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U. S. DEPARTMENT OF AGRICULTURE.
DIVISION OF ENTOMOLOGY.

BIBLIOGRAPHY

OF

THE MORE IMPORTANT CONTRIBUTIONS

TO

AMERICAN ECONOMIC ENTOMOLOGY.

PREPARED BY AUTHORITY OF THE SECRETARY OF AGRICULTURE,

BY

SAMUEL HENSHAW.

Parts I, II, and III.

THE MORE IMPORTANT WRITINGS

OF

BENJAMIN DANN WALSH

AND

CHARLES VALENTINE RILEY.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.

1890.

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1889.

FORTY-SEVENTH CONGRESS, FIRST SESSION.

CONGRESS OF THE UNITED STATES,
IN THE HOUSE OF REPRESENTATIVES,
June 24, 1882.

Resolved, By the House of Representatives (the Senate concurring) that there be printed, for the use of the Department of Agriculture, one thousand copies of a special report, entitled "Bibliography of Economic Entomology."

Attest:

EWD. MCPHERSON,
Clerk.

Passed the Senate July 6, 1882.

F. E. SHOBER,
Acting Secretary.

A true copy.

EWD. MCPHERSON,
Clerk.

LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
DIVISION OF ENTOMOLOGY,
Washington, D. C., June 12, 1889.

SIR: In the absence of Professor Riley, who is now at the Paris Exposition in official capacity, I beg to submit for publication Parts I, II, and III of the Bibliography of American Economic Entomology, which was ordered by Congress in July, 1882. Owing to various unforeseen delays this work has not yet been completed. Its preparation was originally assigned by Professor Riley to Mr. B. Pickman Mann, formerly of this Division, and upon the severance of his connection with the Department, in the fall of 1885, it was turned over in an incomplete and fragmentary condition to Mr. Samuel Henshaw, of Boston, who has added greatly to it and practically rewritten the portions already prepared.

The extent of the work renders it advisable to publish it in several parts, and as there is unquestionably a more urgent need on the part of working economic entomologists for a bibliography of the writings of B. D. Walsh and C. V. Riley than of others, on account of their great number and value, these portions have been finished first. Their immediate publication will probably antecede the publication of the final part only by a few months.

Very respectfully, yours,

L. O. HOWARD,
Acting Entomologist.

Hon. J. M. RUSK,
Secretary of Agriculture.

TABLE OF CONTENTS TO PARTS I, II, AND III.

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INTRODUCTION TO PARTS I, II, AND III.

The object of the present lists is to record the principal entomological writings of B. D. Walsh and C. V. Riley. Few will be likely to criticize the association of the names of Walsh and Riley in a list of this kind, so largely devoted to economic entomology, or to question the desirability of collating their writings in advance of others.

As recognized authorities upon entomology, especially from an economic standpoint, their writings have been extensively quoted sometimes with, but frequently without, credit in the agricultural and horticultural journals of the day. These secondary references, though of a certain value when the original is inaccessible, have, as a rule, been omitted. In citing such as are given I have used my personal judgment. To have given all would have increased the size of the list considerably with but a slight increase in its usefulness.

Occasionally, a publisher to meet some popular demand puts the writings of an author into book form without the knowledge of the latter. Such an occurrence has happened more than once with Dr. Riley's writings. To mention but one: In 1877 Messrs. George Rutledge & Sons, of London, published "The Colorado beetle, with suggestions for its repression and methods of destruction," with Dr. Riley's name upon the title-page as author. This is a partial reprint of Potato Pests entirely unsanctioned and published without knowledge of the author. (See *London Times*, October 17, 1887.) These publishers' reprints are omitted from this list. The "S.-b." after the reference of many of the articles from the agricultural and other journals refers to the series of scrap-books used in divisional work.

A biographical sketch of Dr. Walsh is given in the second volume of the *American Entomologist*, Vol. II, No. 3, pp. 65-68, January, 1870.

The chief facts in Dr. Riley's life may be found in the "Commonwealth of Missouri" (1875) and the *National Farmer*, September 20, 1883.

In the preparation of the list I have freely used all data accumulated by the Division, notably the work of Mr. B. P. Mann and a private list of Dr. Riley's.

Many persons, both within and without the Department, have kindly answered my inquiries.—S. H.

BIBLIOGRAPHY OF THE MORE IMPORTANT CONTRIBUTIONS TO AMERICAN ECONOMIC ENTOMOLOGY.

THE WRITINGS OF B. D. WALSH (1860-1873).

1. WALSH, B. D. Bark-lice. <Western Rural. S.-b. No. 3, p. 11.
Habits of *Lecanium* compared with *Aspidiotus* [= *Mytilaspis*].
2. WALSH, B. D. Entomological notes. <Prairie Farmer, 17 May, 1860, [v. 21], n. s., v. 5, pp. 308-309, figs. S.-b. No. 1, pp. 42-43.
Notice of *Coccus harrisii* n. sp. [= *Chionaspis furfurus*]; figure of its scales; description and figure of *Capsus oblineatus* [= *Lygus pratensis*] infesting apple, quince, and pear trees; figure of larva case and imago and description of *Phycita nebulo* [= *Aerobasis indiginella*]; figures of imago and of injuries of *Amphicerus bicaudatus*; habits of the same and of *Scolytus* [= *Xyleborus*] *pyri*, *Saperda bivittata* [= *candida*] and *Chrysobothris femorata*; means against the last.
3. WALSH, B. D. "Cutworms." <Prairie Farmer, 9 August, 1860, [v. 22], n. s., v. 6, pp. 82-83, fig. S.-b. No. 1, pp. 84-85.
Account of the larvæ of *Lachnosterna quercina* [= *fusca*] of *Elateridæ* of *Agrotidæ* and of *Pangus* [= *Harpalus*] *caliginosus*; figures of larvæ and imagos of the same or allied species; also of *Heteronychus* [= *Ligyris*] *relictus*, *Lopha* [= *Bembidium*] *4-maculatum* and *Agonoderus pallipes*.
4. WALSH, B. D. [*Ips quadrisignatus*, Say.] <Prairie Farmer, 1860, [v. 22], n. s., v. 6, p. —.
Ips 4-signatus [= *fasciatus*] attacks growing ears of sweet corn.
5. WALSH, B. D.] "Insect Life." <Proc. Agric. Conv.; Ann. meeting Ill. Nat. Hist. Soc.; Comm. Exerc. State Normal Univ. [Bloomington, Ill.], 1860, pp. 11-12.
Report, compiled from Chicago papers of address delivered before the Illinois Natural History Society; comparison between injurious insects and an invading army; necessity of appropriations for carrying on entomological work; economic entomology in Europe; importance of beneficial insects.

6. WALSH, B. D. Insects injurious to vegetation in Illinois. < Trans. Ill. State Agric. Soc., September, 1861, v. 4, pp. 335-378, figs. 1-11. Separate: 1861, 43 pp., 1 pl. Reprint in part: < Trans. Ill. Nat. Hist. Soc., v. 1. *Prairie Farmer*, 6 December, 1861, [v. —], n. s., v. —, pp. 370-371.

Ravages of injurious insects; enemies of the same; notes on *Cecidomyia destructor*, *Saperda bivittata* [= *candida*], *Chrysobothris femorata*, *Conotrachelus nenuphar* and *Blissus leucopterus*; natural history, ravages and means against *Leucania unipuncta*; figures its larva, pupa and imago; descriptions and figures primary and secondary parasites of the army-worm; figures *Hippodamia* (= *Megilla*) *maculata*, *Coccinella munda* [= *sanguinea*] and a larval coccinellid.

7. WALSH, B. D. From Benj. D. Walsh. < *Illinois Farmer*, October, 1861.

Denies statement attributed by C. Thomas (*Illinois Farmer*, September, 1861), that he (Walsh) believed in the hibernation of the pupa of *Leucania unipuncta*.

8. WALSH, B. D. The army-worm question. < *Prairie Farmer*, 5 December, 1861, [v. 24], n. s., v. 8, pp. 370-371. S.-b., No. 4, p. 22.

Replies to arguments of C. Thomas (*Prairie Farmer*, 1861, v. 8, pp. 306-307), on the hibernation of *Leucania unipuncta*.

9. WALSH, B. D. The army-worm question. Mr. Walsh's reply. < *Field Notes*, 14 December, 1861.

Controversial answer to the assertion of J. H. Klippart (*Field Notes*, 30 November, 1861), that the larvæ of *Leucania unipuncta* are viviparous.

10. WALSH, B. D. The army-worm and its enemies. < *Prairie Farmer*, 1861, [v. 24], n. s., v. 8, p. 4. Reprint: < Trans. Ill. Nat. Hist. Soc., v. 1. *Prairie Farmer*, 6 December, 1861, [v. 24], n. s., v. 8, pp. 370-371.

Popular account of some of the parasites of *Leucania unipuncta*.

11. WALSH, B. D. The army-worm. < *Prairie Farmer*, 1861, [v. 24], n. s., v. 8, pp. 257-258. Reprint: < Trans. Ill. State Agric. Soc., 1861, v. 4, pp. 373-375.

Hibernation of the egg; spring burning as a means against *Lucania unipuncta*; description of *Hockeria* [= *Haltichella*] *perpulchra* n. sp.; notes on other parasites.

12. WALSH, B. D. The army-worm and its insect foes. < *Prairie Farmer*, 1861, [v. 24], n. s., v. 8, pp. 322-323; 337-339; 354-355.

Habits and description of larva and imago of *Leucania unipuncta*; hibernation of the egg; figures of larva, pupa and imago; also of *Exorista* [= *Nemoræa*] *leucaniæ*, *Pezomachus minimus*, *Microgaster* [= *Apanteles*] *militaris*, *Hockeria* [= *Haltichella*] *perpulchra* and *Glyphe viridascens*.

13. WALSH, B. D. Bug preying on honey-bee. < *Prairie Farmer*, 1861. S.-b., No. 4, p. 7.

Unknown heteropteron, said to prey on *Apis mellifica*.

14. WALSH, B. D. The pea and its insect foe. <Prairie Farmer, 1861. S.-b., No. 4, p. 12.
Unknown leaf-miner and leaf-eater on pea; directions for rearing insects.
15. WALSH, B. D. The grain weevil. <Journ. Ill. State Agric. Soc., January, 1862, fig. Reprint: <Trans. Ill. State Agric. Soc. v. 5, pp. 484-485.
Sitophilus [= *Calandra*] *remotepunctata* infests wheat.
16. WALSH, B. D. [*Ithycerus noveboracensis*.] <St. Louis Valley Farmer, March, 1862, v. 14, pp. 82-85, fig.
Ithycerus noveboracensis attacks twigs of fruit trees in nurseries.
17. WALSH, B. D. [Army-worm.] <St. Louis Valley Farmer, 1862, v. 14, p. 161.
Correction of mistake of E. S. Washington (St. Louis Valley Farmer, 1862, v. 14, p. 161), who mistook parasitic larvæ for young *Leucania unipuncta*; economy of parasites of army-worm.
18. WALSH, B. D. [*Brachytarsus variegatus*.] <Journ. Ill. State Agric. Soc., March, 1862, pp. 8-12, fig.
Brachytarsus variegatus parasitic (?) on a large orange-colored cecidomyid (?) larva in stems of wheat.
19. WALSH, B. D. A new insect in wheat, *Bruchus*. <Journ. Ill. State Agric. Soc., April, 1862. Reprint: <Trans. Ill. State Agric. Soc., v. 5, pp. 485-490.
20. WALSH, B. D. [Two apple-tree borers.] <Journ. Ill. State Agric. Soc., June, 1862, pp. 21-23.
Treats of *Chrysobothris femorata* and *Saperda bivittata* [= *candida*].
21. WALSH, B. D. [Colorado potato beetle.] <St. Louis Valley Farmer, July, 1862, pp. 209-210. Reprint (?): <Prairie Farmer, 6 June, 1863, v. —, p. 356, fig.
Doryphora 10-lineata infests egg plants, potato and tomato vines, etc., in Kansas and Iowa.
22. WALSH, B. D. Fire-blight. Two new foes of the apple and pear. <Prairie Farmer, 6 September, 1862, [v. 26], n. s., v. 10, pp. 147-149, fig. Separate: pp. 4.
Fire-blight defined; probably caused by attacks of *Chloroneura malefica* [= *Empoasca viridescens*] and *C. maligna* [= *E. obtusa*]; characters, habits, and ravages of the same; synoptic separation of several genera of *Typhlocybini*; two (2) new genera and thirteen (13) new species are described. For a list of the same see the *Systematic Index*. The figures show *C. malefica* and *C. maligna* and the venation of allied forms.
(NOTE.—The descriptive portion with figures is reprinted in Proc. Bost. Soc. Nat. Hist., February, 1864, v. 9, pp. 314-318.)
23. WALSH, B. D. Plant lice, the corn-root louse, a new enemy to the corn. <Journ. Ill. State Agric. Soc., September, 1862, pp. 8-13, fig. Reprint: <Trans. Ill. State Agric. Soc., v. 5, pp. 491-497, fig.
Aphis maidis (?) infests the roots of young Indian corn as well as the stems of the roasting ears.

24. WALSH, B. D. List of the Pseudoneuroptera of Illinois contained in the cabinet of the writer, with descriptions of over forty new species, and notes on their structural affinities. <Proc. Acad. Nat. Sci. Phil., September, 1862, pp. 361-402.

One hundred and nine (109) species are enumerated; two (2) new genera and forty (40) new species are described. For a list of the same see the *Systematic Index*.

25. WALSH, B. D. [*Erythroneura tricincta* Fitch.] <St. Louis Valley Farmer, October, 1862, pp. 305-306, fig.

Erythroneura [= *Typhlocyba*] *tricincta* on grape-vines.

26. WALSH, B. D. Grasshoppers and locusts. <Journ. Ill. State Agric. Soc., November, 1862, pp. 1-3. Reprint: <Trans. Ill. State Agric. Soc., v. 5, pp. 497-499.

Injuries of locusts in the Mississippi Valley; differences between locusts and Cicadas.

27. WALSH, B. D. On the genera of *Aphidæ* found in the United States. <Proc. Ent. Soc. Phil., December, 1862, v. 1, pp. 294-311, figs. 1-8.

Synoptic separation of the genera; list of seventy (70) species found in the United States, with food habitat; *Aphis* [= *Nectarophora*] *rudbeckiæ* Fitch, *A. vitis* ? Scop., *A. maidis* ? Fitch, *Lachnus caryæ* Harris, *Thelaxes* [= *Colopha*] *ulmicola* Fitch are described; one (1) new genus and eleven (11) new species are described; see the *Systematic Index* for a list of the same; the figures show venation and other details. Two (2) new ants, *Formica aphidicola* and *F.* [= *Lasius*] *latipes*, are described.

28. WALSH, B. D. [Observations on *Papilio glaucus* and *P. turnus*.] <Proc. Ent. Soc. Phil., February, 1863, v. 1, pp. 349-352.

Reasons for considering *turnus* and *glaucus* identical; the latter a dimorphic ♀ of the former; distribution of the two forms; citation of similar case among *Pieridæ* and of analogous one among *Dytiscidæ*; description of larva from which a black ♀ was raised.

29. WALSH, B. D. [Katydid eggs.] <Prairie Farmer, 28 February, 1863, [v. 27], n. s., v. 11, p. 132, fig.

Oviposition of katydid eggs on apple-twigs.

30. WALSH, B. D. Fire-blight. <Prairie Farmer, 4 April, 1863, [v. 27], n. s., v. 11, p. 212, fig. S.-b., No. 1, p. 10.

Description and figures of eggs of *Chloroneura malefica* [= *Empoasca viridescens*] and the slits in which they are deposited in apple-twigs; cause of fire-blight; suggestion of remedies.

31. WALSH, B. D. Insects injurious to fruit trees. <Prairie Farmer, 2 May, 1863, [v. 27], n. s., v. 11, p. 276, fig. S.-b., No. 1, p. 9.

Fruit and foliage of pear-trees destroyed by *Capsus oblineatus* [= *Lygus pratensis*]; description and figure of imago; habits, food-plants, and remedies.

32. WALSH, B. D. The ten-striped spearman. <Prairie Farmer, 6 June, 1863, [v. 27], n. s., v. 11, p. 356, fig. S.-b., No. 1, p. 7.

History, ravages, and means against *Doryphora 10-lineata*; figure of imago; mentions other injurious *Phytophaga*.

33. WALSH, B. D. The plum-gouger; a new foe of the plum. < Prairie Farmer, 13 June, 1863, [v. 27], n. s., v. 11, pp. 372-373, figs. 1-3. S.-b., No. 1, p. 6.

Habits, description, and figures of *Anthonomus* ? *prunicida* n. sp. [= *Coccotorus scutellaris*], injurious to plums; comparison with *Conotrachelus nenuphar*; figure of the latter.

34. WALSH, B. D. The plum-gouger. < Prairie Farmer, 11 July, 1863, [v. 28], n. s., v. 12, p. 21, 2 figs. S.-b., No. 1, p. 10.

