birches are attacked. Very injurious at present in Buffalo. Beetles appear in June.

Treatment: cut and burn badly infested trees.

GARDEN INSECTS

41 **Colorado potato beetle** (Doryphora 10-lineata). Stout yellowish beetles with black striped wing covers appear in early spring, feed, and deposit yellowish eggs in clusters on under surface of leaves. The reddish, black-marked grubs also devour the foliage.

Treatment: handpicking; spray vines with poison.

42 **Squash vine borer** (Melittia satyriniformis). Wilting of one or more runners is caused by a whitish caterpillar boring in the stem near the root.

Treatment: slit the softer, infested portions, remove the borers and cover the wounded part with earth. Protect young plants with netting.

43 **Striped cucumber beetle** (Diabrotica vittata). Yellow beetles about ¼ in. long, striped with black, occur in numbers on cucumber and squash vines.

Treatment: protect young vines with netting. Dust vines with ashes, plaster of paris, etc. Poison trap crop of squash.

44 **Cucumber flea beetle** (Epitrix cucumeris). Brownish, gnawed spots on leaves made by numerous black jumping beetles about $\frac{1}{16}$ in. long.

Treatment: spray vines with bordeaux mixture.

45 **Squash bug** (Anasa tristis). Wilting leaves with their under surface infested by greenish young or by the large, grayish brown stink bugs about ¾ in. long.

Treatment: place chips and similar shelters near the vines and kill daily the bugs collected underneath. Crush the brownish eggs on under surface of the leaves.

46 **Common asparagus beetle** (Crioceris asparagi). Slate colored grubs about ⅓ in. long or yellowish and bluish green beetles about ¼ in. long eating the more tender portions of the plants. Occurs on Long Island, in Hudson river valley and in the lake regions of the western part of the state.

Treatment: spray affected plants with poison.

47 **12 spotted asparagus beetle** (Crioceris 12-punctata). Slate colored grubs about ⅓ in. long or stout, nearly cylindric red beetles with 12 black spots, eating the more tender portions of the plant. Known to occur in the state at Albany, Newark, Brighton, East Amherst, Buffalo and Crosby.

Treatment: spray affected plants with poison.

48 **Flea beetle on sugar beets** (Systena frontalis). Ragged holes and brown spots made by small, jumping, black, red-headed beetles about $\frac{3}{16}$ in. long.

Treatment: spray affected plants with poison or bordeaux mixture.

49 **Blister beetles** (Epicauta cinerea, E. vittata). Feeding in July and August on the foliage of potato and other plants, cylindric, soft beetles about ⅝ in. long and black and gray, or black striped with yellow.

Treatment: as the grubs of these beetles are known to feed on the eggs of grasshoppers and are therefore beneficial, the adults should be destroyed, by spraying affected plants with poison or by beating the insects into pans containing water and kerosene, only when necessary.

50 **Bumble flower beetle** (Euphoria inda). Brownish mottled beetles about 5/8 in. long feeding in ears of green corn, attacking peaches.

Treatment: handpicking.

51 **Stalk borer** (Hydroecia nitela). Wilting potato vines and within a brown, white-striped active caterpillar about 1 in. long. Attacks many thick stalked herbaceous plants.

Treatment: burn infested stalks before September.

52 **Variegated cut worm** (Peridroma saucia). Stout, brownish cut worms with obscure markings and about 1½ in. long. Injurious to various garden plants. Its operations on carnations in a greenhouse are shown.

Treatment: place poisoned baits near plants to be protected.

53 **Zebra caterpillar** (Mamestra picta). Brilliantly marked black and yellow, red-headed caterpillar about 2 in. long frequently found on cabbage, beets and other garden crops.

Treatment: spray affected plants with poison, hellebore or pyrethrum water.

54 **Cabbage butterfly** (Pieris rapae). Large irregular holes eaten in cabbage by a greenish caterpillar. White butterflies abundant in the field.

Treatment: capture the butterflies with nets. Spray young cabbage with poison, older ones with hellebore or pyrethrum water. Dust with lime.

55 **Cabbage thrips** (Thrips tabaci). Cabbage and lettuce show white spots as though blasted, caused by minute yellowish or brown insects.

Treatment: spray affected plants with kerosene emulsion or a soap solution.

56 **Tarnished plant bug** (Lygus pratensis). Small yellowish and black bugs about ¼ in. long, frequenting many plants and injuring most garden crops and some trees.

Treatment: handpicking or dusting with ashes. Burn all rubbish in the fall.

57 **Four lined leaf bug** (Poecilocapsus lineatus). Yellowish bugs with four black stripes and about $\frac{5}{16}$ in. long frequenting various plants and injuring some considerably.

Treatment: dust affected plants with ashes. Spray young with kerosene emulsion. Cut and burn tips of bushes containing eggs.

GRASS INSECTS

58 **Army worm** (Leucania unipuncta). Brownish, white-striped caterpillars about 2 in. long devouring grasses and allied plants.

Treatment: confine by ditching, kill with poisoned baits. Prevent their occurrence by clean culture.

59 **White grubs** (Lachnosterna fusca, Allorhina nitida). Fleshy, white, brown-headed grubs severing grass roots and those of other plants. Allorhina occurs in vicinity of New York city.

Treatment: spray badly infested areas liberally with kerosene emulsion just before a rain. Dig and destroy the grubs.

60 **Grasshoppers.** A number of species attack various crops.

Treatment: place poisoned baits near crops to be protected.

HOUSEHOLD INSECTS

61 **House fly** (Musca domestica). Easily recognized as the common fly around houses.

Treatment: exclude with screens. As it breeds in manure and garbage, keeping this material cleaned up or inaccessible to flies will reduce their numbers.

62 **Bed bug** (Acanthia lectularia), A flattened, reddish insect about $\frac{1}{4}$ in. long frequenting houses, specially those affording numerous cracks where it can find shelter and where uncleanliness prevails.

Treatment: apply benzine, kerosene or other petroleum oil to crevices in infested beds. Corrosive sublimate may be used in same manner. Fumigation with sulfur is valuable wherever possible.

63 **Kissing bug: masked bed bug hunter** (Opsicoetus personatus). A brownish or black insect about $\frac{3}{4}$ in. long. It is attracted by lights, and its young, which conceals itself by a covering of

lint, etc. is said to have a partiality for bed bugs. Not usually harmful, though it can inflict a severe bite or "sting."

Treatment: screens should exclude it most effectually.

64 **Buffalo carpet beetle** (Anthrenus scrophulariae). Larvae easily recognized by their shaggy appearance, being provided with coarse bristles along the sides and at the posterior extremity of the body. The beetles are about 1/8 in. long, black, marked with white and a red line down the middle of the back, widening into three projections.

Treatment: use rugs or matting in place of carpet whenever possible. Infested carpets should be taken up and sprayed with benzine and the cracks in the floor should be filled with plaster of paris before relaying the carpet.

65 **Black carpet beetle** (Attagenus piceus). Light brown cylindric larva with a long "tail" of slender hairs. The adult is a small oval black beetle nearly 3/16 in. long. This species has a decided taste for feathers.

Treatment: same as for the preceding.

66 **Little red ant** (Monomorium pharaonis). The common yellowish red ant about 3/16 in. long that frequents houses in such numbers at times.

Treatment: destroy colony with carbon bisulfid when possible. Attract to sponge filled with sweetened water and kill the collected ants by dropping them in hot water.

67 **Bacon beetle** (Dermestes lardarius). Dark brownish beetle about 5/16 in. long with yellowish band on wing covers. Larva brown, hairy, about 5/8 in. long. Both adult and larva attack bacon, meat, etc.

Treatment: cleanliness and excluding insects from the food.

68 **Croton bug** (Phyllodromia germanica). The smaller, light brown roach about 3/4 in. long found in houses.

Treatment: roach poisons, such as Hooper's fatal food. Paris green with sugar has been used successfully, but is a dangerous poison. Fumigate with sulfur where possible. Entice the bugs to enter vessels partly filled with stale beer, from which no escape is provided.

69 **Cockroach** (Periplaneta orientalis). The larger dark brown species an inch or more long, found in dwellings.

Treatment: same as for the croton bug.

INSECTS AFFECTING STORED GRAINS AND LEGUMINOUS SEEDS.

70 **Grain moth** (Sitotroga cerealella). A small caterpillar about $\frac{7}{16}$ in. long working in various grains and producing a whitish moth with a wing spread of a little over $\frac{1}{2}$ in.

Treatment: fumigate infested grain with carbon bisulfid and treat suspected granaries in the same manner.

71 **Saw toothed grain beetle** (Silvanus surinamensis). A small, brown, slender beetle about $\frac{1}{8}$ in. long found infesting cereals and dried food products.

Treatment: fumigate infested cereals with carbon bisulfid and allow none of its food to lie long undisturbed.

72 **Indian meal moth** (Plodia interpunctella). Whitish caterpillar living in indian meal and other cereals and fastening the particles of grain together with a web. Moth with the outer two thirds of fore wings reddish brown, the inner portion and hind wings light gray.

Treatment: fumigate infested food with carbon bisulfid.

73 **Confused flour beetle** (Tribolium confusum). A rather stout, shining, reddish brown beetle about $\frac{3}{16}$ in long. Very prolific and frequently causes considerable injury.

Treatment: fumigate with carbon bisulfid and clean infested localities.

74 **Bean weevil** (Bruchus obtectus). Small grayish brown beetles about $\frac{1}{8}$ in. long breeding in dry beans and eating out numerous holes.

Treatment: fumigate beans in all infested localities with carbon bisulfid as soon as threshed.

75 **Pea weevil** (Bruchus pisorum). Brownish or black beetles with indistinct white markings, about $\frac{3}{16}$ in. long, infesting peas.

Treatment: same as for bean weevil.

BENEFICIAL INSECTS

76 **Silk worm** (Bombyx mori). Showing eggs, larva, single and double cocoons, those from which moths have emerged, one from which the silk has been reeled, male and female moths, raw silk; also several other species of silk-producing moths.

77 **Pollen carriers.** A great many insects convey pollen from flower to flower and in certain cases there are some very interesting adaptations. Some of the more common pollen carriers are honey bees,

bumble or humble bees, other bees, wasps, flower or Syrphus flies and many others.

78 **Lady bugs.** Certain species are valuable agents in controlling plant lice, which they and their young feed on. Some forms prey on scale insects.

79 **Soldier beetles** (Chauliognathus species). The beetles are among the pollen carriers and the larvae prey on the worm of the codling moth.

80 **Syrphus flies.** The adults are usually seen among flowers, but the work of their frequently brightly colored larvae in reducing the number of plant lice is not so well known. These beneficial maggots are nearly conical and may be found among colonies of plant lice.

81 **Spined soldier bug** (Podisus spinosus). Represents a number of species which prey on other insects. This one feeds on a number of common pests, such as the potato beetle, elm leaf beetle and asparagus beetle grubs.

82 **Red tailed Tachina fly** (Winthemia 4-pustulata). Valuable parasite of army worm, tent caterpillar and several other pests.