Distribution and ravages of *Anthonomus prunicida* [= *Coccotorus scutellaris*]; list of insects found on plum-trees; description of *Conotrachelus puncticollis* n. sp. [= *C. geminatus*]; usefulness of *Reduvius raptatorius* [= *Sinea diadema*]; figures *A. prunicida* and *R. raptatorius*.

35. WALSH, B. D. A new fruit foe. < Prairie Farmer, 18 July, 1863, [v. 28], n. s., v. 12, p. 37, fig. S.-b., No. 1, p. 11.

Description and figure of imago of *Epicærus imbricatus*; injnries to fruit trees and gooseberry-bushes; supposed habits of this and allied species; hibernation of the larva of *Conotrachelus*; description of *C. crataegi* n. sp.

36. WALSH, B. D. Leaf-hopper. < Prairie Farmer, 25 July, 1863, [v. 28], n. s., v. 12, p. 53.

Proconia [= *Oncometopia*] *undata* injurious to grape-vines in southern Illinois; its eggs laid in twigs.

37. WALSH, B. D. Locust borers. < Prairie Farmer, 15 August, 1863, [v. 28], n. s., v. 12, p. 101. S.-b., No. 1, p. 12.

Description and habits of *Clytus* [= *Cyllenc*] *robiniae*; *Clytus* of *Carya* does not attack *Robinia*; *Cossus robiniae* mentioned; larvæ and imagos of *Nitidulidæ* found under decaying bark.

38. WALSH, B. D. Insect friends and insect foes. The twice-stabbed lady-bird. < Prairie Farmer, 1863, [v. 28], n. s., v. 12; 22 August, p. 117, figs. 1, 2; 29 August, p. 133, figs. 3, 4. S.-b., No. 1, pp. 11-12.

Description and figure of imago of *Chilocorus bivulnerus*; figure of larva; destruction of injnrious insects by predaceous insects; brief description of and means against *Lytta cinerea* [= *Macrobasis unicolor*], found on potato, English bean, and apple, and *L.* [= *Epicauta*] *vittata*, on potato; figures *Lytta atrata* [= *Epicauta pennsylvanica*], found on aster and potato, and larva-cases of *Solenobia* sp. from under bark of apple-trees; note on allies of *Solenobia*.

39. WALSH, B. D. Observations on certain N. A. Neuroptera, by H. Hagen, M. D., of Königsberg, Prussia; translated from the original French MS., and published by permission of the author, with notes and descriptions of about twenty new N. A. species of Pseudoneuroptera. < Proc. Ent. Soc. Phil., October, 1863, v. 2, pp. 167-272, fig.

Dr. Hagen's comments relate to the species described in No. 24; the author's notes supplement these and describe three (3) new genera and twenty-three (23) new species; for a list of these, see the *Systematic Index*; descriptions of previously described species, with notes on their habits, distribution, etc., are also given; *Bætis interlineata* [= *Siphilurus femoratus*] is proposed

39. WALSH, B. D.—Continued.

(p. 190) in case *B.* [= *S.*] *femorata* Walsh is distinct from *B.* [= *S.*] *femorata* Say; in a note (p. 255) *Ophiogomphus mainensis* n. sp. is described from Packard's manuscript; the venation of the *Odonata* and the terminal abdominal characters of *Sialis infumata* are figured.

40. WALSH, B. D. On certain remarkable or exceptional larvæ, coleopterous, lepidopterous, and dipterous, with descriptions of several new genera and species, and of several species injurious to vegetation, which have been already published in agricultural journals. <Proc. Bost. Soc. Nat. Hist., February, 1864, v. 9, pp. 286–318.

Habits of the larva of *Cotalpa lanigera*, *Pelidnota punctata*, *Cratonychus* [= *Melanotus*] *incertus*, and *Xyloryctes satyrus*; comparative characters of the larva and imago of *Halisidota antiphola* n. sp. [= *tessellaris*]; description of larva, pupa, and imago of *Sphingicampa* (n. g.) *distigma* n. sp. [= *bicolor*]; characters and affinities of *Dryocampa* [= *Sphingicampa*] *bicolor*?; description of imagos of *Limacodes scapha* and *L.*? [= *Phobetron*] *hyalinus* n. sp., and of larva of the last and *L.*? [= *Phobetron*?] *tetradactylus* n. sp.; description of the larva, pupa, and imago of *Hipparchiscus* n. g. *venustus* n. sp. [= *Aplodes mimosaria*]; habits and description of the larva of an undetermined *Tabanus*, description of the pupa; description of the larva, pupa, and imago of *Midas fulvipes* n. sp., habits of its larva. On pp. 309–318 descriptions of several new species, with brief notes of food-habits, etc., are reprinted from various agricultural journals.

41. WALSH, B. D. On dimorphism in the hymenopterous genus *Cynips*; with an appendix containing hints for a new classification of *Cynipidæ* and a list of *Cynipidæ*, including descriptions of several new species, inhabiting the oak-galls of Illinois. <Proc. Ent. Soc. Phil., March, 1864, v. 2, pp. 443–500, fig.

Detailed observations proving the frequent occurrence of dimorphism in the *Cynipidæ*; *Cynips* [= *Amphibolips*] *aciculata*, a dimorphic form of *C. q. spongifica*; concludes from analogy “that *aciculata* ♀ generates galls which produce by parthenogenesis ♂ *spongifica* exclusively, and that ♀♀ *spongifica* coupling in June with these ♂♂ oviposit in the same month in the young buds of the oak, the eggs lying dormant till the following spring, when some of the eggs produce ♀ *spongifica* in June, and some ♀ *aciculata* in the autumn or early in the following spring, which last in their turn, as before mentioned, generate ♂ *spongifica* to appear in the following June;” interesting details concerning the history of the group are given; relations between the true gall-flies (*Psenides*) and parasitic *Cynipidæ* (*Inquilinæ*); classification and characters of the same; anatomical structure and homologies of the family; the list includes fifteen (15) species inhabiting the various oaks, with descriptions of their galls and of several new species; seven (7) species of *Inquilinæ* are described; for the new species, see the *Systematic Index*; the figures illustrate the anatomy of the abdomen and ovipositor.

42. WALSH, B. D. The four-humped Curculio. A new foe of the apple. <Valley Farmer. Reprint: <Prairie Farmer, 27 August, 1864, [v. 30], n. s., v. 14, p. 131, 2 figs. S.-b., No. 1, p. 28.

Description and figures of *Anthonomus quadrigibbus*, a foe of the apple; comparison with *Conotrachelus nenuphar* and *Anthonomus prunivora* [= *Coccotorus scutellaris*].

43. WALSH, B. D. On the pupa of the ephemeropterous genus *Batisca* Walsh. <Proc. Ent. Soc. Phil.; August, 1864, v. 3, pp. 200-206, fig.

Description and figures of the pupa of *Batisca obesa* Say.

44. WALSH, B. D. On certain entomological speculations of the New England school of naturalists. <Proc. Ent. Soc. Phil., August-September, 1864, v. 3, pp. 207-249.

Discussion of statements, chiefly by Prof. L. Agassiz, upon questions in general entomology. The memoir is divided into sections; in the first, the distribution of insects in North America is discussed in opposition to the views of Agassiz; in the second section the Darwinian theory of the origin of species is discussed and some remarks on the variation of several species are added; in the third and fourth sections the statements of Prof. Agassiz regarding the worm-like larva stage of insects and the resemblances between the pupæ of insects and the Crustacea are discussed and criticised; in the fifth section the author argues that the relative rank of the different orders of insects must be determined from a consideration of all the characters of each order and not from the significance of any one character; the sixth section is a review of Dana's classification of insects on the principle of cephalization; and in the seventh section several erroneous statements and generalizations in the same author's paper on classification are pointed out.

45. WALSH, B. D. On phytophagic varieties and phytophagic species. <Proc. Ent. Soc. Phil., November, 1864, v. 3, pp. 403-430.

Many species feed exclusively upon a single food-plant, while other species feed upon many kinds; correlated with this are certain larval or imaginal differences; when these different forms interbreed they are considered the same species and are termed phytophagic varieties; these when separated with a single kind of food-plant form phytophagic races, and these again by a continuation of their isolation form phytophagic species. Phytophagous forms are most abundant where the imago is wingless. *Diapheromera velii*, *Tingis* [= *Gargaphia*] *tiliæ*, and *T.* [= *G.*] *amorphæ* are described as new; the following are mentioned in the remarks upon species and varieties: *Haltica* [= *Disonychia*] *alternata*, *Chrysomela scalaris*, *Clytus* [= *Cyllene*] *robinæ*, *C.* [= *C.*] *pictus*, *Dryocampa* [= *Sphingicampa*] *bicolor*, *Sphingicampa distigma* [= *bicolor*], *Bombyx* [= *Sericaria*] *mori*, *Halisidota tessellaris*, *H. caryæ*, *H. antiphola* [= *tessellaris*], *Cynips* [= *Amphibolips*] *q. spongifica*, *C.* [= *Andricus*] *q. punctata*, *C.* [= *A.*] *q. podagræ*, and *C.* [= *Amphibolips*] *q. inanis*.

46. WALSH, B. D. On the insects, coleopterous, hymenopterous, and dipterous, inhabiting the galls of certain species of willow. Part 1st—Diptera. <Proc. Ent. Soc. Phil., December, 1864, v. 3, pp. 543-644.

Structural characters, habits, metamorphoses, etc., of *Cecidomyidæ*; remarks on the unity of habits in genera; synopsis of cecidomyioid galls of *Salix*; descriptions of new species, their galls and inquiline; for a list of the new species, see the *Systematic Index*. See No. 197 for Part 2d.

47. WALSH, B. D. The borer. <Colman's Rural World. Reprint: <Prairie Farmer, 6 May, 1865, v. 15, p. 355.

Notice of soap as a means against borers.

48. WALSH, B. D. The new potato-bug and its natural history. <Pract. Ent., 30 October, 1865, v. 1, pp. 1-4.

Record of the spread eastwards of *Doryphora 10-lineata*; description of the egg; food-plants, enemies, and means against the same; comparative characters of *D. juncta* and *D. 10-lineata*; species of *Meloidæ* injurious to the potato.

49. [WALSH, B. D.] The joint-worm. <Pract. Ent., 27 November, 1865, v. 1, pp. 11, 12.

Reasons for disbelieving that the joint-worm is the larva of one of the *Chalcididæ*.

50. WALSH, B. D. On phytophagic varieties and phytophagic species, with remarks on the unity of coloration in insects. <Proc. Ent. Soc. Phil., November-December, 1865, v. 5, pp. 194-216, fig. See: <Amer. Journ. Sci., September, 1865, ser. 2, v. 40, pp. 282-284. <Ann. and Mag. Nat. Hist., November, 1865, ser. 3, v. 16, pp. 383, 384.

Argues for the origin of races and species by phytophagic isolation; refers to *Datana ministra*, *D. contracta*, *Halisidota tessellaris*, *H. antiphola* [= *H. tessellaris*], *H. harrisii* [= *H. tessellaris*], *Arhopalus* [= *Cyllene*] *pictus*, *A.* [= *C.*] *robiniae*, *A. infans* [= *C. decorus*], *Callidium antennatum*, *C. janthinum*, *Conotrachelus nenuphar*, *Doryphora 10-lineata*, and *D. juncta*; unity of coloration explained by assumption of a genetic connection between various species; figure showing bullæ on wing of *Ichneumon*.

51. WALSH, B. D. [Cicada years.] <Pract. Ent., 25 December, 1865, v. 1, pp. 18-19.

Answer to inquiry of M. S. Hill; Cicada districts of the United States, as given by Fitch in N. Y. Rept. I, p. 39; habits of *C.* [= *Tibicen*] *septendecim*.

52. WALSH, B. D. Insects injurious to vegetation in Illinois. <Trans. Ill. State Agric. Soc., 1865, v. 5, pp. 469-483, figs.

Notes on injurious insects in Illinois in 1861; life-history and ravages of *Leucania unipuncta*.

53. WALSH, B. D. The "Thrips" of the vine-growers. What is it? <Pract. Ent., 25 December, 1865, v. 1, pp. 20-21.

The *Thrips* of fruit-growers probably not a true *Thrips*; food-habits of *Thrips*.

54. WALSH, B. D. The grub-worm. <Colman's Rural World, December, 1865. S.-b., No. 1, p. 51.

Habits, ravages, and means against *Lachnosterna quercina* [= *fusca*]; its larva compared with that of *Ligyris relictus*; vernacular names of the *Lachnosterna* and of *Allorhina nitida*.

55. WALSH, B. D. Borers. <Pract. Ent., 29 January, 1866, v. 1, pp. 25-31, figs. 1-8.

Remarks on the name "borer;" figures, natural history, and means against *Saperda bivittata* [= *candida*], *Chrysobothris femorata*, *Bostrichus* [= *Amphicerus*] *bicaudatus*, *Aegeria* [= *Sannina*] *exitiosa*, *A. tipuliformis*, *Clytus* [= *Cyllene*] *robiniae*, *C.* [= *C.*] *pictus*, and *Cerasphorus* [= *Chion*] *cinctus*; need of State aid against injurious insects.

56. [WALSH, B. D.] [*Attagenus?* injuring feathers.] <Pract. Ent., 26 February, 1866, v. 1, p. 34.
Answer to inquiry of R. Parnell; ravages of and means against *Dermestidæ*.
57. [WALSH, B. D.] [Codling moth.] <Pract. Ent., 26 February, 1866, v. 1, p. 34.
Answer to inquiry of Isaac Hicks; natural history and means against *Carpocapsa pomonella*.
58. [WALSH, B. D.] [*Aphididæ*.] <Pract. Ent., 26 February, 1866, v. 1, p. 34.
Answer to inquiry of J. H. Foster, jr.; comparative characters of *Eriosoma* [= *Schizoneura*] *lanigera* and *Pemphigus pyri* [= *Schizoneura lanigera*].
59. [WALSH, B. D.] [Mites mistaken for plant-lice.] <Pract. Ent., 26 February, 1866, v. 1, p. 34.
Answer to inquiry of W. M. Smith; distinctive characters of Insecta and Arachnida; description and habitat of the eggs of *Aphis mali*.
60. [WALSH, B. D.] [Saddle-back caterpillar.] <Pract. Ent., 26 February, 1866, v. 1, p. 34.
Answer to inquiry of S. P. M.; description of the larva and imago of *Empretia stimulca*; urticating properties of the larva.
61. W[ALSH], B. D. [Red-humped prominent.] <Pract. Ent., 26 February, 1866, v. 1, p. 35.
Answer to inquiry of E. D. Wright; life-habits of *Notodonta* [= *Edemasia*] *concinna*.
62. WALSH, B. D. The joint-worm. <Pract. Ent., 26 February, 1866, v. 1, pp. 37-38.
Habitats of the larva of *Cecidomyia destructor* and of *Eurytoma* sp.; criticism of A. Fitch's report upon the latter.
63. W[ALSH], B. D. Entomology all a humbug. <Pract. Ent., 26 February, 1866, v. 1, p. 39.
Fewness of entomologists and the multiplicity of their duties the reason why so little has been effected against noxious insects.
64. W[ALSH], B. D. [Cocoons of Ichneumon-flies.] <Pract. Ent., 26 March, 1866, v. 1, p. 46.
Answer to inquiry of M. S. Hill; life-habits of the *Microgasters*.
65. W[ALSH], B. D. [Mass of eggs.] <Pract. Ent., 26 March, 1866, v. 1, p. 46.
Answer to inquiry of T. R. Payne; characters and life-habits of *Orgyia leucostigma*.
66. [WALSH, B. D.] [Apple-tree caterpillar; parasites.] <Pract. Ent., 26 March, 1866, v. 1, p. 46.
Answer to inquiries of G. E. Brackett; food-plants of *Clisiocampa americana*; characters and habits of *Tachinidæ*; habits of secondary parasites.
67. W[ALSH], B. D. Apple-tree borers. <Pract. Ent., 26 March, 1866, v. 1, p. 47.
Reprint, with remarks, of "Apple-tree borers" (Journ. of Commerce); extract from A. Fitch, of larval habits of *Saperda bivittata* [= *candida*].

68. WALSH, B. D. The white grub. <Pract. Ent., 30 April, 1866, v. 1, pp. 60-62.

Descriptions and habits of the larval states of *Lachnosterna quercina* [= *fusca*] and *Ligyrrus relictus*; ravages and food-habits of the former; the hog as a white-grub destroyer.

69. WALSH, B. D. [Apple-tree scales.] <Pract. Ent., 30 April, 1866, v. 1, p. 64.

Answer to inquiry of L. S. Pennington; descriptions and ravages of *Mytilaspis pomorum* and *Chionaspis furfurus*; *Coccinellidæ* as a means against the former; petroleum as a remedy against bark-lice.

70. WALSH, B. D. [Clothes-moths.] <Pract. Ent., 30 April 1866, v. 1, p. 64.

Answer to inquiry of S. Canby; habits and means against *Tineidæ*.

71. WALSH, B. D. [Poplar borer.] <Pract. Ent., 30 April, 1866, v. 1, p. 64.

Answer to inquiry of P. C. Truman; larva and imago of *Saperda calcarata* infesting cottonwood.

72. WALSH, B. D. [Worms in flour and rye.] <Pract. Ent., 30 April, 1866, v. 1, p. 64.

Answer to inquiry of L. D. Hunt; descriptions and habits of *Tenebrio molitor* and *Dermestes lardarius*.

73. WALSH, B. D. Popular remedies for noxious insects. <Pract. Ent., 28 May, 1866, v. 1, pp. 71-74.

Criticism of various worthless remedies against injurious insects.

74. WALSH, B. D. [*Serica iricolor* Say.] <Pract. Ent., 28 May, 1866, v. 1, p. 77.

Answer to inquiry of B. F. Seibert; description, ravages, and habitat of *Serica iricolor*.

75. WALSH, B. D. [Measuring-worms.] <Pract. Ent., 28 May, 1866, v. 1, p. 77.

Answer to inquiry of T. Siveter; habits of *Ennomos magnaria* [= *alniaria*]; food-plants, habits, and means against *E.* [= *Eudalimia*] *subsignaria* and *Anisopteryx* [= *Paleacrita*] *vernata*.

76. WALSH, B. D. [*Lygus pratensis*.] <Pract. Ent., 25 May, 1866, v. 1, pp. 77-78.

Answer to inquiry of H. B. Howarth; habits and odors of *Lygus pratensis*; changes insects pass through.

77. WALSH, B. D. [Apple-tree insects.] <Pract. Ent., 28 May, 1866, v. 1, p. 78.

Answer to inquiry of C. Cooke; an unnamed tineid moth raised from cocoons off twigs of apple-tree; *Hemiteles* sp. and *Microgaster* sp. bred from cocoons attached to eggs of *Clisiocampa americana*.

78. WALSH, B. D. [Destructive currant-worm.] <Pract. Ent., 28 May, 1866, v. 1, p. 78.

Answer to inquiry of W. M. Smith; cocoon and sexual characters of *Nematus ribis* [= *ribesii*].

79. WALSH, B. D. [Egg slits made by Homoptera.] <Pract. Ent., 28 May, 1866, v. 1, p. 78.

Answer to inquiry of C. Dadant; slits in pear-twigs caused by *Chloroneura malefica* [= *Empoasca viridescens*]; *Proconia* [= *Oncometopia*] *undata* oviposits in grape-vines.

80. WALSH, B. D. [Plant-lice.] <Pract. Ent., 28 May, 1866, v. 1, p. 78.

Answer to inquiry of J. Flournoy; characters, habits, enemies, and means against *Aphididæ*.

81. WALSH, B. D. [Insects injuring plum-trees.] <Pract. Ent., 28 May, 1866, v. 1, p. 78.

Answer to inquiry of A. C. Hammond; *Ægeria* [= *Sannina*] *exitiosa* and an elaterid larva attacking plum-trees; the latter probably attracted by decayed matter, the work of the peach borer.

82. WALSH, B. D. Prof. Dana and his entomological speculations. <Proc. Ent. Soc. Phil., May-June, 1866, v. 6, pp. 116-121.

Rejoinder to J. D. Dana's reply to criticism upon the classification of insects.

83. WALSH, B. D. Clover-worms. <Pract. Ent., 25 June, 1866, v. 1, pp. 82-83.

Summary of published observations concerning *Asopia costalis*; points which need explanation; probable remedy.

84. WALSH, B. D. Click-beetles. <Pract. Ent., 25 June, 1866, v. 1, p. 83.

Note to W.'s "Click-beetles;" snapping of *Elateridæ*; Jaeger's Life of N. Am. Insects and Emmons' N. Y. Report unreliable.

85. WALSH, B. D. Cut-worms. <Pract. Ent., 25 June, 1866, v. 1, pp. 85-86.

Definition, food-habits, and means against cut-worms; climbing habits; cut-worms in California. See Nos. 229, 281.

86. WALSH, B. D. The canker-worm. Finding a mare's nest. <Pract. Ent., 25 June, 1866, v. 1, p. 87.

Criticism of communication in Western Rural; improbability of the report that *Anisopteryx* [= *Paleacrita*] *vernata* deposits her eggs on the ground.

87. WALSH, B. D. Driving nails into fruit trees. <Pract. Ent., 25 June, 1866, v. 1, pp. 87-88.

Uselessness of nails as a means against borers; extracts from various sources, with comments.

88. WALSH, B. D. The new potato-bug. <Pract. Ent., 25 June, 1866, v. 1, pp. 88-89.

Records *Doryphora 10-lineata* at Bloomington and Athens, Ill.; rate of its eastern progress; need of legislative action against injurious insects.

89. WALSH, B. D. [The painted borer.] <Pract. Ent., 25 June, 1866, v. 1, p. 89.

Answer to inquiry of T. C. Wright; sexual difference in the antennæ of *Clytus* [= *Cyllene*] *pictus* bred from hickory.

90. WALSH, B. D. [Bug allied to the chinch-bug.] <Pract. Ent., 25 June, 1866, v. 1, p. 89.

Answer to inquiry of H. B. Howarth; comparative characters of *Blissus leucopterus* and an unnamed lygæid of similar habits.

91. WALSH, B. D. [Canker-worms.] <Pract. Ent., 25 June, 1866, v. 1, p. 89.

Answer to inquiry of C. H. W. Wood; means against *Anisopteryx*.

92. WALSH, B. D. [Apple-tree tineid.] <Pract. Ent., 25 June, 1866, v. 1, p. 89.

Answer to inquiry of C. Cooke; food-plant of *Bucculatrix pomifoliella*.

93. WALSH, B. D. [Spittle insect.] <Pract. Ent., 25 June, 1866, v. 1, p. 89.

Answer to inquiry of M. V. B. Hathaway; life-habits of species of *Aphrophora*.

94. WALSH, B. D. [Insects named.] <Pract. Ent., 25 June, 1866, v. 1, p. 89.

Answer to inquiry of E. Hall; occurrence of *Doryphora 10-lineata* at Athens, Ill.; *Hippodamia* [= *Megilla*] *maculata* devours the eggs of the same; two species of *Cassida* affect the sweet-potato.

95. WALSH, B. D. [Longicorn borers.] <Pract. Ent., 25 June, 1866, v. 1, p. 90.

Answer to inquiry of Dr. Trimble; food-habits of *Orthosoma cylindricum*, [= *brunneum*], *Prionus laticollis*, and *P. imbricornis*.

96. WALSH, B. D. [Canker-worms.] <Pract. Ent., 25 June, 1866, v. 1, p. 90.

Answer to inquiry of F. K. Phoenix; season of oviposition of *Anisopteryx*.

97. WALSH, B. D. [White-pine scale.] <Pract. Ent., 25 June, 1866, v. 1, p. 90.

Answer to inquiry of H. Shimer; *Aspidiotus* [= *Chionaspis*] *pinifolii* infesting *Pinus strobus*.

98. WALSH, B. D. Doctors differ. <Pract. Ent., 30 July, 1866, v. 1, p. 96.

Criticism of communications in agricultural papers; tanners' oil injurious to trees; sulphur plugged in trees does not protect the leaves; sheep in an orchard do not keep away *Conotrachelus nemophar*.

99. WALSH, B. D. The grain plant-louse. <Pract. Ent., 30 July, 1866, v. 1, pp. 96-97.

The insect attacking small grains in Georgia is probably a plant-louse.

100. WALSH, B. D. Popular names for insects. <Pract. Ent., 30 July, 1866, v. 1, p. 97.

The use of the same vernacular name for different insects causes uncertainty in identifying and in suggesting means against injurious insects.

101. WALSH, B. D. Scientific names. <Pract. Ent., 30 July, 1866, v. 1, pp. 97-99.

Explains the necessity of using Latin for scientific names.

102. WALSH, B. D. [Grape-vine insects.] <Pract. Ent., 30 July, 1866, v. 1, pp. 99-100.

Answer to inquiry of C. S. Jackson; habits of an undescribed *Fidia*; injuries to vines by plant-louse (*Aphis vitis*?); enemies of *Aphididae*.

103. WALSH, B. D. [Wire-worms.] <Pract. Ent., 30 July, 1866, v. 1, p. 100.

Answer to inquiry of A. D. Chesebro; summer fallowing as a means against wire-worms.

104. WALSH, B. D. [Bark-lice.] <Pract. Ent., 30 July, 1866, v. 1, p. 100.

Answer to inquiry of L. E. Harmon; life-history and means against *Coccidae*.

105. WALSH, B. D. [Tortoise beetles.] <Pract. Ent., 30 July, 1866, v. 1, p. 100.

Answer to inquiry of C. K. Yant; food-plants and larval habits of *Cassididae*.

106. WALSH, B. D. [Grape bark-louse.] <Pract. Ent., 30 July, 1866, v. 1, p. 100.

Answer to inquiry of J. Bird; description and ravages of *Lecanium* [= *Pulvinaria*] *vitis*.

107. WALSH, B. D. [Plum bark-louse.] <Pract. Ent., 30 July, 1866, v. 1, p. 100.

Answer to inquiry of O. B. Douglas; description of *Lecanium* sp.

108. WALSH, B. D. [Saw-fly eggs.] <Pract. Ent., 30 July, 1866, v. 1, p. 100.

Answer to inquiry of L. D. Morse; position of saw-fly eggs on oak-leaf; characters of the larvæ of *Tenthredinidae*.

109. WALSH, B. D. [Wheat midge.] <Pract. Ent., 30 July, 1866, v. 1, p. 101.

Answer to inquiry of R. F.; ravages, description, habits, and means against *Cecidomyia* [= *Diplosis*] *tritici*.

110. WALSH, B. D. [Wheat midge.] <Pract. Ent., 30 July, 1866, v. 1, p. 101.

Answer to inquiry of M. H. Boye; *Cecidomyia* [= *Diplosis*] *tritici* not infrequently passes from larval to imaginal state in the same season; means against the same.

111. WALSH, B. D. [Grape galls.] <Pract. Ent., 30 July, 1866, v. 1, p. 101.

Answer to inquiry of J. H. Foster, jr.; description of the galls and larvæ of *Cecidomyidae*.

112. WALSH, B. D. [Apple-tree web-caterpillar.] <Pract. Ent., 30 July, 1866, v. 1, p. 101.

Answer to inquiry of Marion Hobart; description of the eggs of *Clisiocampa americana*; food-plants of the same and of *Hyphantria textor* [= *cunea*].

113. WALSH, B. D. [Grape-vine beetles.] <Pract. Ent., 30 July, 1866, v. 1, p. 101.
 Answer to inquiry of M. S. Hill; food-habits of the larva and imago of *Pelidnota punctata* and of *Anomala lucicola*.
114. WALSH, B. D. [Bot-flies.] <Pract. Ent., 30 July, 1866, v. 1, p. 102.
 Answer to inquiry of J. B. Fisher; habits and hosts of several species of *Estridæ*; parasite infesting *Triplax* [= *Tritoma*] *thoracica*. See No. 153.
115. WALSH, B. D. [Spruce-tree saw-flies.] <Pract. Ent., 30 July, 1866, v. 1, p. 102.
 Answer to inquiry of J. Barratt; description of cocoon and imago of *Lophyrus abietis*; means against the same. See Pract. Ent., v. 1, p. 114.
116. WALSH, B. D. [Stings of insects.] <Pract. Ent., 30 July, 1866, v. 1, p. 102.
 Answer to inquiry of A. O. Brickman; effects of the stings of bees and other insects.
117. WALSH, B. D. [Blackberry scale.] <Pract. Ent., 30 July, 1866, v. 1, p. 102.
 Answer to inquiry of G. E. Brackett; characters of *Lecanium* sp. infesting blackberry.
118. WALSH, B. D. [Eggs in sumach.] <Pract. Ent., 30 July, 1866, v. 1, p. 102.
 Answer to inquiry of W. M. Smith; eggs of *Orchelimum* sp.? or *Xiphidium* sp.? in pith of sumach.
119. W[ALSH], B. D. The "new potato-bug" in Maine. <Pract. Ent., 27 August, 1866, v. 1, p. 105.
 Extract from Maine Farmer, 26 July, 1866, with comments; the larva of *Lema trilineata* mistaken for that of *Doryphora 10-lineata*.
120. WALSH, B. D. [The army-worm.] <Pract. Ent., 27 August, 1866, v. 1, p. 107.
 Extract from Western Rural, 21 July, 1866, with comments; army-worm mistaken for canker-worm; need of precision in using popular names.
121. W[ALSH], B. D. [Fire-cure for potato-beetles.] <Pract. Ent., 27 August, 1866, v. 1, pp. 107-108.
 Extract from letter from M. S. Hill, with comments; burning straw effective as a means against *Meloidæ* infesting potato-vines; its use against *Doryphora 10-lineata*; hot water as a means against the onion-maggot and peach-borer.
122. WALSH, B. D. A new humbug. <Pract. Ent., 27 August, 1866, v. 1, pp. 108-110.
 Exposure of proposed remedy against *Cecidomyia destructor*; life-habits of the same.
123. W[ALSH], B. D. The striped bug. <Pract. Ent., 27 August, 1866, v. 1, p. 110, figs. 1, 2.
 Extract from Western Rural, 21 July, 1866, with comments; characters, habits, means against, and figures of *Diabrotica vittata* and *D. 12-punctata*. See No. 148.

124. WALSH, B. D. [Grape-vine caterpillars.] <Pract. Ent., 27 August, 1866, v. 1, p. 111.

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125. WALSH, B. D. [Squash-vine insects.] <Pract. Ent., 27 August, 1866, v. 1, p. 111.

Answer to inquiry of J. Cope; description and habits of *Epilachna borealis*; habits of *Coccinellidæ*; description and means against the larva of *Trochilium cucurbitæ* [= *Melittia ceto*].

126. WALSH, B. D. [Injurious insects.] <Pract. Ent., 27 August, 1866, v. 1, p. 111.

Answer to inquiry of T. Conard; larval habits and means against *Lema trilineata*; work of the grain plant-louse (*Nectarophora granaria*) and of *Trochilium cucurbitæ* [= *Melittia ceto*]; mention of some of the enemies of bees.

127. WALSH, B. D. [Grape-leaf galls.] <Pract. Ent., 27 August, 1866, v. 1, pp. 111, 112.

Answer to inquiry of E. Daggy; description of the leaf-gall of *Phylloxera vitifoliæ* [= *vastatrix*]; reasons for including it in the *Coccidæ*; dipterous enemy of the same. See No. 154.

128. WALSH, B. D. [Grape-vine insects.] <Pract. Ent., 27 August, 1866, v. 1, p. 112.

Answer to inquiry of W. H. S.; description and means against an undescribed gall on the tendrils and leaf-stalks of a grape-vine; life-habits of parasitic *Chalcididæ*. See No. 160.

129. WALSH, B. D. [Grape-vine beetles.] <Pract. Ent., 27 August, 1866, v. 1, pp. 112, 113.

Answer to inquiry of W. J. Lawrence; food-habits of *Pelidnota punctata* and of *Colaspis flavida*.

130. WALSH, B. D. [*Corydalis cornutus*.] <Pract. Ent., 27 August, 1866, v. 1, p. 113.

Answer to inquiry of J. S. Lewis; natural history and habits of *Corydalis cornutus*.

131. WALSH, B. D. [Tobacco-moth.] <Pract. Ent., 27 August, 1866, v. 1, p. 113.

Answer to inquiry of F. W. Noble; transformations and food-plants of *Sphinx* [= *Protoparce*] *carolina*; food-plants of *S. 5-maculata* [= *P. celeus*].

132. WALSH, B. D. [*Datana ministra*.] <Pract. Ent., 27 August, 1866, v. 1, p. 113.

Answer to inquiry of S. S. Lacy; food-plants and transformations of *Datana ministra*.

133. WALSH, B. D. [Grape-vine and fuschia beetles.] <Pract. Ent., 27 August, 1866, v. 1, p. 113.

Answer to inquiry of F. K. Phoenix; *Colaspis flavida* injurious to grape-vine shoots; *Haltica exapta* [= *carinata*] destructive to fuschia; means against flea-beetles.