LIST OF PUBLICATIONS OF THE ENTOMOLOGIST

The following is a list of the principal publications of the entomologist during the year 1899. 95 are named, with title,[1] place and time of publication and a summary of the contents of each. Volume and page numbers are separated by a colon, the first superior figure tells the column, and the second the exact place in the column in ninths; e. g. 63 : 993^{23} means vol. 63, p. 993, column 2, beginning in the third ninth, i. e. about one third of the way down :

Scale on magnolia and Euonymus. (American gardening, 29 Oct. 1898, 19: 742^{28})

Lecanium tulipiferae Cook and Chionaspis euonymi Comst. from Fishkill on the Hudson are identified and remedies given.

Beneficial bugs. (Country gentleman, 3 Nov. 1898, 63: 868^{44})

The nine pronged wheel-bug, Prionidus cristatus Linn. is figured, briefly described and its beneficial habits given. The masked bed bug hunter, Opsicoetus personatus Linn. is similarly treated and the protection of both forms is urged.

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1 Titles are given as published and in some instances they have been supplied by editors.

A pernicious elm borer. (Country gentleman, 3 Nov. 1898, 63: 869[16]. New England farmer, 26 Nov. 1898, v.76 no.48 p.2)

Describes a serious attack on elms at Berlin Mass. by the elm borer, Saperda tridentata Oliv. and its associates, Neoclytus erythrocephalus Fabr. and Magdalis barbita Say. Several preventives and remedies are given.

Look out for canker worms! (Country gentleman, 10 Nov. 1898, 63: 894[15])

Recent injuries by canker worms are mentioned and the life history of the lime tree winter moth, Erannis tiliaria Harr. received from Gouverneur N. Y., is given.

Hessian fly. (Country gentleman, 17 Nov. 1898, 63: 906[38])

Wheat turning yellow in Michigan is probably caused by Cecidomyia destructor Say.

Elm borer. (Country gentleman, 17 Nov. 1898, 63: 906[46]–7[11])

An unthrifty elm with loose bark, at Utica N. Y. is probably infested by Saperda tridentata Oliv. and species usually associated with it. Several remedies are given.

Grape vine leaf hopper. (Country gentleman, 17 Nov. 1898, 63: 913[31])

Insects from Lahaska Pa. are identified as Typhlocyba comes Say, figured and briefly treated.

Exterminating potato bugs. (Country gentleman, 17 Nov. 1898, 63: 913[41]–14[14])

In response to a report that the potato beetle is kept in subjection by its natural enemies at a locality in Lycoming co. Pa. it is stated that this is out of the ordinary experience. This pest has a large number of insect enemies. One of the more important, Lebia grandis Hentz, is figured and noticed briefly. It probably would not pay to distribute enemies of the potato beetle.

Notes on some insects of the year in the state of New York. (U. S. department of agriculture, division of entomology. Bulletin 17, new series [Rec'd 5 Dec. 1898] p.16–23)

The following species are noticed:

White-marked tussock moth, Notolophus leucostigma Abb. & Sm.; elm leaf beetle, Galerucella luteola Müll.; cherry or pear tree slug, Eriocampoides limacina Retz; Byturus unicolor Say; maple tree pruner, Elaphidion villosum Fabr; Galerucella cavicollis Lec.; apple tree tent caterpillar, Clisiocampa americana Fabr.; forest tent caterpillar, Clisiocampa disstria Hübn.; zebra caterpillar, Mamestra picta Harr.; Xylina laticinerea or X. cinerea Riley [X. antennata Walk.]; elm leaf miner; maple tree scale insect, Pulvinaria innumerabilis Rathv.; Lecanium armeniacum Craw.; Lecanium cerasifex Fitch; San José scale, Aspidiotus perniciosus Comst.

Bean weevil. (Country gentleman, 8 Dec. 1898, 63 : 966[17])

Planting uninfested seed on fresh soil is recommended and the treatment the entire crop in infested localities with carbon bisulfid is advised.

Carbon bisulfid. (Country gentleman, 8 Dec. 1898, 63 : 966[37])

Directions are given for treating grain with carbon bisulfid.

Insects from lily pond. (American gardening, 10 Dec. 1898, 19 : 842[28])

The dragon fly nymphs submitted with the inquiry are predaceous. More probably the depredator on the lily buds was a caddice fly.

Controlling city pests. (Albany evening journal, 10 Dec. 1898, p. 6; *also in* Troy daily times, 10 Dec. 1898; Argus [Albany] 11 Dec. 1898, p. 7; Sunday press [Albany] 11 Dec. 1898, p. 9; Troy budget, 11 Dec. 1898, p. 9)

A general notice recommending the collection of the egg masses of the white-marked tussock moth, Notolophus leucostigma Abb. & Sm.

A destructive borer. (Country gentleman, 15 Dec. 1898, 63 : 993[12])

Notices a very destructive borer, Agrilus anxius Gory, which has seriously injured birches at Buffalo N. Y. The European Agrilus betuleti Ratz. is mentioned.

Everlasting San José scale. (Country gentleman, 15 Dec. 1898, 63 : 993[23])

The recent prohibition of the importation of American nursery stock into France is probably the outcome of resolutions adopted by the Society of agriculturists in France. Mention is made of the interest excited by Aspidiotus perniciosus Comst. in this country and abroad.

Spray barrel on wheels. (Country gentleman, 12 Jan. 1899, 64 : 26[27])

Gives directions for mounting a barrel on wheels and suggests the use of a stone-boat or drag.

14th report on the injurious and other insects of the state of New York for the year 1898. Albany, University of the State of New York, Dec. 1898 [issued 12 Jan. 1899] 150 p. 9 pl. *Also as* Report of the state entomologist for 1898 (New York state museum 52d report, for 1898. Bulletin, v. 5, no. 23. Dec. 1898 [issued 12 Jan. 1899])

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Circular to those interested in entomology. (Issued 6 Feb. 1899. Republished in Argus [Albany] 12 Feb. 1899)

Invites the public to cooperate with the department in the observation of insects.

Squash, melon and cucumber bugs. (Country gentleman, 16 Feb. 1899, 64: 128[12])

A brief general account treating of the following insects: Squash bug, Anasa tristis DeGeer; squash vine borer, Melittia satyriniformis Hübn. (syn. M. cucurbitae Harr.); pickle and melon worms, Margaronia nitidalis Cram. and M. hyalinata Linn.; striped cucumber beetle, Diabrotica vittata Fabr.; northern lady bird, Epilachna borealis Fabr.; cucumber flea beetle, Epitrix cucumeris Harr. and the melon plant louse, Aphis gossypii Glover.

Arsenical poisons. (Country gentleman, 16 Feb. 1899, 64: 128[27])

Discusses several arsenical compounds and recommends the use of arsenate of lead.

13th report on the injurious and other insects of the state of New York for 1897, by J. A. Lintner. Albany, University of the State of New York, 1898 [issued 18 Feb. 1899] 64p., 2 pl. *Also as* Report of the state entomologist for 1897 (New York state museum 51st report for 1897)

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[Introduction to address before the eastern New York horticultural society] (Country gentleman, 2 Mar. 1899, 64: 174[24])

The extension of the upper austral life zone along the Hudson river, and the unexcelled facilities of the stream for the transportation of insects, render this region very interesting and a study of its fauna of great importance. Isolation of orchards is recommended wherever practicable. A few observations on the San José scale are given.

Injurious shade tree insects, with special reference to the elm leaf beetle. Address before the Troy scientific association, 6 Mar. 1899. (Portion published in the Troy times, 7 Mar. 1899. *Also in* Argus [Albany] 12 Mar. 1899, p. 9)

After the work of the elm borer, Saperda tridentata Oliv., and the elm bark louse, Gossyparia ulmi Geoff., is briefly characterized, the elm leaf beetle, Galerucella luteola Müll., is treated under the following heads: injuries, life history and habits, ineffectual measures, spraying with poison, importance of thorough work, approximate cost and the necessity of municipal action.

1 A bibliography and general account is given of each.

Injurious insects of the Hudson river valley. Portion of an abstract of the address delivered before the eastern New York horticultural society. (Rural New Yorker, 18 Mar. 1899, 58: 198[21])

Nearly the same as the above.

Insect enemies of our shade trees and their control, with special reference to the elm leaf beetle. Address delivered before the Albany institute, 4 Ap. 1899. (Extracts from, in Argus [Albany] 5 Ap. 1899, p.6; Press and Knickerbocker [Albany] 5 Ap. 1899, p.8)

Describes the local situation briefly; otherwise nearly same as the address before the Troy scientific association.

Scale on Japan quince. (American gardening, 15 Ap. 1899, 20: 284[23])

Identifies scurfy bark louse, Chionaspis furfurus Fitch, and gives remedies.

Myriapods and mites. (American gardening, 29 Ap. 1899, 20: 321[15])

Spraying with kerosene emulsion is advised for these soil inhabiting forms.

Box elder plant bug. (American gardening, 29 Ap. 1899, 20: 321[16])

Excluding the bugs, Leptocoris trivittatus Say, from the houses is recommended.

Protect the trees from caterpillars. (Argus [Albany] 30 Ap. 1899, p.20. Also in Sunday press [Albany] of same date)

Removing and burning the eggs of the white-marked tussock moth, Notolophus leucostigma Abb. & Sm. is advised.

Ants. (Country gentleman, 4 May 1899, 64: 346[44])

Gives several remedies for ants in houses.

Elm leaf beetle at work. (Troy daily times, 4 May 1899; Troy daily press, 4 May, p.8; Argus [Albany] 5 May, p.4; Times-Union [Albany] 4 May, p.3; Ballston daily journal, 5 May, p.2; Fishkill standard, 6 May, p.2; Rough notes [Valatie N. Y.] 5 May, p.2; Newburgh journal, 5 May, p.2; Sunday press [Albany] 7 May, p.15; Poughkeepsie daily eagle, 9 May, p.8; New York farmer, 11 May, p.4; Rhinebeck gazette, 13 May, p.1; Eastern New York horticulturist, 1899, v.2 no.4 p.13)

States that the beetles, Galerucella luteola Müll., have appeared in numbers and advises spraying at once.

Collection, preservation and distribution of New York insects. (Bulletin New York state museum, v.6 no.26, Ap. 1899 [Issued 6 May] 36p. 29 fig.)

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Forest tent caterpillar. (Country gentleman, 11 May 1899, 64: 367[11])

Identifies eggs of Clisiocampa disstria Hübn. and gives several remedies.

Curious insect tastes. Country gentleman, 11 May 1899, 64: 368[35]; New York farmer. 18 May. p. 8)

Describes work of the black carpet beetle, Attagenus piceus Oliv. in whalebone cane, that of the bristle tail, Lepisma domestica Pack. [Thermobia furnorum Prov.] among papers, mentions the food habits of the cigarette beetle, Lasioderma serricorne Fabr. and refers to lead boring by several insects, specially Sitodrepa panicea Linn.

Cut worms on carnations. (Country gentleman, 11 May 1899, 64: 368[44])

Records an attack by Peridroma saucia Hübn. on carnations in a greenhouse and recommends poisoned bait.

Look out for caterpillars. (Country gentleman, 11 May 1899, 64: 368[46])

General warning is given in regard to the tent caterpillars, Clisiocampa americana Fabr. and C. disstria Hübn.

[Remedies for tent caterpillars] (Daily Saratogian, 15 May 1899, p. 2)

Extracts from 14th report regarding treatment of these pests and the use of insecticides.

[Remedies for forest tent caterpillar.] (Daily Saratogian, 17 May 1899, p. 3 (a portion of the report); 19 May (entire report); also portions in special circular issued by direction of the street commissioners of Saratoga Springs)

Recommends clearing of the trees by individual effort. The caterpillars should be brushed, shaken or burned from the trees and prevented from ascending by the use of cotton bands.

Pests on fruit trees. (Country gentleman, 25 May 1899, 64: 406[45])

Identifies oblique-banded leaf roller, Cacoecia rosaceana Harr.; bud moth, Tmetocera ocellana Schiff.; and cherry aphis, Myzus cerasi Fabr. and gives remedies. Adalia bipunctata Linn. is also noticed as an aid in the destruction of pests.

[Voluntary entomologic service of New York.] (Country gentleman, 25 May 1899, 64: 414[16]; New York farmer, 25 May, p.5; American agriculturist, 27 May, 63: 682[25])

Summary of reports from voluntary observers.

Value of spraying. (Argus [Albany] 29 May, 1899, p.4)

Notices the prompt results obtained in spraying maples infested with forest tent caterpillars, Clisiocampa disstria Hübn.

[Voluntary entomologic service of New York.] (Country gentleman, 1 June 1899, 64: 426[34]; New York farmer, 1 June, 1899, p.5)

Summary of reports from voluntary observers.

Plant lice. (Country gentleman, 1 June 1899, 64: 430[14])

Identifies Aphis rumicis Linn. on Euonymus and gives life history and remedies.

Bark louse and Phytoptus. (Country gentleman, 1 June 1899, 64: 430[17])

Identifies Mytilaspis pomorum Bouché, and Phytoptus quadripes Shim. on silver maple and indicates remedies.

Elm leaf beetle. (Troy budget, 4 June 1899, p.2)

Portions of bulletin on shade tree pests are reproduced, as is also a circular letter urging immediate spraying.

Shade tree pests in New York state. (Bulletin New York state museum v.6 no.27, May, 1899 [issued 5 June] 26p. 8 fig. 5 pl.)

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[Voluntary entomologic service of New York] (Country gentleman, 8 June 1899, 64: 447[22]; New York farmer, 8 June 1899, p. 4)

Summary of reports from voluntary observers.

Forest tent caterpillars. (Country gentleman, 8 June 1899, 64: 448[44])

Gives remedies for these caterpillars, Clisiocampa disstria Hübn. when they occur in numbers on shade trees.

[Voluntary entomologic service of New York] (Country gentleman, 15 June 1899, 64: 466[32]; New York farmer, 15 June 1899, p. 4)

Summary of reports from voluntary observers.

Bordeaux mixture. (Country gentleman, 15 June 1899, 64: 470[14])

This fungicide should cover the plant.

Tent caterpillars. (Country gentleman, 15 June 1899, 64: 470[16])

Recommends arsenical poisons for controlling these pests.

Forest tent caterpillars. (Country gentleman, 15 June 1899, 64: 474[31])

Protection and encouragement of native birds is probably the most practical way of keeping Clisiocampa disstria Hübn. under control in woodlands.

17 year cicada. (Union Springs advertiser, 15 June 1899, p. 2; Cazenovia republican, 15 June 1899, p. 1; Caledonia advertiser, 15 June, p. 2)

Brief notice of the appearance in western central New York of Cicada septendecim Linn.

Galls on maple leaves. (Country gentleman, 22 June 1899, 64: 486[24])

Galls of Phytoptus quadripes Shim. briefly described and treatment indicated.

[Voluntary entomologic service of New York] (Country gentleman, 22 June 1899, 64: 486[45]; New York farmer, 22 June 1899, p. 4)

Summary of reports from voluntary observers.

Kill the elm grubs. (Argus [Albany] 22 June 1899, p. 2)

Brief notice urging the destruction of the grubs of the elm leaf beetle, Galerucella luteola Müll. as they descend for pupation.

[Voluntary entomologic service of New York] (Country gentleman, 29 June, 1899, 64: 506[48]–7[13]; New York farmer, 29 June 1899, p. 4)
Summary of reports from voluntary observers.

Blister beetles. (Country gentleman, 6 July 1899, 64: 526[26])
Ash gray blister beetle, Macrobasis unicolor Kirby, from Aiken, S. C. and the striped blister beetle, Epicauta vittata Fabr. are briefly characterized and remedies are given.

[Voluntary entomologic service of New York] (Country gentleman, 6 July 1899, 64: 526[44]; New York farmer, 6 July 1899, p. 4)
Abstract of reports from voluntary observers.

Cockscomb elm gall. (Rural New Yorker, 18 July 1899, 58: 497[15])
Colopha ulmicola Fitch identified and described.

[Voluntary entomologic service of New York] (Country gentleman, 13 July 1899, 64: 547[27]; New York farmer, 20 July 1899, p. 4)
Summary of reports from voluntary observers.

Kissing bugs. (Argus [Albany] 17 July 1899, p. 8; republished in part in Troy daily times, 18 July 1899)
States that many of the stories are exaggerations. The black corsair, Melanolestes picipes Her.-Sch. and the masked bed bug hunter, Opsicoetus personatus Linn. are briefly noticed as authors of some of the injuries reported.

[Voluntary entomologic service of New York] (Country gentleman, 20 July 1899, 64: 567[17]; New York farmer, 20 July 1899, p. 4)
Abstract of reports from voluntary observers.

[Voluntary entomologic service of New York] (Country gentleman, 27 July 1899, 64: 587[28]; New York farmer, 27 July 1899, p. 4)
Abstract of reports from voluntary observers.

Fall web worm. (Country gentleman, 27 July 1899, 64: 593[21])
Gives life history and remedies for Hyphantria cunea Drury.

Elm tree spraying. (Troy record, 29 July 1899)
Refutes the imputation that elms in New Haven Ct. and vicinity have not been sprayed, refers to the destructive work of the elm leaf beetle, Galerucella luteola Müll. in Albany and Troy, and states that thorough spraying is the only way of controlling the pest.

[Voluntary entomologic service of New York]. (Country gentleman, 3 Aug. 1899, 64: 606[47]–7[13])
Summary of reports from voluntary observers.

Striped blister beetle. (Country gentleman, 10 Aug. 1899, 64: 626[27])
Epicauta vittata Fabr. is identified and remedies are given.

Squash bug. (Country gentleman, 10 Aug. 1899, 64: 626[34])

Anasa tristis DeGeer is described and several methods of fighting it are mentioned.

Spined soldier bug. (Country gentleman, 10 Aug. 1899, 64: 626[37])

The beneficial habits of Podisus spinosus Dallas are described and some of the insect pests on which it preys are named.

Hessian fly. (Country gentleman, 10 Aug. 1899, 64: 628[47]–29[18])

A general account, dwelling mostly on remedies for and preventives of injury by Cecidomyia destructor Say.

[Voluntary entomologic service of New York] (Country gentleman, 10 Aug. 1899, 64: 634[44])

Abstracts from reports of voluntary observers.

[Elm leaf beetle in Troy] (Troy daily times, 12 Aug. 1899)

Declares that where the elms were sprayed thoroughly and at the proper time the results were very satisfactory.

Turnip pest. (Country gentleman, 17 Aug. 1899, 64: 646[14])

Recommends spraying with bordeaux mixture or paris green for the web caterpillar.

Elm leaf beetle. (Country gentleman, 17 Aug. 1899, 64: 646[17])

Identifies Galerucella luteola Müll. from East Greenbush N. Y. and gives remedies.

Rose pest. (Country gentleman, 17 Aug. 1899, 64: 646[36])

Identifies Homoptera lunata Drury, as the species injuring roses at Great Barrington Mass. and gives several remedies.

[Voluntary entomologic service of New York] (Country gentleman, 17 Aug. 1899, 64: 655[11])

Abstract of reports from voluntary observers.

Worms in mushroom bed. (Country gentleman, 24 Aug. 1899, 64: 666[33])

Identifies the attack at Marshfield Hills Mass. as probably that of a species of Sciara and recommends several remedies.

Lilac caterpillars. (Country gentleman, 24 Aug. 1899, 64: 673[11])

Larvae of Promethea moth, Callosamia promethea Drury (syn. Attacus) are briefly described and Dr Lintner's experiment with one is mentioned.

[Voluntary entomologic service of New York] (Country gentleman, 31 Aug. 1899, 64: 698[16])

Abstract of reports from voluntary observers.

Formulas for insecticides and fungicides. (Folder of state department of agriculture, 1899, p. 1–11)

In addition to matter in an earlier edition, the following is given: general directions for the application of insecticides, for the preparation of paris green, london purple, arsenite of lime, arsenate of lead, poison carriers, and for using carbon bisulfid.

Descriptive catalogue of insects exhibited at New York state fair, Syracuse, 4–9 Sep. 1899, p. 1–28. (Folder University of the State of New York, New York state museum)

Gives briefly the characteristics of over 80 species of insects of economic importance and indicates methods of treatment for injurious forms.

Bark louse. (Country gentleman, 7 Sep. 1899, 64: 706[46])

Scurfy bark louse, Chionaspis furfurus Fitch, on apple is identified and a remedy is given.

[Voluntary entomologic service of New York] (Country gentleman, 7 Sep. 1899, 64: 707[13])

Abstract of reports from voluntary observers.

[Sugar maple borer] (Leroy [N. Y.] gazette, 13 Sep. 1899, p. 1)

Describes the injurious work of Plagionotus speciosus Say in Leroy, mentions the associated borer, Tremex columba Linn., and its parasite, Thalessa lunator Fabr. Several preventive and remedial measures are given.

Notes of the year for New York. (Country gentleman, 14 Sep. 1899, 64: 733[16])

The following insects are noticed: willow butterfly, Euvanessa antiopa Linn.; red-headed flea beetle, Systena frontalis Fabr.; forest tent caterpillar, Clisiocampa disstria Hübn.; elm leaf beetle, Galerucella luteola Müll.; asparagus beetles, Crioceris asparagi Linn. and C. 12-punctata Linn.; and 17 year cicada, Cicada septendecim Linn.

Willow butterfly. (Country gentleman, 21 Sep. 1899, 64: 746[25])

Larvae of Euvanessa antiopa Linn. are identified and described, and the principal features of the adult are given.

Strawberry insects. (Country gentleman, 21 Sep. 1899, 64: 746[35])

Gives remedies for white grubs in a strawberry bed.

[Voluntary entomologic service of New York] (Country gentleman, 21 Sep. 1899, 64: 758[15])

Abstracts of reports from voluntary observers.

Potato scab and insects. (Country gentleman, 28 Sep. 1899, 64: 766[21])

Gives several preventives of potato scab and states that the small irregular holes eaten into the potatoes are probably the work of myriapods, though the offenders may be true wire worms.