134. WALSH, B. D. [Blister-beetles.] <Pract. Ent., 27 August, 1866, v. 1, p. 113.
 Answer to inquiry of J. Barber; food-plants of *Lytta marginata* [= *Epicauta cinerea*], *L.* [= *E.*] *vittata*, *L. atrata* [= *E. pennsylvanica*], and *L. cinerea* [= *Macrobasis unicolor*].
135. WALSH, B. D. [*Colaspis flavida*; *Lema trilineata*.] <Pract. Ent., 27 August, 1866, v. 1, p. 114.
 Answer to inquiry of J. F. Benner; *Colaspis flavida* destructive to grape-vines; distribution and method of breeding *Lema trilineata*.
136. WALSH, B. D. [Green worms on gooseberries and currants; *Lema trilineata*.] <Pract. Ent., 27 August, 1866, v. 1, p. 114.
 Answer to inquiry of H. Burt; gooseberries and currants injured by larva of a saw-fly?; effects of excessive rain, heat, and drought; food-plants of *Lema trilineata*.
137. WALSH, B. D. [Galls.] <Pract. Ent., 27 August, 1866, v. 1, p. 114.
 Answer to inquiry of H. Shimer; note of galls made by *Rhodites radicum*, *Trypeta solidaginis*, and *Thelaxes* [= *Colopha*] *ulmicola*.
138. WALSH, B. D. [Potato and corn insects.] <Pract. Ent., 27 August, 1866, v. 1, p. 114.
 Answer to inquiry of T. H. Parsons; scarcity of *Lema trilineata* in Illinois; *Doryphora 10-lineata* destroyed by turkeys, but not by fowls; *Gortyna* sp.? injurious to young Indian corn; rules for breeding insects.
139. WALSH, B. D. [Cocoons on apple-trees.] <Pract. Ent., 27 August, 1866, v. 1, p. 114.
 Answer to inquiry of M. S. Hill; description of cocoon and imago of *Attacus cecropia*; the interaction of organisms.
140. WALSH, B. D. Imported insects; the gooseberry saw-fly. <Pract. Ent., 29 September, 1866, v. 1, pp. 117-125, fig.
 List of some injurious European insects imported into America and of American insects imported into Europe; reasons for the increase and abundance of noxious European insects in America, and why American species do not flourish in Europe; natural history, description, and means against *Nematus ventricosus* [= *ribesii*]; figure of currant-leaf, showing method of deposition of eggs and work of larva; natural history and description of larva and imago of *Pristiphora grossulariæ* n. sp.; number of saw-flies infesting the gooseberry and currant in Europe.
141. WALSH, B. D. [Borers.] <Pract. Ent., 29 September, 1866, v. 1, p. 126.
 Answer to inquiry of W. H. R. Lykins; western distribution of *Clytus* [= *Cyllene*] *robiniae*.
142. WALSH, B. D. [Wheat midge.] <Pract. Ent., 29 September, 1866, v. 1, p. 126.
 Answer to inquiry of C. P. Wickersham; destructiveness of *Cecidomyia* [= *Diplosis*] *tritici*; nature of its cocoon.

143. WALSH, B. D. [Crickets.] <Pract. Ent., 29 September, 1866, v. 1, p. 126.

Answer to inquiry of Marion Hobart; characters and food-habits of *Acheta* [= *Gryllus*] *abbreviatus*; katydids not exclusively vegetarians; *Ecanthus niveus* found feeding on plant-lice.

144. WALSH, B. D. [Walking-stick.] <Pract. Ent., 29 September, 1866, v. 1, p. 126.

Answer to inquiry of L. W. Taylor; characters and habits of *Spectrum* [= *Diaphchromera*] *femorata*.

145. WALSH, B. D. [Apple-tree insects.] <Pract. Ent., 29 September, 1866, v. 1, p. 126.

Answer to inquiry of H. B. Beegle; characters and food-plants of *Limenitis ursula*; description and food-plants of the larva of *Lagoa opercularis*; characters of the imago.

146. WALSH, B. D. [Mites on grasshoppers.] <Pract. Ent., 29 September, 1866, v. 1, p. 126.

Answer to inquiry of W. Riddell; *Astoma* [= *Trombidium*] *locustarum* infesting *Caloptenus femur-rubrum*.

147. W[ALSH], B. D. Grasshoppers and locusts. <Pract. Ent., October, 1866, v. 2, pp. 1-5, 22.

Description, migration, and ravages of *Caloptenus spretus*; limits of its range and means of preventing its increase; confusion caused by the use of popular names of insects. On p. 22 a "note," accidentally omitted, gives the comparative length of the wing-covers and antennæ of *Caloptenus spretus* and *C. femur-rubrum*.

148. W[ALSH], B. D. The striped cucumber-bug. <Pract. Ent., October, 1866, v. 2, p. 5.

Diabrotica vittata attacks German asters. See No. 123.

149. W[ALSH], B. D. Fire-blight. <Pract. Ent., October, 1866, v. 2, p. 7.

Extract from Horticulturist, with comments; cause of fire-blight unknown; not produced by *Scolytus* [= *Xyleborus*] *pyri*.

150. W[ALSH], B. D. The Hessian fly. <Pract. Ent., October, 1866, v. 2, p. 7.

Extract from Colman's Rural World, with comments; late sowing as a means against *Cecidomyia destructor*.

151. [WALSH, B. D.] [Injurious caterpillars; plant-lice enemies.] <Pract. Ent., October, 1866, v. 2, pp. 7-8.

Answer to inquiry of T. McGraw; habits, descriptions, and food-plants of larva of *Dryocampa senatoria* and of *Datana ministra*; food-habits of larva allied to *D. ministra*; description and habits of larva of *Scymnus* sp.; *S. hamorrhous*? bred from gall of *Thelaxes* [= *Colopha*] *ulmicola*.

152. [WALSH, B. D.] [Tomato-worm.] <Pract. Ent., October, 1866, v. 2, p. 8.

Answer to inquiry of A. A. Jackson; description of the larva and pupa of *Protoparce celeus*; food-plants and harmlessness of the larva.

153. [WALSH, B. D.] [Dipterous larva on swallows.] <Pract. Ent., October, 1866, v. 2, p. 8.
 Answer to inquiry of J. B. Fisher; larvæ found on swallows (see No. 114) belong to the *Muscidæ* and not to the *Æstridæ*; extract from letter of Osten Sacken on larval habits of *Muscidæ* found with birds.
154. [WALSH, B. D.] [Bark-louse enemy.] <Pract. Ent., October, 1866, v. 2, p. 8.
 Answer to inquiry of E. Daggy; see No. 127; according to Osten Sacken the bark-louse enemy belongs to *Leucopis*; systematic position of the genus.
155. [WALSH, B. D.] [Parasitized tomato-worm.] <Pract. Ent., October, 1866, v. 2, pp. 8-9.
 Answer to inquiry of T. C. Wright; habits of *Microgaster*, parasitic on *Protoparce celeus*; habits of ichneumonized larvæ.
156. [WALSH, B. D.] [Beetles on buttercup and azalea.] <Pract. Ent., October, 1866, v. 2, p. 9.
 Answer to inquiry of C. H. Peck; identification of *Galeruca* [= *Adimonia*] *rufosanguinea*, found on *Ranunculus acris*, and of *Prasocuris varipes* on *Azalea nudiflora*; synoptic table, by J. L. Leconte, of the species of *Prasocuris*.
157. [WALSH, B. D.] [Flying-bug.] <Pract. Ent., October, 1866, v. 2, p. 9.
 Answer to inquiry of E. E. Sheldon; *Aphodius* mistaken for *Cecidomyia destructor*.
158. [WALSH, B. D.] [Parasitic cocoon.] <Pract. Ent., October, 1866, v. 2, p. 9.
 Answer to inquiry of H. W. Howarth; description of cocoons made by *Microgaster* and *Pezomachus*; habits of *Ichneumonidæ*.
159. [WALSH, B. D.] [Oak-bark louse.] <Pract. Ent., October, 1866, v. 2, p. 9.
 Answer to inquiry of T. Meehan; undetermined *Coccus* on red-oak.
160. [WALSH, B. D.] [Grape-galls.] <Pract. Ent., October, 1866, v. 2, p. 9.
 Answer to inquiry of W. H. S.; see No. 128; larva of *Leucopis* sp., an enemy to grape-vine gall-louse; probable identity of the maker of the tendril and leaf-galls; varieties of grape infested by *Phylloxera vastatrix*.
161. [WALSH, B. D.] ["Saddle-back."] <Pract. Ent., October, 1866, v. 2, p. 9.
 Answer to inquiry of T. M. Harvey; food-plants, description, and urticating properties of *Empretia stimulea*.
162. [WALSH, B. D.] [Corn-worm.] <Pract. Ent., October, 1866, v. 2, p. 9.
 Answer to inquiry of J. B. Ellis; method of work of two lepidopterous larvæ.
163. [WALSH, B. D.] [Insects named.] <Pract. Ent., October, 1866, v. 2, p. 10.
 Answer to inquiry of W. C. Fish; comparative characters of *Entilia sinuata* and *E.* [= *Publilia*] *concava*.

164. [WALSH, B. D.] [Grape insects.] <Pract. Ent., October, 1866, v. 2, p. 10.
Answer to inquiry of J. H. Garman; description and habits of larva of *Procris* [= *Harrisina*] *americana*; *Proconia* [= *Oncometopia*] *undata* and several species of *Erythroneura* [= *Typhlocyba*] as grape enemies.
165. [WALSH, B. D.] [*Datana ministra*.] <Pract. Ent., October, 1866, v. 2, p. 10.
Answer to inquiry of J. B.; increase of injuries caused by *Datana ministra*; distinctive characters of the larvæ of *Geometridæ*.
166. [WALSH, B. D.] [*Iulus marginatus*.] <Pract. Ent., October, 1866, v. 2, p. 10.
Answer to inquiry of T. Wiggins; characters and food of *Iulus* [= *Spirobolus*] *marginatus*.
167. [WALSH, B. D.] [Midge.] <Pract. Ent., October, 1866, v. 2, p. 10.
Answer to inquiry of W. G. Morris; characters and habits of the larva and imago of *Chironomus* sp.
168. [WALSH, B. D.] [Rat-tailed larva.] <Pract. Ent., October, 1866, v. 2, p. 10.
Answer to inquiry of J. A. Lapham; characters and habitats of the larvæ of rat-tailed *Syrphidæ*.
169. [WALSH, B. D.] [Beetle on thistle.] <Pract. Ent., October, 1866, v. 2, p. 10.
Answer to inquiry of W. S. Robertson; characters and food-plants of *Phyllobrotica* [= *Diabrotica*] *longicornis*.
170. [WALSH, B. D.] [Grape-vine *Aphis*.] <Pract. Ent., October, 1866, v. 2, p. 10.
Answer to inquiry of H.; grape-vine injured by *Aphis vitis*.
171. W[ALSH], B. D. The new potato-bug. <Pract. Ent., November, 1866, v. 2, pp. 13-16, fig.
Eastern progress of *Doryphora 10-lineata*; rate of travel; hand-picking the only effective remedy; description of a horse machine for their destruction; pecuniary loss inflicted by the species.
172. W[ALSH], B. D. The canker-worm <Pract. Ent., November, 1866, v. 2, p. 16.
Tarring trees effective against *Paleacrita vernata*.
173. W[ALSH], B. D. The canker-worm again. <Pract. Ent., November, 1866, v. 2, pp. 16-17.
Critical review of article in New England Farmer; value of tarring as a means against *Paleacrita vernata*.
174. WALSH, B. D. Notes by Benj. D. Walsh. <Pract. Ent., November, 1866, v. 2, pp. 19-20.
Remarks on statement of H. Shimer in his paper, "The grape leaf gall-coccus" (Pract. Ent., pp. 17-19); number of eggs to each ♀; tendril and leaf-galls probably produced by the same insect; old leaves entirely free from bark-lice by the end of summer; characters of the pupa of *Leucopis*; systematic position and food-habits of *Thysanoptera*; criticism of paper by H. Shimer in Prairie Farmer, 3 November, 1861.

175. W[ALSH], B. D. The striped bug. <Pract. Ent., November, 1866, v. 2, p. 20.
Remarks on note by A.; effects of plaster as a means against *Diabrotica vittata*.
176. [WALSH, B. D.] [Currant insects; *Psocus venosus*.] <Pract. Ent., November, 1866, v. 2, p. 20.
Answer to inquiry of I. Hicks; occurrence of *Pristiphora grossulariae* in the Eastern States; *Ellopi*a [= *Eufitchia*] *ribearia* injurious to currant; date of introduction of "sulphur-cure" on peach-trees; characters and habits of *Psocus venosus*.
177. [WALSH, B. D.] [Worm in apple.] <Pract. Ent., November, 1866, v. 2, pp. 20-21.
Answer to inquiry of C. Ward; description and ravages of larva of *Trypeta pomonella*?
178. [WALSH, B. D.] [Insects attracted to light.] <Pract. Ent., November, 1866, v. 2, p. 21.
Answer to inquiry of Practical Pomologist; conditions favorable for attracting insects to light; kinds most frequently attracted; the proportion of injurious species attracted.
179. [WALSH, B. D.] [Zebra caterpillar.] <Pract. Ent., November, 1866, v. 2, p. 21.
Answer to inquiry of J. H. Parsons; description of the larva of *Mamestra picta*; times of transformation.
180. [WALSH, B. D.] [Inquiries answered.] <Pract. Ent., November, 1866, v. 2, p. 21.
Answer to inquiry of J. Pettit; identification of several beetles; galls on golden-rod made by *Euryptychia saligneana* and *Trypeta solidaginis*; characters of short-winged form of *Micropus* [= *Blissus*] *leucopterus*; its occurrence in Canada.
181. [WALSH, B. D.] [Worm in corn.] <Pract. Ent., November, 1866, v. 2, pp. 21-22.
Answer to inquiry of J. B. Ellis; description of larva, habits, transformations, and means against an undetermined noctuid.
182. [WALSH, B. D.] [Bag-worms.] <Pract. Ent., November, 1866, v. 2, p. 22.
Answer to inquiry of C. P. Wickersham; characters and synonymy of *Thyridopteryx ephemeraeformis*.
183. [WALSH, B. D.] [Ichneumon cocoons.] <Pract. Ent., November, 1866, v. 2, p. 22.
Answer to inquiry of S. A. N.; characters of cocoons of *Microgaster* sp.?
184. WALSH, B. D. Note. <Proc. Ent. Soc. Phil., December, 1866, v. 5, p. 260.
Withdraws assertion attributed to C. R. Osten Sacken.
185. W[ALSH], B. D. The old-fashioned potato-bugs. <Pract. Ent., December, 1866, v. 2, pp. 25-27, figs.
Natural history and means against *Lema trilineata*, *Lytta* [= *Epicauta*] *vittata*, *L. atrata* [= *E. pennsylvanica*], *L. marginata* [= *E. cinerea*], and *L. cinerea* [= *Macrobasis unicolor*]; figures *L. trilineata* and *E. vittata*.

186. W[ALSH], B. D. Klippart's wheat plant. <Pract. Ent., December, 1866, v. 2, pp. 27-29.

Adverse criticism of the entomological portion of the above-named book.

187. W[ALSH], B. D. Trimble's insect enemies of fruit and fruit trees. <Pract. Ent., December, 1866, v. 2, pp. 29-30.

Favorable review of the above-named book.

188. W[ALSH], B. D. Answer to the above, by B. D. W. <Pract. Ent., December, 1866, v. 2, pp. 31-33, figs.

Answers to questions asked in J. S. Houghton's "Insects in the Orchard" (Pract. Ent., pp. 30-31); food-habits and hibernation of *Conotrachelus nenuphar*; comparative characters and figures of *Aspidiotus conchiformis* [= *Mytilaspis pomorum*] and *Coccus harrisii* [= *Chionaspis furfurus*]; natural history of *C. harrisii*; means against and enemies of the two species; figures *Chilocorus bivulnerus* and *Hippodamia* [= *Megilla*] *maculata*; food-habits and synonymy of *Lytta* [= *Pomphopæa*] *sayi*; flowing as a means against root-feeding insects; inefficacy of salt, lime, ashes, etc., against the same; insects attacking evergreens not likely to injure fruit trees; cannibal habits of spiders; habits of bees and wasps.

189. [WALSH, B. D.] [Cicada; gooseberry-worm.] <Pract. Ent., December, 1866, v. 2, p. 33.

Answer to inquiry of M. S. Hill; *Cicada* [= *Tibicen*] *septendecim* compared with an undescribed species; ravages of *Pristiphora grossulariæ*? on gooseberry bushes.

190. [WALSH, B. D.] [*Vespidæ*.] <Pract. Ent., December, 1866, v. 2, pp. 33, 34.

Answer to inquiry of M. Hobart; life-habits of *Vespidæ*.

191. [WALSH, B. D.] [Meal-worms: Timber-borers.] <Pract. Ent., December, 1866, v. 2, p. 34.

Answer to inquiry of M. C. D.; characters, food-habits, and means against *Tenebrio molitor* and *T. obscurus*; characters of *Ptinus brunneus* infesting pine timber; corrosive sublimate as a means against timber insects.

192. [WALSH, B. D.] [Corn-worm.] <Pract. Ent., December, 1866, v. 2, p. 34.

Answer to J. B. Ellis; number of broods of *Heliothis armigera* in the Northern and Southern States.

193. [WALSH, B. D.] [Thousand-legged worms.] <Pract. Ent., December, 1866, v. 2, pp. 34-35, fig.

Answer to inquiry of G. W. Robinson; description and figure of *Iulus multi-striatus* n. sp. [= *Cambala annulata*]; habits and means against the same.