Controlling insect pests. (Country gentleman, 28 Sep. 1899, 64: 767[26])

Shows the difficulty of constantly maintaining another's point of view and asserts that the Association of economic entomologists heartily indorses all well directed efforts to suppress or exclude foreign insect pests. Though it may be impossible to prevent the eventual introduction of certain insects protection for a time is valuable.

[Voluntary entomologic service of New York] (Country gentleman, 28 Sep. 1899, 64: 767[44])

Abstracts of reports from voluntary observers.

Student collectors of insects. (Times-Union [Albany] 29 Sep. 1899, p.1; Argus [Albany] 30 Sep. 1899, p.5)

Circular letter offering pupils in regents high schools a nominal price for insects.

Katydid eggs. (Country gentleman, 5 Oct. 1899, 64: 786[24])

The eggs of Microcentrum retinervis Burm. are identified and oviposition is described.

White-lined sphinx. (Country gentleman, 5 Oct. 1899, 64: 792[43])

Deilephila lineata Fabr. is identified from a brief description and the moth and larva are described.

CONTRIBUTIONS TO THE COLLECTION 15 OCT. 1898 — 14 OCT. 1899

Hymenoptera

Bumble bees, Bombus fervidus Fabr. and Bombus virginicus Oliv.; honey bee, Apis mellifica Linn. and large carpenter bee, Xylocopa virginica Drury, 21 June; from **W. C. Hitchcock,** Cropseyville N. Y.

Carpenter bee as above, 23 June and wasp, Polistes pallipes St. Farg. 17th Aug.; from Mrs **E. B. Smith,** Coeymans N. Y.

Sphex ichneumonea Linn. 31 July; from **James A. Burns,** Albany N. Y.

Pelopoeus caementarius Drury, 17 Aug.; from Mrs **E. B. Smith,** Coeymans N. Y.

Red ant, Monomorium pharaonis Linn. 1 Sep.; from **G. H. Anderson,** Albany N. Y.

Pelecinus polyturator Drury, 2 Aug.; from **Arthur Carty,** Albany N. Y.

Pupae of Cratotechus species, 6 July; from **Rhoda Thompson,** Ballston Spa N. Y.

Dibrachys boucheanus Ratz., from cocoons of Clisiocampa disstria Hübn., 5 July; from **C. L. Williams,** Glens Falls N. Y.

Pimpla conquisitor Say, from cocoons of Clisiocampa disstria, 5 July; from **C. L. Williams,** Glens Falls N. Y.

Lunate long-sting, Thalessa lunator Fabr. 21 June; from **W. C. Hitchcock,** Cropseyville N. Y. Same, 24 July; from **C. J. Tobin,** Albany N. Y. Same, 8 Aug.; from **H. F. Cleveland,** Leroy N. Y.

Exochilum mundum Say, 17 Aug.; from Mrs **E. B. Smith,** Coeymans N. Y.

Ophion tityri Pack. 21 June; from **W. C. Hitchcock,** Cropseyville N. Y.

Ichneumon seminiger Cress. 14 Ap.; from **Franklin Sherman jr,** Foresthome, Tompkins co. N. Y.

Galls of Holcaspis globulus Fitch on bur oak, 28 Sep.; from **L. E. Boutwell,** Eden N. Y.

Pigeon Tremex, Tremex columba Linn. 5 July; from **F. J. Riggs,** Albany N. Y. Same, 15 specimens, 21 July; from **Alfred Scoons,** Albany N. Y. Same, 3 Aug.; from **A. P. Williams,** Mannsville N. Y.

Urocerus albicornis Fabr. 12 July; from **F. J. Riggs,** Albany N. Y.

Currant borers Janus integer Norton, 7 and 19 Ap.; from **Thomas Tupper,** Corning N. Y.

Monostegia rosae Harris on rose, 15 June; from **W. R. Houston,** Geneseo N. Y.

Larvae of Monophadnoides rubi Harr. on raspberry, 10 June; from **C. H. Stuart,** Newark N. Y.

Dolerus arvensis Say, injuring apple leaves, 3 May; from **Paul Roach,** Quaker Street, Schenectady co. N. Y.

Larvae and pupae of Pteronus ribesii Scop. on leaves of currant, 19 May; from Miss **E. P. Dennison,** Binghamton N. Y. Same, 1 June; from **Rhoda Thompson,** Ballston Spa N. Y.

Lygaeonematus erichsonii Hart. on European larch, 13 June; from **Cyrus Crosby,** Crosby N. Y. Same, 20 June; from Mrs **L. A. Millington,** New Russia N. Y.

Coleoptera

Grain weevil, Calandra granaria Linn. overrunning a house, 2 June; from **Cyrus Crosby,** Crosby N. Y.

Chestnut weevil, Balaninus species, 10 larvae in one chestnut, 31 Oct.; from **J. A. Otterson,** Berlin Mass.

Ovate snout beetle, Otiorhynchus ovatus Linn. 6 July; from **C. C. Merriam,** Lyon Falls N. Y.

Ash gray blister beetle, Epicauta cinerea Forst. on Clematis paniculata, 7 Aug.; from **W. T. Cox,** Millneck, Nassau co. N. Y.

Striped blister beetle, Epicauta vittata Fabr. on potato vines, 2 Aug; from **James Bacon,** Jericho N. Y.

Forked fungus beetle, Boletotherus bifurcus Fabr. 3 Ap; from **C. S. Watrous,** Walton N. Y.

Meal worm, Tenebrio molitor Linn. 22 May; from **C. H. Stuart,** Newark N. Y. Same, 23 June; from Mrs **E. B. Smith,** Coeymans N. Y.

Haplandrus femoratus Fabr. 23 June; from Mrs **E. B. Smith,** Coeymans N. Y.

Bean weevil, Bruchus obtectus Say 31 Oct.; from **M. M. Miller,** Evans Mills, Jefferson co. N. Y. through the state department of agriculture.

Argus tortoise beetle, Chelymorpha argus Licht. on sugar beets in Onondaga co. 31 Aug.; from **G. G. Atwood,** Geneva N. Y.

Clubbed tortoise beetle, Coptocycla clavata Fabr. 23 June; from Mrs **E. B. Smith,** Coeymans N. Y.

Red-headed flea beetle, Systena frontalis Fabr. injuring sugar beets at Syracuse, 3 Aug.; from **G. G. Atwood,** Geneva N. Y.

Cucumber flea beetle, Epitrix cucumeris Harr. on tomatoes and potatoes, 6 June; from **C. B. Cook,** Oswego Center N. Y.

Grape vine flea beetles, Haltica chalybea Ill. under bark of elm, 8 Nov.; from **M. Goldman,** Pittsfield Mass. Larvae of same on grape, 24 May; from **F. A. Taber,** Poughkeepsie N. Y. Same, 6 June; from **C. H. Stuart,** Newark N. Y.

Larvae of Disonycha ? triangularis Say, skeletonizing elm leaves, 14 July; from **G. S. Graves,** Newport N. Y.

Elm leaf beetle, Galerucella luteola Müll. adults and pupae, 26 July; from **Alice Young,** Clinton Mass. Same, 28 July; from **J. A. Otterson,** Berlin Mass. Same, 11 Aug.; from **N. Davenport,** East Greenbush N. Y.

Chrysomela multiguttata Stäl. 11 May; from Mrs **Glode Young,** Clinton Mass.

Striped cucumber beetle, Diabrotica vittata Fabr. 15 June; from **Rhoda Thompson,** Ballston Spa N. Y. Same, 26 Aug.; from **Harry W. Riggs,** Albany N. Y.

12 spotted asparagus beetle, Crioceris 12-punctata Linn. 22 May and 6 June; from **C. H. Stuart,** Newark N. Y. Same, 29 May; from **J. U. Metz,** East Amherst N. Y. Same, 17 July; from

C. H. Peck, Menands N. Y. Same with larvae, 16 Sep.; from **W. H. McLaughlin,** Oswego Center N. Y. Same from Ithaca N. Y. 22 Sep.; from **Cyrus Crosby,** Crosby N. Y.

Asparagus beetle, Crioceris asparagi Linn. 22 May and 6 June; from **C. H. Stuart,** Newark N. Y. Same, 21 May; from **J. U. Metz,** East Amherst N. Y. Same, 1 June; from **W. R. Houston,** Geneseo N. Y. Same on asparagus, 5 June; from **C. H. Peck,** Menands N. Y. Same, 7 June; from **C. L. Allen,** Floral Park N. Y. Same, 20 June; from **O. Q. Flint,** Athens N. Y. Same with larvae, 16 Sep.; from **W. H. McLaughlin,** Oswego Center N. Y. Same, 18 Sep.; from **Jack Landers,** Whitesboro N. Y.

Raspberry cane girdler, Oberea bimaculata Oliv. girdling blackberry canes, 21 June; from **Lewis Hooker,** Rochester N. Y. Raspberry cane showing oviposition of same, 21 July; from **Mary B. Sherman,** Ogdensburg N. Y.

Larvae of Saperda calcarata Say, from Populus monilifera, 16 Aug.; from **M. F. Adams,** Buffalo N. Y.

Hyperplatys maculatus Hald. 17 Aug.; from Mrs **E. B. Smith,** Coeymans N. Y.

Leptura canadensis Fabr., male, 7 Aug.; from **Mary B. Sherman,** Ogdensburg N. Y.

Cloaked knotty horn, Desmocerus palliatus Forst. 30 June; from **Amos Carty,** Albany N. Y.

Neoclytus erythrocephalus Fabr. 22 May; from **C. H. Stuart,** Newark N. Y.

Sugar maple borer, Plagionotus speciosus Say, 14 June; from **O. Q. Flint,** Athens N. Y. Larvae of same, 11 Aug. and 5 Oct. and sections of sugar maple showing work of same, 1 Sep.; all from **M. F. Adams,** Buffalo N. Y.

Locust borer, Cyllene robiniae Forst. 4 Sep.; from **M. F. Adams,** Buffalo N. Y. Same on locust, 20 Sep.; from **J. E. West,** Poughkeepsie N. Y.

Hickory twig containing maple pruner, Elaphidion villosum Fabr. 2 Nov.; from **Dr S. A. Russell,** Poughkeepsie N. Y. Same, 21 June; from **W. C. Hitchcock,** Cropseyville N. Y.

Orthosoma brunneum Forst. 26 July; from **Jesse Barnet,** Roundlake N. Y. Same, 27 July; from **J. B. Briggs,** Macedon N. Y. Same 8 Aug.; from **J. F. Rose,** South Byron N. Y. Same, 8 Aug.; from **C. E. Childs,** Mayfield N. Y. Same, 12 Sep.; from Miss **A. M. Armstrong,** Belle Isle N. Y.

Rough flower beetle, Osmoderma scabra Beauv., 23 June; from Mrs **E. B. Smith,** Coeymans N. Y. Same, 12 July; from **F. J. Riggs,** Albany N. Y. Same, 28 July; from **Rhoda Thompson,** Ballston Spa N. Y. Same, 29 July; from **J. A. Otterson,** Berlin Mass. Same, 12 Sep.; from Miss **A. M. Armstrong,** Belle Isle N. Y.

Bumble flower beetle, Euphoria inda Linn. 23 May and 21 June; from **W. C. Hitchcock,** Cropseyville N. Y. Same, 30 Sep.; from **D. H. Burrell jr,** Littlefalls N. Y.

Goldsmith beetle, Cotalpa lanigera Linn. 29 July; from **J. A. Otterson,** Berlin Mass.

Spotted grape vine beetle, Pelidnota punctata Linn. 8 July; from **Lillian Flanders,** Albany N. Y. Same, 14 July; from Mrs **B. Gehring,** Albany N. Y. Same, 2 specimens, 19 July; from **John De Groot** and **Edith Phelps,** Albany N. Y. Same, 28 July; from **Rhoda Thompson,** Ballston Spa N. Y. Same, 8 Aug.; from **G. S. Graves,** Newport N. Y. Same, 12 Sep.; from Miss **A. M. Armstrong,** Belle Isle, N. Y.

Light-loving grape vine beetle, Anomala lucicola Fabr. 6 July; from **Rhoda Thompson,** Ballston Spa N. Y.

Polyphylla variolosa Hentz. 28 July; from **George Van V. Warner,** Asbury Park N. J.

Larva of May beetle, Lachnosterna ?fusca Fröhl., infested by Cordyceps ravenelii, 21 Ap.; from **C. E. Childs,** Mayfield N. Y. Larvae of same, 23 May; from **Dr J. B. Washburne,** Delmar N. Y. Same, 1 June; from **Rhoda Thompson,** Ballston Spa N. Y. Same, injuring strawberries, 6 July; from **Mary B. Sherman,** Ogdensburg N. Y.

Rose beetle, Macrodactylus subspinosus Fabr. 22 May; from **C. H. Stuart,** Newark N. Y. Same, 15 June; from **Rhoda Thompson,** Ballston Spa N. Y. Same, injuring hydrangeas and roses, 18 June; from **G. S. Graves,** Newport N. Y. Pupae of same, 23 May; from **Dr J. B. Washburne,** Delmar N. Y.

Hoplia trifasciata Say, on Kieffer pear flowers, 12 May; from **H. C. Peck,** Brighton N. Y.

Stag beetle, Lucanus dama Thunb. 28 July; from **Rhoda Thompson,** Ballston Spa N. Y.

Powder post beetle, Lyctus unipunctatus Hbst., from boards in carriage, 15 June; from Mrs **James Holroyd,** Albany N. Y.

Larva of cigarette beetle, Lasioderma serricorne Fabr. in goldfish food, 23 Nov.; from Mrs **E. C. Anthony,** Gouverneur N. Y.

Telephorus carolinus Fabr. 21 June; from **W. C. Hitchcock,** Cropseyville N. Y.

Larvae of bronze birch borer, Agrilus anxius Gory, infesting birch at Buffalo N. Y. 18 Nov; from **J. C.** ———.? Same on birch, 8 Ap. and pupae of same, 5 May; from **M. F. Adams,** Buffalo N. Y.

Melanophila ?drummondi Kirby, 21 June; from **W. C. Hitchcock,** Cropseyville N. Y.

Divaricated Buprestid, Dicerca divaricata Say, 27 July; from **O. Q. Flint,** Athens N. Y. Same 8 Aug.; from **G. S. Graves,** Newport N. Y. Same 29 Aug.; from Mrs **E. B. Smith,** Coeymans N. Y.

Chalcophora liberta Germ. 21 June; from **W. C. Hitchcock,** Cropseyville N. Y.

Owl beetle, Alaus oculatus Linn. 1 July; from **J. U. Metz,** East Amherst N. Y. Same, 17 July; from **C. E. Chapman,** Peruville N. Y. Same, 21 June; from **W. C. Hitchcock,** Cropseyville N. Y.

Cadelle, Tenebriodes mauritanica Linn. larva, 26 Aug.; from Mrs **F. J. Riggs,** Albany N. Y.

Ips quadriguttatus Fabr. 30 Sep. from **D. H. Burrell jr,** Littlefalls N. Y.

Buffalo carpet beetle, Anthrenus scrophulariae Linn. and Anthrenus verbasci Linn. 20 Feb. from **Prof. Charles H. Peck,** Menands N. Y.

Whalebone cane eaten by larvae of black carpet beetle, Attagenus piceus Oliv. found among the effects of the late Dr Hall, 13 Dec. from **J. M. Clarke,** Albany N. Y. Adult of same, 17 Aug. from Mrs **E. B. Smith,** Coeymans N. Y.

Bacon beetle, Dermestes lardarius Linn. in meat box, 15 June; from **W. R. Houston,** Geneseo N. Y. Same working in pine floor of house, 1 July; from **J. U. Metz,** East Amherst N. Y.

Saw-toothed grain beetle, Silvanus surinamensis Linn. 2 Aug.; from **L. H. Hurd,** Albany N. Y. Same, 26 Aug.; from Mrs **F. J. Riggs,** Albany N. Y.

Pentilia misella Lec. among plant lice on elm leaves, 2 June; from **Cyrus Crosby,** Crosby N. Y.

Two spotted lady bug, Adalia bipunctata Linn. larvae and pupae, 3 and 6 June; from **J. Jay Barden,** Stanley N. Y. 35 specimens of same, 14 Oct.; from **F. E. Dawley,** Fayetteville N. Y.

Carrion beetle, Silpha americana Linn. 3 Ap.; from **C. S. Watrous,** Walton N. Y. Same, 23 May; from **W. C. Hitchcock,** Cropseyville, N. Y.

Harpalus caliginosus Fabr. 23 May; from **Dr J. B. Washburne,** Delmar N. Y. Same, 26 Aug.; from **F. J. Riggs,** Albany N. Y.

Harpalus pennsylvanicus DeGeer, 17 Aug. from Mrs **E. B. Smith,** Coeymans N. Y.

Agonoderus pallipes Fabr. 21 June; from **W. C. Hitchcock,** Cropseyville N. Y.

Platynus cupripennis Say, 14 Ap.; from **Franklin Sherman jr.** Foresthome, Tompkins co. N. Y.

Calosoma scrutator Fabr. 13 June; from **Herman Sellnow,** Albany N. Y.

Purple tiger beetle, Cicindela purpurea Oliv. 3 Ap.; from **C. S. Watrous,** Walton N. Y.

Six spotted tiger beetle, Cicindela 6-guttata Fabr. 22 May; from **Alice Young,** Clinton Mass. Same, 3 Ap.; from **C. S. Watrous,** Walton N. Y.

Diptera

Sheep tick Melophagus ovinus Linn. from sheep, 25 May; from **Rhoda Thompson,** Ballston Spa N. Y.

Bot fly, Gastrophilus equi Fabr. female, 21 June; from **W. C. Hitchcock,** Cropseyville N. Y.

Pupae of ? Eristalis tenax Linn. from **O. Q. Flint,** Athens N. Y.

Large black horse fly, Tabanus atratus Fabr. 21 July; from **Albert Kelly** and **Frank Riordan,** Albany N. Y. Same 26 Aug.; from **F. J. Riggs,** Albany N. Y.

Chrysops niger Macq. 23 May; from **W. C. Hitchcock,** Cropseyville N. Y. Same 23 June; from Mrs **E. B. Smith,** Coeymans N. Y.

Pupae of Sciara species in moss, 23 Nov. from Mrs **E. C. Anthony,** Gouverneur N. Y.

Wheat midge, Diplosis tritici Kirby, infesting wheat, 20 June; from Miss **A. M. Armstrong,** Belle Isle N. Y.

Wheat stems infested with Hessian fly, Cecidomyia destructor Say, 18 June and 1 July; from **J. U. Metz,** East Amherst N. Y. Same

20 June; from Miss **A. M. Armstrong,** Belle Isle N. Y. Same in wheat from Illinois, 20 Oct.; from **C. W. Stuart & Co.,** Newark N. Y.

Willow twigs infested with Cecidomyia species, 15, 18, 22 Mar.; from **H. C. Peck,** Brighton N. Y.

Lepidoptera

Chrysalis of milkweed butterfly, Anosia plexippus Linn. 19 July; from **T. B. Basselin,** Croghan N. Y. Adults of same, as follows: 24 July; from Mrs **G. L. Flanders,** Albany N. Y. 5 Aug.; from **Helen Monahan,** Albany N. Y. (8 specimens) 5 Aug.; from **Amos Carty,** Albany N. Y. 17 Aug. from Mrs **E. B. Smith,** Coeymans N. Y. 28 Aug.; from **E. J. Preston,** Amenia N. Y. Discolored chrysalis of same, 26 Sep. from **C. H. Stuart,** Newark N. Y.

Red spotted purple, Basilarchia astyanax Fabr. 27 July; from **Marguerite Riggs,** Albany N. Y.

Viceroy, Basilarchia archippus Cram. 4 specimens, 21 June; from **W. C. Hitchcock,** Cropseyville N. Y.

Larva of violet tip, Polygonia interrogationis Fabr. on currant, 31 May; from **G. S. Graves,** Newport N. Y. Same, 15 June; from **Rhoda Thompson,** Ballston Spa N. Y. Same and work on hop leaves, 12 Aug.; from **W. B. Dupree,** Centerport N. Y.

Willow butterfly, Euvanessa antiopa Linn. larvae on maples, 5 June; from **A. P. Finder,** Troy N. Y. Same on elm, 7 June; from **G. M. Ingalsbe,** Sandyhill N. Y. Same, 9 June; from **S. L. Frey,** Palatine Bridge N. Y. Same on elm, 9 June; from Mrs **Glode Young,** Clinton Mass. Same on elm, 9 June; from **E. T. Schoonmaker,** Albany N. Y. Same, 12 June; from **J. H. Durkee,** Sandyhill N. Y. Same, 15 June; from **Rhoda Thompson,** Ballston Spa N. Y. Same 21 June; from **W. C. Hitchcock,** Cropseyville N. Y. Same, 29 June; from **H. S. Ambler,** Chatham N. Y.

Great spangled fritillary, Argynnis cybele Fabr. three specimens; meadow fritillary, Brenthis bellona Fabr.; pearl crescent, Phyciodes tharos Drury; American copper, Heodes hypophleas Boisd.; and clouded sulfur, Eurymus philodice Godt. male and female, 21 June; from **W. C. Hitchcock,** Cropseyville N. Y.

Cabbage butterfly, Pieris rapae Linn. 12 Sep.; from Miss **A. M. Armstrong,** Belle Isle N. Y.

Pupa of the blue swallow-tail, Laertias philenor Linn. from larva on Dutchman's pipe, 8 Aug.; from **Charles Lyman,** Bellport N. Y.

Black swallow-tail, Papilio polyxenes Fabr., 2 specimens, 21 June; from **W. C. Hitchcock,** Cropseyville N. Y. Larva of same, 22 June; from **Cyrus Crosby,** Crosby N. Y. Same, 6 July; from **Rhoda Thompson,** Ballston Spa N. Y. Tiger swallow-tail, Jasoniades glaucus Linn., four specimens, 21 June; from **W. C. Hitchcock,** Cropseyville N. Y.