194. [WALSH, B. D.] [Cranberry-galls, etc.] <Pract. Ent., December, 1866, v. 2, p. 35.

Answer to inquiry of W. C. Fish; occurrence of galls made by *Cecidomyia* sp. on leaves of cranberry; identification of several insects.

195. [WALSH, B. D.] Another humbug. <Pract. Ent., December, 1866, v. 2, p. 35.

Extract, with comments, from Cultivator and Country Gentleman, 22 November, 1866, exposing worthlessness of P. B. Sheldon's composition for destroying borers.

196. [WALSH, B. D.] Notices. <Pract. Ent., December, 1866, v. 2, p. 35.

Mention of several agricultural journals.

197. WALSH, B. D. On the insects, coleopterous, hymenopterous, and dipterous, inhabiting the galls of certain species of willow. Part 2d and last. <Proc. Ent. Soc. Phil., December, 1866-January, 1867, v. 6, pp. 223-288.

See No. 46 for Part 1st. Supplementary notes on the *Cecidomyidæ* (gall-makers and guest-flies); criticism of statements of Fitch and Harris; discussion of structure and habits of *Tenthredinidæ* and insects generally; synopsis of tenthredinidous willow-galls; descriptions of the galls, their makers and inquilines; for the new species described, see the *Systematic Index*; remarks on species and varieties; figures fore-wings of *Tenthredo* and *Ichneumon*.

198. W[ALSH], B. D. Plant-lice—their friends and enemies. <Pract. Ent., January, 1867, v. 2, pp. 37-44, figs.

Method of work and mode of reproduction of *Aphididæ*; their relations to ants; plant-lice enemies; figures *Aphis mali* and several enemies of plant-lice; means against *Aphididæ*.

199. W[ALSH], B. D. Birds *versus* insects. <Pract. Ent., January, 1867, v. 2, pp. 44-47.

Insectivorous birds not necessarily beneficial; a bird must be shown to eat at least thirty (30) times as many injurious insects as it does beneficial ones before it can be considered useful.

200. [WALSH, B. D.] [Insects named.] <Pract. Ent., January, 1867, v. 2, p. 47.

Answer to inquiry of J. Pettit; identification of many species, mostly beetles; characters and food-habits of *Clerus nigripes* [= *4-guttatus*]; habitat of *Lep-tura capitata* and *Tingis* [= *Corythuca*] *ciliata*.

201. [WALSH, B. D.] [Apple-tree insects.] <Pract. Ent., January, 1867, v. 2, p. 47.

Answer to inquiry of M. Hobart; increasing distribution of *Aspidiotus conchiformis* [= *Mytilaspis pomorum*]; enemies of the same; characters of the eggs of *Aphis mali*.

202. [WALSH, B. D.] [Work in entomology.] <Pract. Ent., January, 1867, v. 2, p. 47.

Answer to G. Scarborough; advice for the study of entomology by beginners.

203. W[ALSH], B. D. The true *Thrips* and the bogus *Thrips*. <Pract. Ent., February, 1867, v. 2, pp. 49-52, figs.

Natural history, characters, habits, and figures of *Thrips* sp.; characters of the larva and imago of *Haltica chalybea*; figure of imago; habits of species of *Erythroneura* [= *Typhlocyba*]; description and figures of *E.* [= *T.*] *vitis*.

204. W[ALSH], B. D. Universal remedies. <Pract. Ent., 1867, v. 2, p. 52.

Exposure of proposed universal remedy against fruit-tree insects.

205. W[ALSH], B. D. Poisoning noxious insects. <Pract. Ent., February, 1867, v. 2, pp. 52-53.

Sugaring with poison as a means against *Noctuidæ*.

206. W[ALSH], B. D. Remarks by B. D. W. <Pract. Ent., February, 1867, v. 2, p. 54.
Comments on S. S. Rathvon's "Bag-worms" (Pract. Ent., pp. 53-54); distribution and food-plants of *Thyridopteryx ephemereformis*.
207. W[ALSH], B. D. Habits of the tree-cricket (*Ecanthus niveus*). <Pract. Ent., February, 1867, v. 2, p. 54, figs.
Characters of eggs and method of deposition; characters, food-habits, and figures of the imago.
208. [WALSH, B. D.] Importing European parasites. <Pract. Ent., February, 1867, v. 2, pp. 54-55.
Imaginary correspondence between Asa Fitch and John Curtis on the importation of parasitic insects.
209. [WALSH, B. D.] [Screw-worm.] <Pract. Ent., February, 1867, v. 2, p. 55.
Answer to inquiry of L. D. Morse; undetermined larva found in osage-orange seed; hominivorous habits of *Lucilia macellaria*.
210. [WALSH, B. D.] [*Attacus cecropia*.] <Pract. Ent., February, 1867, v. 2, p. 55.
Answer to inquiry of T. T. Smith; characters of larva and imago of *Attacus cecropia*; food-plants; method of issuance from cocoon; nature of fluid discharged when emerging from cocoon.
211. [WALSH, B. D.] [Apple-worm.] <Pract. Ent., February, 1867, v. 2, pp. 55-56.
Answer to inquiry of W. C. Fish; characters of the pupa of *Sciara mali*.
212. [WALSH, B. D.] [Oak-gall.] <Pract. Ent., February, 1867, v. 2, p. 56.
Answer to inquiry of W. Muir; characters of an undetermined cynipid gall on oak.
213. [WALSH, B. D.] [*Cicada*: Grape-vine *Procris*.] <Pract. Ent., February, 1867, v. 2, p. 56.
Answer to inquiry of M. S. Hill; variations in the imago of *Cicada* [= *Tibicen*] *septendecim* and in the song of the same; characters of the larva of *Procris* [= *Harrisina*] *americana*.
214. [WALSH, B. D.] [*Nitidulidæ*.] <Pract. Ent., February, 1867, v. 2, p. 56.
Answer to inquiry of W. H. S.; food-habits of *Ips fasciatus* and *Nitidula bipustulata*.
215. [WALSH, B. D.] [Turnip enemy.] <Pract. Ent., February, 1867, v. 2, p. 56.
Answer to inquiry of F. T. Pember; characters and food-habits of *Polydesmus complanatus*.
216. [WALSH, B. D.] [Wheat midge.] <Pract. Ent., February, 1867, v. 2, p. 57.
Answer to inquiry of C. P. Wickersham; nature of the membrane enveloping the full-grown larva of *Diplosis tritici*.

217. [WALSH, B. D.] [Queries answered.] <Pract. Ent., February, 1867, v. 2, p. 57.
 Answer to inquiry of R. Middleton; toads, frogs, and spiders beneficial; effects of the stings of various insects.
218. [WALSH, B. D.] [Scales.] <Pract. Ent., February, 1867, v. 2, p. 57.
 Answer to inquiry of M. M. S.; characters and ravages of scales on oleander and orange; means against *Coccidæ*.
219. [WALSH, B. D.] [Hundred-legged worm.] <Pract. Ent., February, 1867, v. 2, p. 57.
 Answer to inquiry of S. P. Monks; identification of *Polydesmus virginiensis*; distinctive characters of Myriapoda.
220. [WALSH, B. D.] [Bark-borers.] <Pract. Ent., February, 1867, v. 2, pp. 57-58.
 Answer to inquiry of C. V. Riley; synoptic table and food-habits of several species of *Scolytus*; descriptions of *S. fagi* n. sp. and *S. caryæ* n. sp. [=4-spinosus].
221. [WALSH, B. D.] [Aleurodes.] <Pract. Ent., February, 1867, v. 2, p. 58.
 Answer to inquiry of D. F. C.; characters and food-plants of an undescribed species of *Aleurodes*.
222. W[ALSH], B. D. The critic criticized. <Pract. Ent., February, 1867, v. 2, p. 58. Answer [by C. V. Riley]. <Prairie Farmer, 16 March, 1867, [v. 35], n. s., v. 19, p. 169. S.-b., No. 2, p. 58. Criticism of article by C. V. Riley (Prairie Farmer, 19 January, 1867, [v. 35], n. s., v. 19, p. 37).
223. [WALSH, B. D.] Obituary. <Pract. Ent., February, 1867, v. 2, p. 58.
 Notice of the late Brackenridge Clemens.
224. W[ALSH], B. D. Wire-worms. <Pract. Ent., March, 1867, v. 2, pp. 61-62, figs.
 Characters of Myriapoda and larvæ of *Elateridæ*, popularly called wire-worms; food-habits of larva of *Ludius attenuatus*; figure of larva and imago of the same; confusion caused by the use of the term "wire-worms" by correspondents of the Country Gentleman.
225. W[ALSH], B. D. Imported insects.—The onion-fly. <Pract. Ent., March, 1867, v. 2, p. 64, figs.
 Figures of larva and imago of *Anthomyia ceparum* and of *Ortalis* [= *Tritoxa*] *flexa*; comparative characters of imagos; distribution and means against the two species.
226. W[ALSH], B. D. [Means against cut-worms.] <Pract. Ent., March, 1867, v. 2, p. 66.
 Recommends, in reply to J. Townley's inquiry, sugaring with poisoned molasses as a means against cut-worms.

227. W[ALSH], B. D. Entomology indeed run mad. <Pract. Ent., March, 1867, v. 2, pp. 66, 67.

Reprint of "The bud-worm" (N. C. Rural Journ., September, 1866), with criticism and correction of some of the errors.

228. W[ALSH], B. D. The imported gooseberry saw-fly. <Pract. Ent., March, 1867, v. 2, p. 67.

Reason for re-appearance in June and for the non-appearance of the second brood of *Nematus ventricosus* [= *ribesii*] in New York in 1866.

229. W[ALSH], B. D. Tree cut-worms. <Pract. Ent., March, 1867, v. 2, p. 67.

Cut-worm described (Pract. Ent., v. 1, pp. 85-86) identified as *Hadena chenopodii* [= *Mamestra trifoli*]. See Nos. 85, 231.

230. W[ALSH], B. D. Doctoring fruit trees again. <Pract. Ent., March, 1867, v. 2, pp. 67, 68.

Extract from Industrial Gazette, 15 December, 1866, with criticism; calomel, sulphur, and substances insoluble in water not absorbed into the circulation of trees.

231. W[ALSH], B. D. The grape-vine *Colaspis* (*Colaspis flavida* Say). <Pract. Ent., March, 1867, v. 2, pp. 68-69, fig.

Ravages of *Colaspis flavida*; comparison with allied species; remarks on the law of priority and on certain insects becoming suddenly injurious; figures *C. flavida*.

232. W[ALSH], B. D. Another universal remedy. <Pract. Ent., March, 1867, v. 2, p. 69.

Extract from reprint (?) in Cultivator and Country Gentleman, 10 January, 1867, with criticism of proposed remedy against insects injurious to trees.

233. W[ALSH], B. D. Borers. The plug-ugly theory. <Pract. Ent., March, 1867, v. 2, p. 69.

Criticism of theory that a plug driven into a hole in a tree is death to borers.

234. W[ALSH], B. D. A mass of mistakes. <Pract. Ent., March, 1867, v. 2, p. 70.

Correction of errors in "Remedy for the borer" (Prairie Farmer, 9 February, 1867).

235. W[ALSH], B. D. Hop-growing in the West. <Pract. Ent., March, 1867, v. 2, p. 70.

Extract from Country Gentleman, 31 January, 1867, showing ravages of *Phorodon humuli* in Vermont; danger of its introduction into the Western States.

236. W[ALSH], B. D. Thousand-legged worms. <Pract. Ent., March, 1867, v. 2, p. 70.

Extract from letter of J. H. Parsons, with comments; injuries to onions by *Iulus multistriatus* [= *Cambala annulata*]; *I. multistriatus* undistinguishable from *I. cæruleo-cinctus*.

237. W[ALSH], B. D. Fighting the Curculio. <Pract. Ent., March, 1867, v. 2, p. 71.

Extract from Genesee Farmer for 1853, p. 125; ridicule of additions to "jarring" as a means against *Conotrachelus nemophar*.

238. W[ALSH], B. D. ["Bushels of butterflies."] <Pract. Ent., March, 1867, v. 2, p. 71.

Extract from Cincinnati Gazette, August, 1866, with comments; occurrence of dead imagos of *Attacus cecropia*? in large numbers ("10 bushels") in Newport, Ohio; food-plants of the larva.

239. [WALSH, B. D.] [Scab on potato.] <Pract. Ent., March, 1867, v. 2, pp. 71-72.

Answer to inquiry of T. L. J. Baldwin; account of blister-like scabs on potatoes, probably caused by *Sciara* sp.; means against the same.

240. [WALSH, B. D.] [Mass of eggs.] <Pract. Ent., March, 1867, v. 2, p. 72.

Answer to inquiry of E. Daggy; egg-masses of *Clisiocampa americana*; food-plants of *C. americana* and *C. sylvatica* [= *disstria*].

241. [WALSH, B. D.] [Food of katydids.] <Pract. Ent., March, 1867, v. 2, p. 72.

Answer to inquiry of C. M.; food of *Microcentrum retinervis* largely carnivorous.

242. [WALSH, B. D.] [Caterpillar nest on wild cherry.] <Pract. Ent. March, 1867, v. 2, p. 72.

Answer to inquiry of H. Morey; undetermined larva on wild cherry, food-plants of *Hyphantria textor* [= *cunea*].

243. [WALSH, B. D.] [Insect eggs.] <Pract. Ent., March, 1867, v. 2, p. 72.

Answer to inquiry of P. Ferris; undetermined eggs of Lepidoptera and Hemiptera on apple-tree twigs.

244. [WALSH, B. D.] [*Attacus polyphemus*, etc.] <Pract. Ent., March, 1867, v. 2, pp. 72-73.

Answer to inquiry of M. M. S.; variations in *Attacus* [= *Telca*] *polyphemus*; habits and times of transformations of *Arctia* [= *Pyrrharctia*] *isabella*; references to history of *Dryocampa rubicunda*.

245. [WALSH, B. D.] [*Cossus robiniae*, etc.] <Pract. Ent., March, 1867, v. 2, p. 73.

Answer to inquiry of J. Townley; food-habits and injuries of *Cossus robiniae*; result of freezing insects; characters of some wood-borers.

246. [WALSH, B. D.] [Museum pests.] <Pract. Ent., March, 1867, v. 2, p. 73.

Answer to inquiry of F. L. Van Arsdale; means against *Dermestidæ*.

247. [WALSH, B. D.] [Katydid eggs.] <Pract. Ent., March, 1867, v. 2, p. 73.

Answer to C. M. B.; characters of eggs of *Microcentrum retinervis*.

248. [WALSH, B. D.] [Squash-vine borer.] <Pract. Ent., March, 1867, v. 2, p. 73.

Answer to inquiry of E. Nason; ravages and means against *Trochilium cucurbita* [= *Melittia ceto*].

249. [WALSH, B. D.] [Apple-twigg borers, etc.] <Pract. Ent., March, 1867, v. 2, pp. 73-74.

Answer to inquiry of A. W. Brumbaugh; work of *Bostrichus* [= *Amphicrus*] *bicaudatus*; characters and habits of *Teniopteryx fasciata*; ravages, habits, and means against *Macroductylus subspinosus*.

250. [WALSH, B. D.] [Hessian fly.] <Pract. Ent., March, 1867, v. 2, p. 74.

Answer to inquiry of E. E. Sheldon; hibernation of the larva of *Cecidomyia destructor*.

251. [WALSH, B. D.] [Tree-cricket.] <Pract. Ent., March, 1867, v. 2, p. 74.

Answer to inquiry of J. M. Cole; food-habits of *Ecanthus niveus*; characters of its eggs.

252. [WALSH, B. D.] [Tineids in bee-hives.] <Pract. Ent., March, 1867, v. 2, p. 74.

Answer to inquiry of J. H. Hunt; characters of case and larva of undetermined tineid.

253. W[ALSH], B. D. Jumping to conclusions. <Pract. Ent., March, 1867, v. 2, p. 74.

Criticism of article "THE potato-bug" (Wisconsin Farmer, 2 March, 1867).

254. W[ALSH], B. D. The common Curculio and its allies. <Pract. Ent., April, 1867, v. 2, pp. 75-81.

Characters of the *Rhyncophora*; characters, ravages, life-history, food-habits, number of broods, and means against *Conotrachelus nenuphar*; ravages, habits, characters, and means against *Anthonomus prunivora* [= *Coccotorus scutellaris*] and *A. 4-gibbus*; mention of additional injurious weevils; comparative characters of the three species.

255. W[ALSH], B. D. Remarks by B. D. W. <Pract. Ent., April, 1867, v. 2, p. 82.

Comments on C. V. Riley's article, "The imported apple-tree bark-louse" (Prairie Farmer, 23 March, 1867, [v. 35], n. s., v. 19, p. 184).

256. W[ALSH], B. D. Confessing the corn. <Pract. Ent., April, 1867, v. 2, p. 82.

Acknowledgment of mistake in quoting from Prairie Farmer.