Larva of Thyreus abbotii Swains. 5 July; from **Harold S. Downer,** Albany N. Y. Same, 5 July; from **O. Q. Flint,** Athens N. Y. Same 15 July; from **M. Goldman,** Pittsfield Mass. Same, 17 Aug.; from Mrs **L. A. Millington,** New Russia N. Y.

Tomato worm, Phlegethontius celeus Hübn. 3 Aug.; from **H. U. Swinnerton,** Cherry Valley N. Y. Same, 3 Aug.; from **J. H. Farrell,** Albany N. Y. Same, 20 Oct.; from Mrs **E. B. Smith,** Coeymans N. Y.

White-lined sphinx, Deilephila lineata Fabr. 12 Aug.; from **John Jackson,** Albany N. Y. Same, 17 Aug.; from Mrs **E. B. Smith,** Coeymans N. Y. Same, 26 Aug.; from **F. J. Riggs,** Albany N. Y. Same, 28 Aug.; from **V. P. D. Lee,** Altamont N. Y. Same, August; from **O. Q. Flint,** Athens N. Y. Same, 11 Oct.; from **B. Walton Smith,** captured near Paul Smiths in the Adirondacks, about 20 Sep. 1879.

Philampelus pandorus Hübn. 11 July; from **Dr J. B. Washburne,** Delmar N. Y. Same, 5 Aug.; from **Catherine Fivey,** Albany N. Y. Larva of same, 28 Aug. from **C. E. Childs,** Mayfield N. Y. Same, 31 Aug.; from Miss **F. L. Briggs,** Coeymans N. Y.

Grape vine hog-caterpillar, Ampelophaga myron Cram. parasitized by Apanteles congregatus Say, 20 July; from **H. M. Pollock,** Patria N. Y.

Painted footman, Hypoprepia fucosa Hübn. and Haploa confusa Lyman; from **Addison Ellsworth,** Binghamton N. Y.

Harlequin caterpillar, Euchaetes egle Drury, 27 Aug.; from Mrs **E. B. Smith,** Coeymans N. Y.

Hickory tussock moth, Halisidota caryae Harr. 21 June; from **W. C. Hitchcock,** Cropseyville N. Y. Larva of same 28 July; from **J. A. Otterson,** Berlin Mass. Larva of same 29 Aug.; from Mrs **E. B. Smith,** Coeymans N. Y.

Halisidota tessellaris Abb. and Sm. 19 May; from **Addison Ellsworth,** Binghamton N. Y.

Adult female and eggs of Estigmene acraea Drury, 9 June; from **S. L. Frey,** Palatine Bridge N. Y.

Fall web worm, Hyphantria cunea Drury, larvae on apple, 30 June; from Miss **F. L. Briggs,** Coeymans N. Y. Same, 1 July; from **O. Q. Flint,** Athens N. Y.

Larvae of Isabella tiger moth, Pyrrharctia isabella Abb. and Sm. 20 Oct.; from Mrs **E. B. Smith,** Coeymans N. Y.

Spilosoma virginica Fabr. 17 Aug.; from Mrs **E. B. Smith,** Coeymans N. Y. Same, 12 Sep.; from Miss **A. M. Armstrong,** Belle Isle N. Y.

Euprepia parthenice Kirby and Euprepia arge Drury; from **Addison Ellsworth,** Binghamton N. Y.

Eight spotted forester, Alypia octomaculata Fabr. 9 June; from **F. J. Riggs,** Albany N. Y. Larva of same on grape vine, 17 June; from **J. Jay Barden,** Stanley N. Y.

Brown tail moth, Euproctis chrysorrhoea Linn. in its various stages; from **A. H. Kirkland,** Malden Mass.

Female and eggs of Notolophus antiqua Linn. 28 Sep.; from Mrs **E. C. Anthony,** Gouverneur N. Y.

Eggs of white-marked tussock moth, Notolophus leucostigma Abb. and Sm. 5 Dec.; from **Dr J. B. Washburne,** Delmar N. Y. Same on apple and plum, 3 Feb.; from Geneva N. Y. through state department of agriculture.

Saddle back caterpillar, Sibine stimulea Clem.; 15 Aug. from **O. Q. Flint,** Athens N. Y. Same on sweet peas, 22 Sep.; from Mrs **W. T. Cox,** Millneck N. Y.

Nadata gibbosa Abb. and Sm. from **Addison Ellsworth,** Binghamton N. Y.

Larvae of Symmerista albifrons Abb. and Sm. on white oak, 12 and 17 Aug.; from **W. B. Dupree,** Centerport N. Y.

Yellow-necked apple tree caterpillar, Datana ministra Drury, on quince, 26 Aug.; from **C. H. Peck,** Menands N. Y. Same, 29 Aug.; from **G. S. Graves,** Newport N. Y.

Red-humped apple tree caterpillar, Schizura concinna Abb. and Sm. on apple, 1 July; from **S. B. Huested,** Blauvelt N. Y.

Larva of Schizura unicornis Abb. and Sm. on prune, 29 Aug.; from **Joseph Foord & Sons,** Auburn N. Y.

Bag worm, Thyridopteryx ephemeraeformis Haw. on oak, 9 Aug.; from **Florence W. Myers,** Mt Vernon N. Y.

Cecropia moth, Samia cecropia Linn. two specimens, 21 June; from **W. C. Hitchcock,** Cropseyville N. Y. Same, 5 July; from **George Gamble,** Albany N. Y. Larvae of same, 15 July; from

Rhoda Thompson, Ballston Spa N. Y. Larva of same, 9 Aug.; from **William Osborn,** Albany N. Y.

Larvae of Promethea moth, Callosamia promethea Drury, on lilac, 8 Aug.; from **W. H. Coleman,** Albany N. Y.

Luna moth, Tropaea luna Linn. 30 June; from Miss **McCulloch,** New Scotland N. Y.

Polyphemus moth, Telea polyphemus Cram. 30 June; from **Theresa E. Johnson,** Streetroad N. Y. Same, 11 July; from Mrs **Hurley,** Albany N. Y. Larva of same on oak, 16 Aug.; from **Mary B. Sherman,** Ogdensburg N. Y. Same, 12 Sep. from Miss **A. M. Armstrong,** Belle Isle N. Y.

Io moth, Automeris io Fabr. 15 June; from **Rhoda Thompson,** Ballston Spa N. Y. Larva of same on corn, 28 Aug.; from **Charles E. Childs,** Mayfield N. Y. Larva of same, 29 Aug.; from Mrs **E. B. Smith,** Coeymans N. Y.

Larvae of Anisota senatoria Abb. and Sm. on oak, 17 Aug.; from **W. B Dupree,** Centerport N. Y.

Imperial moth, Basilona imperialis Drury with eggs, 30 June; from **Rhoda Thompson,** Ballston Spa N. Y. Same, 18 July; from **George Gamble,** Albany N. Y. Same, 19 July; from **Gustav Sickinger,** Albany N. Y. Larva of same, 27 Aug. from **Eunice S. Lamson,** Mannsville N. Y.

Egg belts of forest tent caterpillar, Clisiocampa disstria Hübn. abundant in orchards, 3 Feb.; from Geneva N. Y. through state department of agriculture. Same on maple, 18 Mar.; from **J. Thomson,** Rochester N. Y. Same, 24 Mar. from **C. H. Darrow,** Geneva N. Y. Larvae of same on apple, 10 May; from **G. A. Flashover,** Colonie N. Y. On cherry, 12 May; from Mrs **E. B. Smith,** Coeymans N. Y. 11 May; from **C. H. Peck,** Menands N. Y. On pear, 24 May; from **C. H. Peck,** Menands N. Y. 29 May; from Mrs **E. L. Strong,** Ogdensburg N. Y. 1 June; from **C. C. Merriam,** Lyon Falls N. Y. Same, 1 June; from **J. H. Durkee,** Sandyhill N. Y. On maple, 5 June; from **A. P. Finder,** Troy N. Y. 6 June; from **G. T. Powell,** Ghent N. Y. 6 June; from **James Hendricks,** Slingerlands N. Y. 20 June; from **Mary B. Sherman,** Ogdensburg N. Y. Same and pupae, 26 June; from **C. C. Merriam,** Lyon Falls N. Y. Cocoons of same in various leaves, 1 July; from **G. S. Graves,** Newport N. Y. and 6 July; from **Rhoda Thompson,** Ballston Spa N. Y. Eggs of same on apple, 28 July; from **Mary B. Sherman,** Ogdens-

burg N. Y. Numerous egg belts of same, 29 Aug. from **G. S. Graves,** Newport N. Y.

Apple tree tent caterpillar, Clisiocampa americana Fabr. eggs on apple, 3 Mar.; from **J. Jay Barden,** Stanley N. Y. Same 6 Mar.; from **J. Thompson,** Cobleskill N. Y. Larvae of same, 22 May; from Miss **A. M. Armstrong,** Belle Isle N. Y. Same, 1 June; from **C. C. Merriam,** Lyon Falls N. Y. Same, 1 June; from **J. H. Durkee,** Sandyhill N. Y. Egg belts of same 29 Aug.; from **G. S. Graves,** Newport N. Y.

Larva of lappet moth, Tolype velleda Stoll, from Burlington Vt. 8 July; from **P. K. Nott,** Troy N. Y. Same, 27 July; from **Richard DeGroot,** Albany N. Y.

Arsilonche albovenosa Goeze., Acronycta oblinita Abb. and Sm., Acronycta dactylina Grt., Microcoelia diphteroides Guen.; from **Addison Ellsworth,** Binghamton N. Y.

Variegated cut worms, Peridroma saucia Hübn. attacking carnations, 28 Ap.; from **Charles Limmer,** Cobleskill N. Y.

Noctua c-nigrum Linn. and Feltia subgothica Haw. from **Addison Ellsworth,** Binghamton N. Y.

Striped cut worm, Carneades tessellata Harr. attacking cab bage, 12 Sep.; from **C. L. Allen,** Floral Park N. Y.

Dark-sided cut worm, Carneades messoria Harr. 23 May; from **Dr J. B. Washburne,** Delmar N. Y.

Zebra caterpillar, Mamestra picta Harr. on strawberry, 6 June from **G. T. Powell,** Ghent N. Y.

Mamestra cristifera Walk., M. renigera Steph., M. pur; purissata Grt., M. subjuncta Gr. and Rob., Xylophasia devastatrix Brace; from **Addison Ellsworth,** Binghamton N. Y. X. devastatrix Brace, 12 Sep.; from Miss **A. M. Armstrong,** Belle Isle N. Y. X. arctica Boisd. 7 July; from **O. Q. Flint,** Athens N. Y. Same, 28 July; from **Rhoda Thompson,** Ballston Spa N. Y.

Dipterygia scabriuscula Linn., Brotolomia iris Guen., Hydroecia velata Walk. 19 May; from **Addison Ellsworth,** Binghamton N. Y.

Hydroecia nitela Guen. larva in potato stalk, 6 June; from **Thomas Tupper,** Corning N. Y. Same, 13 July; from **C. L. Williams,** Glens Falls N. Y.

Leucania multilinea Walk. 21 June; from **W. C. Hitchcock,** Cropseyville N. Y. Same, male and female, Amphipyra pyra-

midoides, Guen., Scopelosoma graefiana Grt., Cucullia asteroides Guen., Plusia simplex Guen.; from **Addison Ellsworth,** Binghamton N. Y.

Plusia precationis Guen., 8 July; from **Marguerite Riggs,** Albany N. Y.

Chamyris cerintha Treits; from **Addison Ellsworth,** Binghamton N. Y.

Catacola unijuga Walk. 18 July; from **George Gamble,** Albany N. Y.

Larva of Homoptera lunata Drury, injuring rosebuds, 8 Aug.; from Great Barrington Mass. through *Country gentleman.*

Eggs of fall canker worm, Alsophila pometaria Harr. on maple probably, 15 Mar.; from **J. Thomson,** Rochester N. Y.

Haematopis grataria Fabr. from **Addison Ellsworth,** Binghamton N. Y. Same, male and female, and Synchlora glaucaria Guen. 21 June; from **W. C. Hitchcock,** Cropseyville N. Y.

Currant span worm Diastictis ribearia Fitch on currant, 7 June; from **Mary B. Sherman,** Ogdensburg N. Y.

Lycia cognataria Guen., Rhaphidodemas titea Cram.; from **Addison Ellsworth,** Binghamton N. Y.

Lime tree winter moth, Erannis tiliaria Harr. 28 Oct.; from Mrs **E. C. Anthony,** Gouverneur N. Y. Larvae of same, 1 June; from **C. C. Merriam,** Lyon Falls N. Y.

Cingilia catenaria Cram.; from **G. S. Graves,** Newport N. Y.

Xanthotype crocataria Fabr., Euchlaena serrata Drury, Endropia bilinearia Pack., Azelina peplaria Hübn.; from **Addison Ellsworth,** Binghamton N. Y. Pyrausta futilalis Led. from dogbane, 24 May; from **Cyrus R. Crosby,** Crosby N. Y.

Clydonopteron tecomae Riley, reared from pods of Tecoma radicans, 24 Jan.; from **F. C. Pratt,** Washington D. C.

Work of leaf crumpler, Mineola indigenella Zell. from Michigan, 21 June; from **J. F. Rose,** South Byron N. Y.

Larvae of gartered plume moth, Oxyptilus periscelidactylus Fitch on grape, 5 June; from **C. H. Peck,** Menands N. Y. Same, 1 June; from **Rhoda Thompson,** Ballston Spa N. Y.

Larvae of cherry Tortrix, Cacoecia cerasivorana Fitch, 19 June; from **Jeanette C. Miller,** Aldercreek N. Y.

Hibernacula and larvae of bud moth, Tmetocera ocellana Schiff. 11 May; from **M. V. Slingerland,** Ithaca N. Y.

Larvae of codling moth, Carpocapsa pomonella Linn. 5 Dec.; from **Dr J. B. Washburne,** Delmar N. Y.

Pistol case bearer, Coleophora malivorella Riley, 3 Feb.; from Geneva N. Y. through state department of agriculture. Same on apple, 3 Mar.; from **J. Jay Barden,** Stanley N. Y.

Maple leaves mined by Lithocolletis aceriella Clem. 10 Sep.; from **Jeanette C. Miller,** Aldercreek N. Y.

Leaves of chestnut oak mined by Lithocolletis hamadryadella Clem. 20 July; from **C. Cruger,** Cruger's Island N. Y.

Larvae of apple leaf miner, Tischeria malifoliella Clem. 2 Nov.; from Forestlawn, Monroe co. N. Y. through state department of agriculture.

Apple tree Bucculatrix, Bucculatrix pomifoliella Clem. 3 Feb.; from Geneva N. Y. through state department of agriculture.

Hibernacula of Micropteryx pomivorella Pack. on apple 15, 18, 22 Mar.; from **H. C. Peck,** Brighton N. Y. Hundreds of hibernacula of same on apple twigs, 25, 31 Mar. from **G. G. Atwood,** Geneva N. Y.

Neuroptera

Horned Corydalis, Corydalis cornuta Linn. 17 July; from Mrs **M. B. Witherell,** Shushan N. Y. Same, 20 July; from **Mary B. Sherman,** Ogdensburg N. Y. Same, 19 Aug.; from **W. J. Woodman,** Albany N. Y.

Polystoechotes punctatus Fabr. 26 July; from **Jesse Barnet,** Troy N. Y. Same, 2 Sep.; from **G. S. Graves,** Newport N. Y.

Hemiptera

Sehirus bicolor Linn., Pentatoma (Tropicoris) rufipes Linn., Carpocoris (Pentatoma) fuscispinus Boh. from **G. W. Kirkaldy,** Wimbledon Eng.

Eggs and young of spined soldier bug, Podisus spinosus Dallas, on raspberry, 15 Aug.; from Mrs **H. E. Robinson,** North Nassau N. Y. Same preying on potato beetles, 2 Aug.; from **J. H. Clark,** Moreton Farms N. Y. Same, 17 Aug.; from Mrs **E. B. Smith,** Coeymans N. Y.

Cosmopepla carnifex Fabr., Nezara hilaris Say, 29 Aug.; from Mrs **E. B. Smith,** Coeymans N. Y.

Acanthosoma haemorrhoidale Linn. from **G. W. Kirkaldy,** Wimbledon Eng.

Eggs and young of squash bug, Anasa tristis DeGeer, 31 July; from **H. N. Howe**, Ontario. Same on squash, 17 Aug.; from **W. B. Dupree**, Centerport N. Y. Same, 26 Aug.; from **Harry W. Riggs**, Albany N. Y.

Chinch bug, Blissus leucopterus Say, 14 Ap.; from **Franklin Sherman jr**, Foresthome, Tompkins co. N. Y.

Anthocoris nemoralis Fabr., Anthocoris sylvestris Linn., Miris calcaratus Fall. from **G. W. Kirkaldy**, Wimbledon Eng.

Leptoterna dolobrata Linn. abundant in grass, 2 June; from **Cyrus Crosby**, Crosby N. Y.

Calocoris 6-guttatus Fabr. from **G. W. Kirkaldy**, Wimbledon Eng.

Tarnished plant bug, Lygus pratensis Linn. injuring Japanese plums and quinces, 3 May; from **Paul Roach**, Quaker Street, Schenectady co. N. Y. Same abundant on grape, 2 June; from **Cyrus Crosby**, Crosby N. Y.

Four lined leaf bug, Poecilocapsus lineatus Fabr. injuring potatoes, 17 June; from **J. Jay Barden**, Stanley N. Y. Same, 23 June; from Mrs **E. B. Smith**, Coeymans N. Y. Same, 12 Sep.; from Miss **A. M. Armstrong**, Belle Isle N. Y.

Poecilocapsus goniphorus Say, 17 Aug. from Mrs **E. B. Smith**, Coeymans N. Y.

Capsus (Rhopalotomus) ater Linn. from **G. W. Kirkaldy**, Wimbledon Eng.

Phymata wolffii Stäl. 23 June; from Mrs **E. B. Smith**, Coeymans N. Y. Same, 4 Aug.; from **H. W. Gordinier**, Troy N. Y. Eggs of ?same, 6 Mar.; from **J. Thompson**, Cobleskill N. Y.

Eggs of Acholla multispinosa DeGeer, 6 Mar.; from **J. Thompson**, Brighton N. Y. Adults of same, 15 Aug.; from **O. Q. Flint**, Athens N. Y. Same, 24 Aug.; from **Mary E. Hanks**, Kanona N. Y. Same, 26 Aug.; from **F. J. Riggs**, Albany N. Y. Same, 29 Aug.; from Mrs **E. B. Smith**, Coeymans N. Y.

Wheel bug, Prionidus cristatus Linn. 21 Oct.; from Philadelphia Pa. Sent by Mrs **E. C. Anthony**, Gouverneur N. Y.

Masked bed bug hunter, "kissing bug," Opsicoetus personatus Linn. 15 July; from **J. G. Linsley**, Oswego N. Y. Same, 15 July; from **Dr S. G. Shanks**, Albany N. Y. Same, 31 July; from **A. H. Wright**, Rome N. Y.

Pelocoris femoratus, Pal. Beauv. from America through **G. W. Kirkaldy,** Wimbledon Eng.

Giant water bug, Belostoma americanum Leidy, 24 July; from **Mary B. Sherman,** Ogdensburg N. Y. Same, 27 July; from **Harry Alexander,** Albany N. Y. Same, 4 Aug.; from **Herrman Dresser,** Albany N. Y. Same 15 Aug.; from **J. Berberick,** Albany N. Y.

Benacus griseus Say, 31 May; from **Dr A. M. Young,** Salem N. Y. Same, 1 June; from **J. A. Sweeney,** Albany N. Y. Same 9 June; from Miss **E. P. Dennison,** Binghamton N. Y.

4 Ilyocoris (Naucoris) cimicoides Linn., 4 Nepa cinerea Linn., 4 Notonecta glauca Linn., 1 Notonecta insulata W. Kirby, 4 Corixa praeusta Fieb. from **G. W. Kirkaldy,** Wimbledon Eng. Notonecta americana Fabr. adult and ova, probably from Mexico, 2 lots of Notonecta undulata Say, probably from America, Notonecta undulat var. from Jamaica, Corixa mercenaria Say, ova and adult, probably from Mexico; all through **G. W. Kirkaldy,** Wimbledon Eng.

Hog louse, Haematopinus urius Nitz. from pigs, 25 May from **Rhoda Thompson,** Ballston Spa N. Y.

17 year cicada, Cicada septendecim Linn. 1 June; from **W. R. Houston,** Geneseo N. Y. Same 9 June; from **J. Jay Barden,** Union Springs N. Y. Same 17 June, from Onondaga Valley; from Miss **A. M. Armstrong,** Belle Isle N. Y. Same from Penfield N. Y. 21 June; from **M. S. Baxter,** Rochester N. Y.

Cicada tibicen Linn, (2) one just emerging from pupa, 21 July; from **Frank Nicholl,** Albany N. Y. Same, 29 July; from **Rev. W. H. Roberts,** Utica N. Y. Same, 29 July; from **J. A. Otterson,** Berlin Mass. Same, 17 and 29 Aug.; from Mrs **E. B. Smith,** Coeymans N. Y. Same, 12 Sep.; from Miss **A. M. Armstrong,** Belle Isle N. Y.

Ormenis pruinosa Say on currant bushes, 31 July; from **C. H. Peck,** Menands N. Y.

Fulgora coccinea Walk. from Ceylon, through **G. W. Kirkaldy,** Wimbledon Eng., Eupteryx atropunctata Goeze, Deltocephalus abdominalis Fabr., Thamnotettix subfusculus Fall. and T. prasinus Fall., all from **G. W. Kirkaldy,** Wimbledon Eng.

Two spotted tree hopper, Enchenopa binotata Say, on Celastrus scandens, 5 July; from **M. Goldman,** Pittsfield Mass.

Ceresa diceros Say, 10 Aug.; from **G. S. Graves,** Newport N. Y.

Telamona ampelopsidis Harr. 30 June; from **Harry W. Riggs,** Albany N. Y. Same, 5 July; from **F. J. Riggs,** Albany N. Y.