257. [WALSH, B. D.] [*Bibio albipennis*.] <Pract. Ent., April, 1867, v. 2, p. 83.

Answer to inquiry of H. Burt; habits of larva of *Bibio albipennis*.

258. [WALSH, B. D.] [Lice on horses.] <Pract. Ent., April, 1867, v. 2, p. 83.

Answer to inquiry of L. West; comparative characters of *Pediculina* and *Mallophaga*.

259. [WALSH, B. D.] [Cocoon on wild cherry.] <Pract. Ent., April, 1867, v. 2, p. 83.
Answer to inquiry of A. A. Baker; sexual differences of *Attacus promethea*; food-plants of its larva.
260. [WALSH, B. D.] [Lepidopterous case-bearer.] <Pract. Ent., April, 1867, v. 2, p. 83.
Answer to inquiry of J. H. Hunt; larval characters of case-bearing *Lepidoptera*.
261. [WALSH, B. D.] ["Thousand-legged worms."] <Pract. Ent., April, 1867, v. 2, p. 83.
Answer to inquiry of J. H. Parsons; *Iulus virgatus* eating dead seeds; injurious habits of species of *Polydesmus*.
262. [WALSH, B. D.] [Toads: Glorified squash-bug.] <Pract. Ent., 1867, v. 2, p. 83.
Answer to inquiry of F. C. Hill; food of toads; poisonousness of *Prionotus novenarius* [= *Prionidus cristatus*].
263. [WALSH, B. D.] [Galls on blackberry.] <Pract. Ent., April, 1867, v. 2, pp. 83-84.
Answer to inquiry of J. H. Tice; identification of the gall of *Diastrophus nebulosus*; genera of *Cynipidae* confined to single plants.
264. [WALSH, B. D.] [Bark-lice.] <Pract. Ent., April, 1867, v. 2, p. 84.
Answer to inquiry of Dr. Houghton; comparative harmlessness of *Coccus harisii* [= *Chionaspis furfurus*]; means against *Coccidae*.
265. [WALSH, B. D.] [Plant-lice.] <Pract. Ent., April, 1867, v. 2, p. 84.
Answer to inquiry of E. Orton; description of eggs of *Lachnus strobi*; means against *Aphididae*.
266. [WALSH, B. D.] [Bag-worms.] <Pract. Ent., April, 1867, v. 2, pp. 84-85.
Answer to inquiry of J. Murphy; food-habits and means of dispersal of *Thyridopteryx ephemeraeformis*.
267. [WALSH, B. D.] [Insects injurious to grape.] <Pract. Ent., April, 1867, v. 2, p. 85.
Answer to inquiry of J. Wood; supposed *Cureulio* punctures in grapes.
268. [WALSH, B. D.] [*Attacus promethea*.] <Pract. Ent., April, 1867, v. 2, p. 85.
Answer to inquiry of J. B. Lyon; mention of undetermined parasite of *Attacus promethea*.
269. [WALSH, B. D.] [Borer in hickory.] <Pract. Ent., April, 1867, v. 2, p. 85.
Answer to inquiry of B. Norris; characters of young and mature larva of *Clytus* [= *Cyllene*] *pictus*.
270. [WALSH, B. D.] [Apple-tree plant-lice.] <Pract. Ent., April, 1867, v. 2, p. 85.
Answer to inquiry of W. W. Linn; identification of eggs of *Aphis mali*; enemies of the same.

271. [WALSH, B. D.] [Tulip-tree bark-louse: Basket-worm.] <Pract. Ent., April, 1867, v. 2, p. 85.

Answer to inquiry of I. Hicks; parasites and enemies of undescribed bark-louse on tulip-tree; *Thyridopteryx ephemeraformis* destructive to evergreens.

272. W[ALSH], B. D. The grape-vine *Fidia*. (*Fidia viticida*, new species.) <Pract. Ent., May, 1867, v. 2, pp. 87-88, fig.

Ravages, description, and figure of *Fidia viticida* n. sp.; modification of the clasping organs of insects.

273. W[ALSH], B. D. Enemies of the rice crop. <Pract. Ent., May, 1867, v. 2, p. 89.

Injuries caused by and means adopted against the water-weevil [= *Lissorhoptus simplex*] and the rice-grub [= *Chalepus trachypygus*.]

274. [WALSH, B. D.] The canker-worm once more. <Pract. Ent., May, 1867, v. 2, p. 89. Abstract: <Cultivator and Country Gentleman, 6 June, 1867, v. 29, p. 370.

Extract from and review of W. G. C.'s "My trials with the canker-worms: remedy" (Iowa Homestead, 13 March, 1867); sorghum as a means against *Anisopteryx*.

275. W[ALSH], B. D. None so blind as those who shut their eyes. <Pract. Ent., May, 1867, v. 2, pp. 89-90.

Criticism of error by editors of agricultural papers; rate of eastward progress of *Doryphora 10-lineata*.

276. W[ALSH], B. D. Self-taught entomologists. <Pract. Ent., May, 1867, v. 2, pp. 91-92.

Criticism of misstatements found in agricultural papers; first occurrence of *Doryphora 10-lineata* in Illinois in 1864.

277. W[ALSH], B. D. Pear-tree and apple-tree insects. <Pract. Ent., May, 1867, v. 2, pp. 92-93.

Food-plants of *Attacus cecropia*, *Clisiocampa americana*, and *Saperda bivittata* [= *candida*].

278. W[ALSH], B. D. More universal remedies. <Pract. Ent., May, 1867, v. 2, p. 93.

Reprint and criticism of "Destruction of insects" (Mo. Rept. Bureau Agric., February, 1867, p. 60).

279. W[ALSH], B. D. Hop-growing in the West. <Pract. Ent., May, 1867, v. 2, pp. 93-94.

Occurrence in Michigan of *Phorodon humuli*; its destructiveness; popular ignorance of entomology.

280. W[ALSH], B. D. The wheat midge—jumping to a conclusion. <Pract. Ent., May, 1867, v. 2, p. 94.

Extract, with comment, from Maryland Farmer and Mechanic, August, 1865; *Diplosis tritici* not infested with parasites in America; food-habits of *Thrips*.

281. W[ALSH], B. D. Tree cut-worms. <Pract. Ent., May, 1867, v. 2, p. 94.
 "Dark-sided cut-worm" an *Agrotis* and not *Hadena chenopodii* [= *Mamestra trifolii*]. See Nos. 85, 229.
282. W[ALSH], B. D. Quacks and physicians. <Pract. Ent., May, 1867, v. 2, p. 95.
 Criticism of proposed universal remedy against insects injurious to the rose (Western Rural, 30 March, 1867).
283. W[ALSH], B. D. The ephemeron or May-fly. <Pract. Ent., May, 1867, v. 2, p. 95.
 Length of duration of life of *Ephemeridæ*.
284. W[ALSH], B. D. A groundless fear. <Pract. Ent., May, 1867, v. 2, p. 95.
 Extract from Mo. Rept. Bureau Agric., February, 1867, p. 62; food-habits of larva and imago of *Lytta atrata* [= *Epicauta pennsylvanica*]; places of oviposition.
285. W[ALSH], B. D. Fire-blight. <Pract. Ent., May, 1867, v. 2, p. 96.
 Probable cause.
286. [WALSH, B. D.] [Insect eggs.] <Pract. Ent., May, 1867, v. 2, p. 96.
 Answer to inquiry of W. Willock; identification of eggs of *Æcanthus niveus* and of one of the *Membracidæ* on grape twigs.
287. [WALSH, B. D.] [*Attacus cecropia*.] <Pract. Ent., May, 1867, v. 2, p. 96.
 Answer to inquiry of J. B. H.; characters of *Attacus cecropia*.
288. [WALSH, B. D.] [Twig pruners.] <Pract. Ent., May, 1867, v. 2, p. 96.
 Answer to inquiry of M. W. Philips; twigs of pear and other trees amputated in the same manner as oak twigs by *Elaphidion putator* [= *villosum*].
289. [WALSH, B. D.] [Blister-beetles.] <Pract. Ent., May, 1867, v. 2, p. 97.
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290. [WALSH, B. D.] [Means against Curculio: *Æstridæ*.] <Pract. Ent., May, 1867, v. 2, p. 97.
 Answer to inquiry of C. Greene; ineffective means against *Conotrachelus neuophar*; *Æstridæ* infesting the ox and rabbit.
291. [WALSH, B. D.] [Insect eggs.] <Pract. Ent., May, 1867, v. 2, p. 97.
 Answer to inquiry of P. Ferris; identification of eggs of *Clisiocampa sylvatica* [= *disstria*] and *Aphis mali*.

292. W[ALSH], B. D. The wheat midge. <Pract. Ent., June, 1867, v. 2, pp. 99-101.
Extract from letter from S. S. Rathvon, with remarks; natural history of *Diplosis tritici*.
293. W[ALSH], B. D. The new or Colorado potato-bug. <Pract. Ent., June, 1867, v. 2, pp. 101-102.
Distribution, habits, and extent of injuries of *Doryphora 10-lineata*.
294. [WALSH, B. D.] [Gall-flies; saw-flies.] <Pract. Ent., June, 1867, v. 2, pp. 102-103.
Answer to inquiry of M. W. Philips; mention of various insects which are gall-makers; their modes of life; characters of the larvæ of *Cecidomyidæ* and *Tenthredinidæ*.
295. [WALSH, B. D.] [Bark-beetles.] <Pract. Ent., June, 1867, v. 2, p. 103.
Answer to inquiry of W. C. Fish; identification of specimens sent; habits of *Tomicus pusillus* [= *Pityophthorus minutissimus*] and of *T. ramulorum* [= *P. micrographus*].
296. [WALSH, B. D.] [Apple-tree insects.] <Pract. Ent., June, 1867, v. 2, p. 103.
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297. [WALSH, B. D.] [*Attacus cecropia*.] <Pract. Ent., June, 1867, v. 2, p. 103.
Answer to inquiry of T. McGraw; larvæ of *Attacus cecropia* usually solitary.
298. [WALSH, B. D.] [Grape-vine flea-beetle.] <Pract. Ent., June, 1867, v. 2, p. 103.
Answer to inquiry of A. Kelley; hibernation of the imago of *Haltica chalybea*; ravages and means against the same.
299. [WALSH, B. D.] [*Sphyracephala brevicornis*.] <Pract. Ent., June, 1867, v. 2, p. 103.
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300. [WALSH, B. D.] [May-bug.] <Pract. Ent., June, 1867, v. 2, p. 103.
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301. [WALSH, B. D.] [Blister-beetles: plant-louse enemy.] <Pract. Ent., June, 1867, v. 2, p. 104.
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302. [WALSH, B. D.] [Blackberry borers.] <Pract. Ent., June, 1867, v. 2, p. 104.
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303. W[ALSH], B. D. Scientific nomenclature. <Pract. Ent., July, 1867, v. 2, pp. 105-106.

Criticism of the practice of establishing new genera upon slight characters, as illustrated by the American silk-worms.

304. W[ALSH], B. D. Currant plant-lice (*Aphis ribis*). <Pract. Ent., July, 1867, v. 2, p. 106.

* Method of work of *Aphis* [= *Myzus*] *ribis*.

305. [WALSH, B. D.] [*Lucanus elaphus*.] <Pract. Ent., July, 1867, v. 2, p. 107.

Answer to inquiry of S. Hayeraft; characters and habits of *Lucanus elaphus*; rarity of the ♀; use of prolonged jaws in ♂ insects.

306. [WALSH, B. D.] [New York weevil.] <Pract. Ent., July, 1867, v. 2, p. 107.

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307. [WALSH, B. D.] [Codling-moth.] <Pract. Ent., July, 1867, v. 2, p. 107.

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308. [WALSH, B. D.] [Hickory borer, etc.] <Pract. Ent., July, 1867, v. 2, p. 107.

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309. [WALSH, B. D.] [Wasps.] <Pract. Ent., July, 1867, v. 2, p. 107.

Answer to inquiry of G. W. Smith; food-habits of digger-wasps.

310. [WALSH, B. D.] [Parasitic flies, etc.] <Pract. Ent., July, 1867, v. 2, pp. 107-108.

Answer to inquiry of S. P. Monks; method of transformation of parasitic Hymenoptera; use of Latin plurals for English words.

311. [WALSH, B. D.] [Workers among Hymenoptera.] <Pract. Ent., July, 1867, v. 2, p. 108.

Answer to inquiry of W. V. Andrews; economy of workers among the social Hymenoptera.

312. [WALSH, B. D.] [Cut-worms.] <Pract. Ent., July, 1867, v. 2, p. 108.

Answer to inquiry of V. Abbey; means against *Agrotis* sp.?

313. [WALSH, B. D.] [Potato-beetle enemies.] <Pract. Ent., July, 1867, v. 2, p. 108.

Answer to inquiry of W. Smith; scutellerid enemy of larva of *Doryphora 10-lineata*; katydids as an enemy of the same.

314. [WALSH, B. D.] [Black-bug.] <Pract. Ent., July, 1867, v. 2, p. 108.

Answer to inquiry of J. R. Tewksbury; characters and habits of *Pirates* [= *Melanolestes*] *picipes*.

315. [WALSH, B. D.] [Burying-beetles.] <Pract. Ent., July, 1867, v. 2, p. 108.

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316. [WALSH, B. D.] [Insects named.] <Pract. Ent., July, 1867, v. 2, p. 108.

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317. [WALSH, B. D.] [Spring-tails.] <Pract. Ent., July, 1867, v. 2, pp. 108-109.

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318. [WALSH, B. D.] [Blackberry gall insects.] <Pract. Ent., July, 1867, v. 2, p. 109.

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319. [WALSH, B. D.] [Pine and cedar longicorns.] <Pract. Ent., July, 1867, v. 2, p. 109.

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320. [WALSH, B. D.] [White-pine plant-louse, etc.] <Pract. Ent., July, 1867, v. 2, p. 109.

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321. [WALSH, B. D.] [Cut-worms.] <Pract. Ent., July, 1867, v. 2, p. 109.

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322. [WALSH, B. D.] [Currant plant-louse.] <Pract. Ent., July, 1867, v. 2, pp. 109, 110.

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323. [WALSH, B. D.] [Beetles.] <Pract. Ent., July, 1867, v. 2, p. 110.

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324. W[ALSH], B. D. Fertilizing plants. <Pract. Ent., July, 1867, v. 2, p. 110.

Part played by insects in fertilizing plants.

325. W[ALSH], B. D. The peach-worm. <Pract. Ent., July, 1867, v. 2, p. 110.

Larvæ of *Ephestia zea* [= *interpunctella*] injurious to dried peaches; food-plants and enemies of the same.

326. W[ALSH], B. D. Valedictory. <Pract. Ent., August–September, 1867, v. 2, p. 111.

Note of thanks for aid received in editing the Practical Entomologist.

327. W[ALSH], B. D. The State entomologist of Illinois. <Pract. Ent., August–September, 1867, v. 2, p. 111. Reprint: <Can. Farmer, 1 October, 1867, v. 4. S.-b., No. 2, p. 98.

Bill for appointment of State entomologist of Illinois not carried into effect.

328. W[ALSH], B. D. The three so-called army-worms. <Pract. Ent., August–September, 1867, v. 2, pp. 111–114.

Confusion caused by the use of the same popular name for *Anomis* [= *Aletia*] *xylina*, *Leucania unipuncta*, and *Clisiocampa sylvatica* [= *disstria*]; habits, etc., of the three species; food-habits of their larvæ; characters, parasites, and means against *C. sylvatica* [= *disstria*].

329. W[ALSH], B. D. The little Turk and its crescent. <Pract. Ent., August–September, 1867, v. 2, pp. 114–115.

Comments on letter from F. C. Hill; oviposition of *Conotrachelus nenuphar*.

330. [WALSH, B. D.] Apple-worm. (*Carpocapsa pomonella*.) <Pract. Ent., August–September, 1867, v. 2, p. 115.

Prevalence of *C. pomonella* in 1867; food-habits of its larva.

331. W[ALSH], B. D. Spindle-worms. <Pract. Ent., August–September, 1867, v. 2, pp. 115–116.

Habits, etc., of *Achatodes zea* and of *Gortyna nitela*.

332. W[ALSH], B. D. A plant growing out of an insect. <Pract. Ent., August–September, 1867, v. 2, p. 116.

Larvæ of *Lachnosterna fusca* infested with *Cordyceps* turned up by the plow in large numbers; larvæ supposed to have eaten poisonous seed which has germinated after killing the larvæ; sowing the seed as a means against the larvæ.

333. [WALSH, B. D.] The imported gooseberry saw-fly. <Pract. Ent., August–September, 1867, v. 2, p. 116.

Changes in the larva of *Nematus ventricosus* [= *ribesii*] during the last moult; ravages in Columbia County, N. Y.; extent of spread from Rochester, N. Y.

334. W[ALSH], B. D. The Colorado potato-bug. <Pract. Ent., August–September, 1867, v. 2, p. 116.

Spread of *Doryphora 10-lineata* into southern Michigan and western Indiana.

335. W[ALSH], B. D. Apple-tree plant-lice. (*Aphis mali*.) <Pract. Ent., August–September, 1867, v. 2, pp. 116–117.

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337. [WALSH, B. D.] A new foe of the corn. <Pract. Ent., August-September, 1867, v. 2, pp. 117-118.
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365. [WALSH, B. D.] [Potato-beetle enemies.] <Pract. Ent., August-September, 1867, v. 2, p. 121.

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366. WALSH, B. D. The Colorado potato-bug. <Pract. Ent., August-September, 1867, v. 2, p. 121.

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367. [WALSH, B. D.] Entomology. <Prairie Farmer, December, 1867, [v. 36], n. s., v. 20, pp. 358-359.

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368. WALSH, B. D. The grasshoppers. <Iowa Homestead, 15 January, 1868 (v. 13?), p. 9. S.-b., No. 2, p. 119.

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369. WALSH, B. D. Birds vs. insects. <Prairie Farmer, 1868, [v. 37], n. s., v. 21; 30 May, pp. 346-347; 6 June, pp. 362-363; 13 June, pp. 378, 379.

370. WALSH, B. D. The seventeen-year locust. <Dixie Farmer, 11 June, 1868. S.-b., No. 3, p. 23.

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371. WALSH, B. D. Entomological. Do locusts sting? <Chicago Republican, 1868. S.-b., No. 3, p. 25.

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372. WALSH, B. D. The bug-hunter in Egypt. A journal of an entomological tour into south Illinois by the senior editor. <Amer. Ent., 1868, v. 1; September, pp. 6-14, figs. 1-7; October, pp. 29-36, figs. 23-29.

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373. WALSH, B. D. First annual report on the noxious insects of the State of Illinois. <Trans. Ill. State Hortic. Soc. for 1867, n. s., v. 1, Appendix. Separate: <Chicago, 1868, 103 pp., figs. 1-3.

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375. WALSH, B. D. Appendix to the article on "Wasps and their habits," in No. 7. <Amer. Ent., April, 1869, v. 1, pp. 162-164.

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376. WALSH, B. D. Mr. Couper's thorn-leaf gall. <Ca. Ent., 15 April, 1869, v. 1, pp. 79-80.

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377. WALSH, B. D. The six worst insect enemies of the fruit growers in northern Illinois. <Trans. North. Ill. Hort. Soc. for 1867-'68, pp. 91-96.

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378. WALSH, B. D. Squash borer. <Cultivator and Country Gentleman, 30 September, 1869, v. 34, p. 256. Extract: <Prairie Farmer, 30 October, 1869.

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379. WALSH, B. D. Apple-tree borers. <Journ. Ill. State Agric. Soc. Reprint: <Trans. Ill. State Agric. Soc., v. 5, pp. 499-501.

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380. WALSH, B. D. On a species of *Hemiteles* (*Ichneumonidæ*), ascertained by the editor to be parasitic in Canada on the imported currant-worm fly (*Nematus ventricosus* Klug). <Can. Ent., 1 October, 1869, v. 2, pp. 9-12.

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381. WALSH, B. D. The imported currant-worm fly (*Nematus ventricosus* Klug) and its parasite (*Hemiteles nemativorus* Walsh). <Ca. Ent., 15 November, 1869, v. 2, pp. 31-33.

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382. WALSH, B. D. Larvæ in the human bowels. One of Mr. Walsh's posthumous articles. <Amer. Ent., March, 1870, v. 2, pp. 137-141, fig. 93.

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383. WALSH, B. D. One day's journal of a State entomologist. <Amer. Ent. and Bot., May, 1870, v. 2, pp. 197-199.

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384. WALSH, B. D. On the group *Eurytomides* of the hymenopterous family *Chalcididae*; with remarks on the theory of species and a description of *Antigaster*, a new and very anomalous genus of *Chalcididae*. <Amer. Ent. and Bot., 1870, v. 2, September, pp. 297-301, fig. 1, 2; October, pp. 329-335, fig. 3-6; December, pp. 367-370, fig. 7-10.

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385. WALSH, B. D. Descriptions of North American Hymenoptera. <Trans. Acad. Sci. St. Louis, 7 May-9 June, 1873, v. 3, pp. 65-166, fig.

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BIBLIOGRAPHY

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PART II.

386. [WALSH, B. D., and C. V. RILEY.] Salutory. To the agriculturists and horticulturists of the United States. <Amer. Ent., September, 1868, v. 1, pp. 1-3.
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389. [WALSH, B. D., and C. V. RILEY.] A new bark-louse on the osage orange. <Amer. Ent., September, 1868, v. 1, p. 14, fig. 8.
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390. [WALSH, B. D., and C. V. RILEY.] Entomological ignorance in the South. <Amer. Ent., September, 1868, v. 1, pp. 14-16.
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393. [WALSH, B. D., and C. V. RILEY.] The animal kingdom. <Amer. Ent., September, 1868, v. 1, pp. 17-18.
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394. [WALSH, B. D., and C. V. RILEY.] *Ad interim* committees. <Amer. Ent., September, 1868, v. 1, p. 18.
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395. [WALSH, B. D., and C. V. RILEY.] On our table. <Amer. Ent., September, 1868, v. 1, p. 18.
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396. [WALSH, B. D., and C. V. RILEY.] "Fire-flies." <Amer. Ent., September, 1868, v. 1, p. 19, fig. 9.
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401. [WALSH, B. D., and C. V. RILEY.] Potato bugs. <Amer. Ent., 1868, v. 1, October, pp. 21-27, fig. 10-19; November, pp. 41-49, fig. 33-48.
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402. [WALSH, B. D., and C. V. RILEY.] "Grasshoppers." Their devastations in western Iowa and the good that has resulted from them. <Amer. Ent., October, 1868, v. 1, pp. 27-28.
Letter of M. C. Nickerson, with comments; seeds of *Vilfa vaginæflora* carried by "grasshoppers."

403. [WALSH, B. D., and C. V. RILEY.] An apple growing on a grape-vine. <Amer. Ent., October, 1868, v. 1, p. 28.
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404. [WALSH, B. D., and C. V. RILEY.] Ticks and Texas fever. <Amer. Ent., October, 1868, v. 1, p. 28.
Improbability that *Ixodes bovis* is the cause of the Texas fever of cattle.
405. [WALSH, B. D., and C. V. RILEY.] Scientific symbols. <Amer. Ent., October, 1868, v. 1, p. 28. Reprint: <Op. cit., November, 1869, v. 2, p. 50.
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406. [WALSH, B. D., and C. V. RILEY.] A swarm of butterflies. <Amer. Ent., October, 1868, v. 1, pp. 28-29, figs. 20-22.
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407. [WALSH, B. D., and C. V. RILEY.] The sting of the 17-year Cicada. <Amer. Ent., October, 1868, v. 1, pp. 36-37.
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408. [WALSH, B. D., and C. V. RILEY.] On our table. <Amer. Ent., October, 1868, v. 1, p. 37.
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409. [WALSH, B. D., and C. V. RILEY.] Squash-bug; its change of color. <Amer. Ent., October, 1868, v. 1, p. 37.
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410. [WALSH, B. D., and C. V. RILEY.] White grub; immunity from it next year in Clinton County, Mo. <Amer. Ent., October, 1868, v. 1, p. 37.
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411. [WALSH, B. D., and C. V. RILEY.] Insect enemies of the Colorado potato beetle. <Amer. Ent., October, 1868, v. 1, p. 37.
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412. [WALSH, B. D., and C. V. RILEY.] "Harvest-bugs" in America, misnamed "jiggers." <Amer. Ent., October, 1868, v. 1, p. 38.
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413. [WALSH, B. D., and C. V. RILEY.] Insects named. <Amer. Ent., October, 1868, v. 1, p. 38.
Answer to inquiry of J. T. Smith; food-plants of *Aphis mali* and of *Noto-donta* [= *Edemasia*] *concinna*; *Campoplex* [= *Limneria*] *fugitiva* parasitic on larva of *Euchætes cglc*.
414. [WALSH, B. D., and C. V. RILEY.] Grapes cut off by the tree cricket. <Amer. Ent., October, 1868, v. 1, p. 38, fig. 30-31.
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415. [WALSH, B. D., and C. V. RILEY.] The Buffalo tree-hopper. <Amer. Ent., October, 1868, v. 1, p. 38.
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416. [WALSH, B. D., and C. V. RILEY.] A scavenger mistaken for a foe. <Amer. Ent., October, 1868, v. 1, p. 38.
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417. [WALSH, B. D., and C. V. RILEY.] Insect foes of the bark-louse. <Amer. Ent., October, 1868, v. 1, p. 39, fig. 32.
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418. [WALSH, B. D., and C. V. RILEY.] Best works on entomology. <Amer. Ent., October, 1868, v. 1, p. 39.
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419. [WALSH, B. D., and C. V. RILEY.] Larvæ in plum-gum. <Amer. Ent., October, 1868, v. 1, p. 39.
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420. [WALSH, B. D., and C. V. RILEY.] Insect foes of the hop vine. <Amer. Ent., October, 1868, v. 1, p. 39.
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421. [WALSH, B. D., and C. V. RILEY.] Insect foe of the apple-tree borer. <Amer. Ent., October, 1868, v. 1, p. 39.
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422. [WALSH, B. D., and C. V. RILEY.] Oak tree caterpillars. <Amer. Ent., October, 1868, v. 1, p. 39.
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423. [WALSH, B. D., and C. V. RILEY.] Bark-lice on apple trees. <Amer. Ent., October, 1868, v. 1, p. 40.
Answer to inquiry of J. G. Fleck; *Mytilaspis pomorum* destroyed by a minute mite.
424. [WALSH, B. D., and C. V. RILEY.] The "saddle-back" caterpillar. <Amer. Ent., October, 1868, v. 1, p. 40.
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425. [WALSH, B. D., and C. V. RILEY.] The regal walnut caterpillar. <Amer. Ent., October, 1868, v. 1, p. 40.
Answer to inquiry of M. Copley; characters and food-plants of larva of *Citheronia regalis*; times of metamorphosis; characters of the imago.
426. [WALSH, B. D., and C. V. RILEY.] The Hessian fly. <Amer. Ent., October, 1868, v. 1, p. 40.
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427. [WALSH, B. D., and C. V. RILEY.] Red cedar caterpillar. <Amer. Ent., October, 1868, v. 1, p. 40.
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428. [WALSH, B. D., and C. V. RILEY.] Wheat-midge winter killed. <Amer. Ent., October, 1868, v. 1, p. 40.
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429. [WALSH, B. D., and C. V. RILEY.] Grape-vine borer. <Amer. Ent., October, 1868, v. 1, p. 40.
Answer to inquiries of A. Barter and J. H. Hogan; undetermined cerambycid larva injurious to grape-vines.
430. [WALSH, B. D., and C. V. RILEY.] Popular names and scientific names. <Amer. Ent., November, 1868, v. 1, p. 49, figs. 49-51.
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431. [WALSH, B. D., and C. V. RILEY.] Entomological ignorance in the North. <Amer. Ent., November, 1868, v. 1, pp. 50-51, figs. 52-54.
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432. [WALSH, B. D., and C. V. RILEY.] Tit for tat. <Amer. Ent., November, 1868, v. 1, p. 52.
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433. [WALSH, B. D., and C. V. RILEY.] Grasshoppers. <Amer. Ent., November, 1868, v. 1, p. 53.
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434. [WALSH, B. D., and C. V. RILEY.] To keep seed peas from bugs. <Amer. Ent., November, 1868, v. 1, p. 53.
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435. [WALSH, B. D., and C. V. RILEY.] Mind how you pack insects. <Amer. Ent., November, 1868, v. 1, p. 54.
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436. [WALSH, B. D., and C. V. RILEY.] The apple growing on a grape vine. <Amer. Ent., November, 1868, v. 1, p. 54.
The "vegetable phenomenon," see Nos. 332, 403, 478, proved to be a gall.
437. [WALSH, B. D., and C. V. RILEY.] The late exhibition of useful and destructive insects at Paris. <Amer. Ent., November, 1868, v. 1, p. 55.
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438. [WALSH, B. D., and C. V. RILEY.] Destroying black ants in gardens. <Amer. Ent., November, 1868, v. 1, p. 55.
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439. [WALSH, B. D., and C. V. RILEY.] Entomological quackery. <Amer. Ent., November, 1868, v. 1, p. 56.
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440. [WALSH, B. D., and C. V. RILEY.] The cruel bug-hunters. <Amer. Ent., November, 1868, v. 1, p. 56.
Insects are not susceptible of such feelings of pain and pleasure as are felt by higher animals.
441. [WALSH, B. D., and C. V. RILEY.] Honey bees eating grapes. <Amer. Ent., November, 1868, v. 1, p. 56.
Reprint of a letter by T. W., from Ohio Farmer, with comments; *Apis mellifica* as an enemy of sound fruit.
442. [WALSH, B. D., and C. V. RILEY.] Twigs amputated by some unknown animal. <Amer. Ent., November, 1868, v. 1, p. 57.
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443. [WALSH, B. D., and C. V. RILEY.] Twigs girdled by some animal. <Amer. Ent., November, 1868, v. 1, p. 57.
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444. [WALSH, B. D., and C. V. RILEY.] Hop-vine caterpillar. <Amer. Ent., November, 1868, v. 1, p. 57.
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445. [WALSH, B. D., and C. V. RILEY.] "Galls" on leaves of soft maple. <Amer. Ent., November, 1868, v. 1, p. 57.
Answer to inquiry of A. L. Child; characters of undescribed mite-galls and their architects; mode of formation of leaf-galls by mites.
446. [WALSH, B. D., and C. V. RILEY.] Unsightly galls on the cottonwood. <Amer. Ent., November, 1868, v. 1, p. 57.
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447. [WALSH, B. D., and C. V. RILEY.] Insects named. <Amer. Ent., November, 1868, v. 1, p. 57.
Answer to inquiry of E. Baxter; *Gordius aquaticus* a host in *Orchelimum gracile*; *Cetonia* [= *Euphoria*] *inda* destructive to the peach.
448. [WALSH, B. D., and C. V. RILEY.] The stick-bug. <Amer. Ent., November, 1868, v. 1, p. 58. Reprint: <Can. Farmer, 15 January, 1870.
Description, vernacular names, and habits of *Spectrum* [= *Diapheromera*] *femorata*.
449. [WALSH, B. D., and C. V. RILEY.] Woolly lice on the beech. <Amer. Ent., November, 1868, v. 1, p. 58.
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450. [WALSH, B. D., and C. V. RILEY.] The sheep-bot or head-maggot. <Amer. Ent., November, 1868, v. 1, p. 58.
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451. [WALSH, B. D., and C. V. RILEY.] Leaf-miners of the locust. <Amer. Ent., November, 1868, v. 1, p. 58.
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452. [WALSH, B. D., and C. V. RILEY.] Leaf-hoppers on celery. <Amer. Ent., November, 1868, v. 1, p. 58.
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453. [WALSH, B. D., and C. V. RILEY.] Parsnip caterpillars.—Scorpions. <Amer. Ent., November, 1868, v. 1, p. 59.
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454. [WALSH, B. D., and C. V. RILEY.] Noxious insects named. <Amer. Ent., November, 1868, v. 1, p. 59.
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455. [WALSH, B. D., and C. V. RILEY.] Cut-worms destroying recently sown wheat. <Amer. Ent., November, 1868, v. 1, p. 59.
Answer to inquiry of T. R. Allen; characters, habits, and means against undetermined *Noctuidæ* attacking wheat.
456. [WALSH, B. D., and C. V. RILEY.] The spined soldier bug. <Amer. Ent., November, 1868, v. 1, p. 59.
Answer to inquiry of I. Hicks; *Podisus spinosus* as an enemy of *Hyphantria textor* [= *cunea*].
457. [WALSH, B. D., and C. V. RILEY.] The preying Mantis, alias Devil's riding horse, etc. <Amer. Ent., November, 1868, v. 1, p. 59.
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458. [WALSH, B. D., and C. V. RILEY.] The pigeon Tremex. <Amer. Ent., November, 1868, v. 1, p. 59.
Answer to inquiry of F. Brewer; characters of *Tremex columba*; food-habits and parasites of its larva.
459. [WALSH, B. D., and C. V. RILEY.] Flesh-worms. <Amer. Ent., November, 1868, v. 1, p. 59.
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460. [WALSH, B. D., and C. V. RILEY.] Fall web-worm on hickory. <Amer. Ent., November, 1868, v. 1, p. 59.
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461. [WALSH, B. D., and C. V. RILEY.] Butterflies named. <Amer. Ent., November, 1868, v. 1, p. 60.
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462. [WALSH, B. D., and C. V. RILEY.] Museum pest. <Amer. Ent., November, 1868, v. 1, p. 60.
Answer to inquiry of T. W. Holt, jr.; means against *Dermestidæ*.
463. [WALSH, B. D., and C. V. RILEY.] Insects named. <Amer. Ent., November, 1868, v. 1, p. 60.
Answer to inquiry of J. Weed; enemies of plant-lice and bark-lice; food-plant and characters of the larva of *Papilio turnus*.
464. [WALSH, B. D., and C. V. RILEY.] Grapes spoiled by something. <Amer. Ent., November, 1868, v. 1, p. 60.
Answer to inquiry of J. Wood; grapes injured from some unknown cause; juice from wounded grapes as food for moths.
465. [WALSH, B. D., and C. V. RILEY.] White-pine worms. <Amer. Ent., November, 1868, v. 1, p. 60.
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466. [WALSH, B. D., and C. V. RILEY.] The Tarantula of Texas. <Amer. Ent., November, 1868, v. 1, p. 60.
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467. [WALSH, B. D., and C. V. RILEY.] Insect foes of the apple-tree. <Amer. Ent., November, 1868, v. 1, p. 60.
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468. [WALSH, B. D., and C. V. RILEY.] Grape-leaf folders eaten by spiders. <Amer. Ent., November, 1868, v. 1, p. 60.
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469. [WALSH, B. D., and C. V. RILEY.] Caterpillar of the Troilus butterfly. <Amer. Ent., November, 1868, v. 1, p. 60.
Answer to inquiry of A. S. Fuller; food-habits of larva of *Papilio troilus*.
470. [WALSH, B. D., and C. V. RILEY.] Potato beetles. <Amer. Ent., November, 1868, v. 1, p. 60.
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471. [WALSH, B. D., and C. V. RILEY.] Holes round the roots of young ash trees in the nursery. <Amer. Ent., November, 1868, v. 1, p. 60.
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472. [WALSH, B. D., and C. V. RILEY.] Locust borers. <Amer. Ent., November, 1868, v. 1, p. 60.
Answer to inquiry of U. Bruner; destructiveness of the larva of *Clytus* [= *Cyllene*] *robinæ*.