Chermes abietis Linn. on spruce 25 Aug.; from Mrs **A. G. Fisher,** Batavia N. Y.

Pemphigus acerifolii Riley, 27 July; from **H. N. Otterson,** Bolton Mass.

Galls of Pemphigus ulmifusus Walsh on slippery elm, 30 June; from **G. A. Jackson,** Catskill N. Y.

Cockscomb elm gall, Colopha ulmicola Fitch, 21 June; from **M. T. Willis,** Sandyhill N. Y.

Woolly apple aphis, Schizoneura lanigera Hausm. 2 Dec.; from **C. C. Coe,** Ridge Mills, N. Y. through state department of agriculture. Same on apple, 12 Sep.; from **S. L. Frey,** Palatine Bridge N. Y. Apple limb badly infested with same, 18 Sep.; from **Virgil Bogue,** Albion N. Y.

Schizoneura americana Riley, on elm, 20 June; from **Mary B. Sherman,** Ogdensburg N. Y.

Callipterus betulaecolens Fitch, on birch, 20 June; from **M. F. Adams,** Buffalo N. Y.

?Melanoxanthus salicis Linn. on Russian willows, 6 Sep.; from **T. Guilford Smith,** Buffalo N. Y.

Aphis rumicis Linn. on Euonymus europaeus, 15 May; from **Gertrude Kellogg,** Port Kent N. Y.

Aphis viburni Scop., 25 May; from **Rhoda Thompson,** Ballston Spa N. Y.

Apple aphis, Aphis mali Fabr. on apple, 11 May; from **W. A. Lafler,** Albion N. Y. Same, 20 May, from **Ruth Sherwood,** Fishkill N. Y. Same, 4 June; from **C. L. Allen,** Floral Park N. Y.

Nectarophora destructor Johns. injuring peas, 7 July; from **C. L. Allen,** Floral Park N. Y.

Pseudaonidia species on Camellia japonica, 5 Jan. from New York, through state department of agriculture.

Gossyparia ulmi Geoff. on Ulmus campestris, 6 June, from Flushing L. I., through state department of agriculture.

Maple leaf scale insect, Pseudococcus aceris Geoff. on maple leaves with active young, 20 Sep.; from **O. Q. Flint,** Athens N. Y.

Asterolecanium quercicola Bouché on English oak, 25 Feb. from **G. G. Atwood,** Geneva N. Y. Same on oak, 15 May; from **M. F. Cleary,** Cortland N. Y.

Lecanium pruinosum Comst. MS. Coq. on grape vines, 31 Oct. from Brighton N. Y. through state department of agriculture.

Twigs of Magnolia soulangea badly infested with Lecanium tulipiferae Cook, 19 Oct.; from Fishkill on the Hudson; from **Leonard Barron,** New York.

Lecanium armeniacum Craw. on English gooseberry, 12 Ap.; from **G. G. Atwood,** Geneva N. Y. Same, 3 May; from Brighton N. Y. through state department of agriculture.

Lecanium cerasifex Fitch on peach, 6 Ap.; from **G. G. Atwood,** Geneva N. Y.

English ivy badly infested with the white scale, Aspidiotus nerii Bouché, 29 Dec. from **W. S. Eager,** Berlin Mass.

San José scale, Aspidiotus perniciosus Comst. on willow and several shrubs, 28 Ap.; from Mrs **E. H. Mairs,** Irvington on the Hudson N. Y. Same on apple, 17 Aug.; from **W. B. Dupree,** Centerport N. Y.

Aspidiotus ancylus Putnam, 3 May, from Brighton N. Y.; on Prunus, 19 May from New York; on Betula alba and on Ilex verticillata at Flushing L. I. 26 May; on hemlock, 1 Aug.; on apple twigs, 4 Jan. and 15 Mar. from Brighton N. Y; on currant, 30 Aug. from Geneva N. Y.; all through state department of agriculture. Same on mountain ash, 28 Aug.; from **H. C. Peck,** Brighton N. Y. Same on currant, 22 Aug.; from **P. L. Huested,** Blauvelt N. Y.; 3 Mar.; from **J. Jay Barden,** Stanley N. Y.; 27 Aug.; at Lodi N. Y.; from same.

English oyster shell bark louse, Aspidiotus ostreaeformis Curtis, on apple, 3 Dec. and 3 Feb. from Geneva N. Y. through state department of agriculture; 23 Feb.; from **H. C. Peck,** Brighton N. Y.; 6 Mar.; from **J. Thompson,** Brighton N, Y.; 10 Ap. and 27 Aug.; from **J. Jay Barden,** Stanley N. Y.; 10 Aug.; from near Kinderhook N. Y. through **P. L. Huested;** on dwarf apple, 24 Feb.; from **H. C. Peck,** Brighton N. Y. Probably same on plum, 25 Feb.; from **G. G. Atwood,** Geneva N. Y. and 2 Mar.; from **C. H. Darrow,** Geneva N. Y. Same on plum, 22 May, from **James Buckley,** Lewiston N. Y. through **Henry Lutts,** Youngstown N. Y.; on European plum, 15 Mar.; from Geneva N. Y. through state department of agriculture. Same on cherry, 25 Mar.; from Geneva N. Y. through same,

and 27 Aug. from **J. Jay Barden,** Stanley N. Y. Same on pear from Brighton N. Y. 22 June, through state department of agriculture; 10 Aug.; from near Kinderhook N. Y. through **P. L. Huested;** 28 Aug.; from **H. C. Peck.** Same on elm and on purple leaved plum 22 Aug.; from **P. L. Huested,** Blauvelt N. Y. Probably same, 4 Ap.; from **T. C. Maxwell Bros.** Geneva N. Y. through **G. G. Atwood.**

Peach scale, Diaspis amygdali Tryon, 23 Jan.; from **L. O. Howard,** Washington D. C.

Rose scale, Aulacaspis rosae Sandberg on rose twigs from Baltimore Md. 5 Dec.; from **Leonard Barron,** New York.

Parlatoria viridis Ckll. on recently imported Japanese maples; stock seized by state department of agriculture, 28 Mar. Same on Japanese maples 29 June; from Brighton, through state department of agriculture.

Parlatoria pergandii Comst. on tangerine, 5 Jan.; from New York, through state department of agriculture.

Apple tree bark louse, Mytilaspis pomorum Bouché, 5 Dec.; from **Dr J. B. Washburne,** Delmar N. Y. Same on apple, 25 Feb.; from **G. G. Atwood,** Geneva N. Y. Same, 3 Mar.; from **J. Jay Barden,** Stanley N. Y. Same, 15 Mar.; from Brighton N. Y. through state department of agriculture. Same, 11 May; from **H. C. Peck,** Brighton N. Y. Same on apple and willow, 5 Aug.; from **Dr S. A. Russell,** Poughkeepsie N. Y. Same, on ash, 7 Mar.; from **Isaac Hicks & Son,** Westbury Station N. Y. Same, 28 Ap.; from Mrs **E. H. Mairs,** Irvington on the Hudson N. Y. and 23 May; from **W. B. Diamond,** Montgomery co. Md.

Chionaspis pinifoliae Fitch on pine, 25 Feb.; from **G. G. Atwood,** Geneva N. Y. Same 31 May; from **E. T. Schoonmaker,** Albany N. Y.

Scurfy bark louse, Chionaspis furfurus Fitch, on pear, 25 Feb. from **G. G. Atwood,** Geneva N. Y.; 11 May; from **H. C. Peck,** Brighton N. Y. 1 Sep.; from **J. O. Carleton,** New York. Same on Pyrus japonica, Ap. from Hingham Mass. through **Leonard Barron,** New York. Same on crimson thorn, 7 Mar.; from **Isaac Hicks & Son,** Westbury Station N. Y.

Branches of Euonymus europaeus nearly covered with Chionaspis euonymi Comst. 19 Oct.; from Fishkill on the Hudson, from **Leonard Barron,** New York. Same on lilac, 19 Ap.; from **E. C. Powell,** Greatneck N. Y. Same on Prunus pissardi and other shrubs, Ap.; from Mrs **E. H. Mairs,** Irvington on the Hudson N. Y.

Physopoda

Onion thrips, Thrips tabaci Lind. on lettuce, 15 June; from **W. R. Houston,** Geneseo N. Y.; 1 July; from **G. S. Graves,** Newport N. Y.

Orthoptera

White flower cricket, Oecanthus niveus DeGeer, 17 Aug.; from Mrs **E. B. Smith,** Coeymans N. Y.

Small, striped, ground cricket, Nemobius fasciatus DeGeer, 8 Aug.; from **Rev. W. H. Roberts,** Utica N. Y.

Eggs of katydid, Microcentrum retinervis Burm. on grape; 25 Sep.; from **F. H. Hein,** Philadelphia co. Pa.

Ceuthophilus maculatus Say, male, 17 Aug.; from Mrs **E. B. Smith,** Coeymans N. Y.

Orchelimum vulgare Harr., 17 July; from **F. J. Riggs,** Albany N. Y.

Schistocerca rubiginosa Harr., 23 May; from **W. C. Hitchcock,** Cropseyville N. Y.

Periplaneta orientalis Linn, 21 July; from **Albert Kelly** and **Frank Riordan,** Albany N. Y.

Isoptera

White ant, Termes flavipes Kollar, infesting dwelling house, 30 Mar.; from **W. G. Lewis,** Trinity place, Albany N. Y.

Plecoptera

Leuctra species, 14 Ap.; from **Franklin Sherman jr,** Foresthome Tompkins co. N. Y.

Perla tristis Hagen, 21 June; from **W. C. Hitchcock,** Cropseyville N. Y.

Odonata

Anax junius Drury, male, 17 Aug.; from Mrs **E. B. Smith,** Coeymans N. Y.

Epiaeschna heros Fabr. female, 9 June; from Miss **B. E. Riggs,** Albany N. Y.

Plathemis trimaculata DeGeer, male, 12 June; from **Herman Sellnow,** Albany N. Y.

Thysanura

Thermobia furnorum Prov. 29 May; from Mrs **E. L. Strong,** Ogdensburg N. Y.

Arachnida

Nest of trap door spider, 25 Mar.; from **Eliza B. Torrey,** San Diego Cal.

Red spider, Tetranychus telarius Linn. on apple, 3 Feb.; from Geneva N. Y. through state department of agriculture.

Eggs of clover mite, Bryobia pratensis Garm. on apple twigs, 14 Jan. and 15 Mar.; from Brighton N. Y. through state department of agriculture.

Tyroglyphus ?siro Linn. abundant in wheat bran, 17 Aug.; from **M. Albert Morris,** Oneonta N. Y. through **W. C. Franklin.**

Phytoptus quadripes Shim., 23 May; from **W. B. Diamond,** Montgomery co. Md.

Myriapoda

Young of Julus caeruleocinctus Wood, injuring squashes, 6 July; from **C. C. Merriam,** Lyon Falls N. Y.

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ERRATA

Page 534, line 17, for W. H. Gordinier, read H. W. Gordinier.

Page 539, line 4, for J. H. West, read J. E. West.

Page 611, line 6, page 614, lines 12 and 10 from bottom and page 617, line 9 from bottom, for J. Thompson, read J. Thomson.

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