473. [WALSH, B. D., and C. V. RILEY.] The hellgrammite fly. <Amer. Ent., December, 1868, v. 1, pp. 61-62, figs. 56-57.
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474. [WALSH, B. D., and C. V. RILEY.] The periodical Cicada. <Amer. Ent., December, 1868, v. 1, pp. 63-72, figs. 58-64. Extract: <Op. cit., June, 1869, v. 1, p. 202.
Characterization of the 13-year brood of *Cicada* as a new species, *C.* [= *Tibicen*] *tredecim*; dimorphism of the same and of *C.* [= *T.*] *septendecim*; seasons, natural history, transformations, enemies, sting, and injuries of these species; chronological history of their several known broods; figures the several stages of *C.* [= *T.*] *septendecim*, the towers made by the pupa and twigs with eggs.
475. [WALSH, B. D., and C. V. RILEY.] The hateful or Colorado grasshopper, *Caloptenus spretus*, Uhler and Walsh. <Amer. Ent., December, 1868, v. 1, pp. 73-76, fig. 65.
Comparative characters and figures of *Caloptenus spretus* and *C. femur-rubrum*; native habitat, migrations, distribution, and ravages of the former; harmlessness of its second generation in the Mississippi Valley as compared with the first generation; improbability that it will ever become a permanent resident in that region.
476. [WALSH, B. D., and C. V. RILEY.] The twig-girdler, *Oncideres cingulatus*, Say. <Amer. Ent., December, 1868, v. 1, pp. 76-77, fig. 66.
Oviposition and food habits of *Oncideres cingulata*; figure of imago and of amputated twig.
477. [WALSH, B. D., and C. V. RILEY.] An Ichneumon fly mistaken for a wasp. <Amer. Ent., December, 1868, v. 1, p. 77.
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478. [WALSH, B. D., and C. V. RILEY.] A plant growing out of an insect. <Amer. Ent., December, 1868, v. 1, p. 77.
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479. [WALSH, B. D., and C. V. RILEY.] On our table. <Amer. Ent., December, 1868, v. 1, p. 78.
Notices of The butterflies of North America by W. H. Edwards.—The Canadian Entomologist.—Guide to the study of insects by A. S. Packard, jr.
480. [WALSH, B. D., and C. V. RILEY.] Eggs of the white-marked tussock moth. <Amer. Ent., December, 1868, v. 1, p. 79, fig. 67.
Answer to inquiry of J. M. Hannah; characters of egg and larva of *Orgyia leucostigma*; sexual differences; parasites; figure of the larva.
481. [WALSH, B. D., and C. V. RILEY.] Currant borers. <Amer. Ent., December, 1868, v. 1, p. 79.
Answer to inquiry of B. N. McKinstry; means against *Trochilium* [= *Egeria*] *tipuliformis*, *T.* [= *Alcathæ*] *caudatum*, and *Psenocerus supernotatus*.

482. [WALSH, B. D., and C. V. RILEY.] Insect infesting grape seed.
 <Amer. Ent., December, 1868, v. 1, p. 79, fig. 68.
 Answer to inquiry of A. S. Fuller; characters and figure of larva of *Isosoma vitis* infesting grape seed.
483. [WALSH, B. D., and C. V. RILEY.] Museum pests again. <Amer. Ent., December, 1868, v. 1, p. 79.
 Answer to inquiry of J. Huggins; means against *Anthreni* in collections of natural history.
484. [WALSH, B. D., and C. V. RILEY.] Grape-vine leaf-hoppers.
 <Amer. Ent., December, 1868, v. 1, p. 79.
 Answer to inquiry of P. C. Holmes; means against grape-vine leaf-hoppers.
485. [WALSH, B. D., and C. V. RILEY.] Apple-tree borer. <Amer. Ent., December, 1868, v. 1, p. 80, fig. 69.
 Answer to inquiries of J. T. Zimmerman, C. H. Roberts, and C. R. Babbitt; habits, ravages, and figure of *Bostrichus* [= *Amphicerus*] *bicaudatus*.
486. [WALSH, B. D., and C. V. RILEY.] The murky ground beetle.
 <Amer. Ent., December, 1868, v. 1, p. 80.
 Answer to inquiry of E. T. Dale; food-habits and bombardier discharges of *Harpalus caliginosus*.
487. [WALSH, B. D., and C. V. RILEY.] Curculio and bark-lice.
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 Answer to inquiry of D. A. Compton; hibernation of *Conotrachelus nenuphar*; soft soap as a means against *Coccidæ*.
488. [WALSH, B. D., and C. V. RILEY.] Insects to be named. <Amer. Ent., December, 1868, v. 1, p. 80.
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489. [WALSH, B. D., and C. V. RILEY.] Young pecan trees girdled.
 <Amer. Ent., December, 1868, v. 1, p. 80.
 Answer to inquiry of Mann and Redmond; means against *Oncideres cingulata*.
490. [WALSH, B. D., and C. V. RILEY.] Insects named. <Amer. Ent., December, 1868, v. 1, p. 80.
 Answer to inquiry of E. T. Dale; identification of several Colcoptera; supposed food-habits of *Tragidion fulvipeune*; character of cocoons of two species of *Microgaster* infesting *Protoparce celeus*.
491. [WALSH, B. D., and C. V. RILEY.] Eggs of true bugs. <Amer. Ent., December, 1868, v. 1, p. 80.
 Answer to inquiry of S. C. Thornton; characters of eggs of *Prionidus cristatus*. See Amer. Ent., v. 1, pp. 96 and 187.
492. [WALSH, B. D., and C. V. RILEY.] Museum pest once more.
 <Amer. Ent., December, 1868, v. 1, p. 80.
 Answer to inquiry of G. M. L.; larvæ of *Anthrenus musæorum* injuring whale-bone, woolen goods, etc.
493. [WALSH, B. D., and C. V. RILEY.] The Tarantula of Texas again.
 <Amer. Ent., December, 1868, v. 1, p. 80.
 Answer to inquiry of C. Peabody; distribution of *Mygale hentzii* in Missouri.

494. [WALSH, B. D., and C. V. RILEY.] The Hessian fly on seed wheat. <Amer. Ent., December, 1868, v. 1, p. 80.
Answer to inquiry of U. Scott; broods and times of transformation of *Cecidomyia destructor*.
495. [WALSH, B. D., and C. V. RILEY.] The apple-root plant-louse. *Eriosoma (Pemphigus) pyri*, Fitch. <Amer. Ent., January, 1869, v. 1, pp. 81-84, figs. 70-72.
Habits, ravages, description, enemies, and parasites of, and means against *Eriosoma pyri* [= *Schizoneura lanigera*]; figures injured root, larva, and adult with details of structure; figures adult plant-louse found on cottonwood; description and figure of larva, puparium, and imago of *Pipiza radicum* n. sp.
496. [WALSH, B. D., and C. V. RILEY.] Ants' nests in gardens. <Amer. Ent., January, 1869, v. 1, p. 84.
Means against ants.
497. [WALSH, B. D., and C. V. RILEY.] The parasites of the human animal. <Amer. Ent., January, 1869, v. 1, pp. 84-88, figs. 73-74.
Brief accounts of *Pediculus humanus* [= *vestimenti*], *P. cervicalis* [= *capitis*], *P. [=Pthirus] pubis*, *Æstrus [=Dermatobia] hominis*, *Pulex irritans*, *P. [=Sarcopsylla] penetrans*, *Acanthia lectularia*, *Conorhinus sanguisuga*, and *Acarus [=Sarcoptes] scabiei*; figures and habits of *Reduvius* [= *Opsicætus] personatus* and of *Pirates* [= *Rasahus] biguttatus*; figure of *Conorhinus sanguisuga*; classificatory relations of *Pediculina* and *Mallophaga*.
498. [WALSH, B. D., and C. V. RILEY.] The coffee borer. <Amer. Ent., January, 1869, v. 1, p. 88.
Unnamed coffee borer injurious to coffee trees in Madras.
499. [WALSH, B. D., and C. V. RILEY.] Strawberry worms. <Amer. Ent., January, 1869, v. 1, pp. 89-91, figs. 75-76.
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500. [WALSH, B. D., and C. V. RILEY.] Fungoid growths. <Amer. Ent., January, 1869, v. 1, pp. 91-92.
Mention of instances of the growth of fungi on living plants and animals; letter of S. H. Y. Early on the occurrence of fungoid growths on the larvæ of *Lachnosterna fusca*.
501. [WALSH, B. D., and C. V. RILEY.] Plums for the million. <Amer. Ent., January, 1869, v. 1, pp. 92-93.
Means against *Conotrachelus nenuphar*; notes on varieties of plum exempt from the attacks of the same.
502. [WALSH, B. D., and C. V. RILEY.] The "Colorado grasshopper." <Amer. Ent., January, 1869, v. 1, pp. 95-96.
Answer to inquiries of W. N. Byers and V. Devinny; specific names indicating particular districts can not be changed because the insect is found in other regions.

503. [WALSH, B. D., and C. V. RILEY.] Universal remedies. <Amer. Ent., January, 1869, v. 1, p. 97.
Criticism of an advertisement of "Best's patent fruit tree and vine invigorator."
504. [WALSH, B. D., and C. V. RILEY.] Complimentary. <Amer. Ent., January, 1869, v. 1, p. 98.
Notices of several notices of the American Entomologist.
505. [WALSH, B. D., and C. V. RILEY.] Paper-makers. <Amer. Ent., January, 1869, v. 1, p. 98.
Comparison of the manufacture of paper by man and by the *Vespidæ*.
506. [WALSH, B. D., and C. V. RILEY.] On our table. <Amer. Ent., January, 1869, v. 1, p. 98.
Notices of L'Insectologie agricole—Cecil's books of natural history.
507. [WALSH, B. D., and C. V. RILEY.] Look out for the eggs of the apple-tree plant-louse. <Amer. Ent., January, 1869, v. 1, p. 99.
Abundance of eggs of *Aphis mali* in winter of 1868-'69, in Missouri and Illinois; means against the same.
508. [WALSH, B. D., and C. V. RILEY.] Greenhouse plants [= pests]. <Amer. Ent., January, 1869, v. 1, p. 99.
Means against *Aphididæ*, *Coccidæ*, and *Tetranychus telarius*.
509. [WALSH, B. D., and C. V. RILEY.] How to hatch pupæ. <Amer. Ent., January, 1869, v. 1, p. 99.
Answer to inquiry of D. P. Smith; methods of raising insects.
510. [WALSH, B. D., and C. V. RILEY.] Drug-store pests. <Amer. Ent., January, 1869, v. 1, p. 99.
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511. [WALSH, B. D., and C. V. RILEY.] Apple-tree worms. <Amer. Ent., January, 1869, v. 1, p. 99.
Answer to inquiry of J. J. Thomas; habits, food-plants, and means against *Phycita nebulo* [= *Acrobasis indiginella*].
512. [WALSH, B. D., and C. V. RILEY.] Crane-fly larvæ. Amer. Ent., January, 1869, v. 1, p. 100.
Answer to inquiries of R. D. Alexander and — Hickman; habits of *Tipula* sp.; food-habits of *T. trivittata*.
513. [WALSH, B. D., and C. V. RILEY.] Punctured grape canes. <Amer. Ent., January, 1869, v. 1, p. 100.
Answer to inquiry of B. L. Kingsbury; description of punctures in grape canes probably caused by *Orocharis saltator*; means against tree-crickets.
514. [WALSH, B. D., and C. V. RILEY.] Insects to be named. <Amer. Ent., January, 1869, v. 1, p. 100.
Answer to inquiry of W. R. Marine; identification of several insects found in apple and peach nurseries.
515. [WALSH, B. D., and C. V. RILEY.] Supposed cause of yellows in peach trees. <Amer. Ent., January, 1869, v. 1, p. 100, fig. 77.
Answer to inquiry of C. H. Roberts; yellows of peach-trees a vegetable disease; figure of healthy and diseased limb; affected trees more subject to the attacks of insects than healthy trees.

516. [WALSH, B. D., and C. V. RILEY.] Eggs of katydid. <Amer. Ent., January, 1869, v. 1, p. 100.
Answer to inquiry of A. A. Hilliard; character of the eggs of *Platyphyllum* [= *Cyrtophyllus*] *concavus*.
517. [WALSH, B. D., and C. V. RILEY.] Apple-twig borer. <Amer. Ent., January, 1869, v. 1, p. 100.
Answer to inquiry of J. T. Zimmerman; ravages of *Bostrichus* [= *Amphicerus*] *bicaudatus*.
518. [WALSH, B. D., and C. V. RILEY.] Galls and their architects. <Amer. Ent., February, 1869, v. 1, pp. 101-110, figs. 78-90.
Definition, classification, and variation of galls; accounts of some galls made by *Cynipidæ*, *Cecidomyidæ*, and *Aphididæ* and of the gall-makers; natural history, descriptions, and figures of *Cynips* [= *Amphibolips*] *q.-spongifica*, *C.* [= *A.*] *q.-inanis*, *C.* [= *A.*] *q.-prunus* n. sp., *Cecidomyia* *s.-strobiloides*, *C. s.-brassicoides*, *C. v.-pomum* n. sp., *C. v.-coryloides* n. sp., *Pemphigus* *ragabundus*, *P. rhois* and *Colopha* *ulmicola*; description of the imago of *Cynips q.-prunus* and of *Pemphigus* *ulmifusus* n. sp., and of the larvæ of the new species of *Cecidomyia*; dimorphism of gall-makers; presence of inquilines and parasites in galls. (See No. 821.)
519. [WALSH, B. D., and C. V. RILEY.] The bogus Colorado potato-bug, *Doryphora juncta*, Germar. <Amer. Ent., February, 1869, v. 1, p. 110.
Food-habits of *D. juncta*.
520. [WALSH, B. D., and C. V. RILEY.] Ants and aphides. <Amer. Ent., February, 1869, v. 1, p. 110.
Inquiry of W. Batchelor, with answer; secretion of honey-dew by *Aphididæ* and harvesting of the same by ants.
521. [WALSH, B. D., and C. V. RILEY.] The Tarantula of Texas, *Mygale hentzii*, Girard. <Amer. Ent., February, 1869, v. 1, p. 11, fig. 91.
Figure of *Mygale hentzii*; habits of *Pompilus* [= *Pepsis*] *formosa*; quotes from G. Lincecum's "The Tarantula killers of Texas" (Amer. Nat., v. 1, pp. 137-141).
522. [WALSH, B. D., and C. V. RILEY.] The melancholy chafer. <Amer. Ent., February, 1869, v. 1, p. 111.
Ravages and figure of the imago of *Euphoria melancholica*.
523. [WALSH, B. D., and C. V. RILEY.] Apple worms (*Carpocapsa pomonella*, Linn.). <Amer. Ent., February, 1869, v. 1, pp. 112-114, fig. 93.
Natural history, ravages, and means against *Carpocapsa pomonella*; figures injured apple, larva, pupa, and imago.
524. [WALSH, B. D., and C. V. RILEY.] The asparagus beetle (*Crioceris asparagi*, Linn.). <Amer. Ent., February, 1869, v. 1, pp. 114-115, fig. 94.
Introduction into the United States; natural history, ravages, parasites of, and means against *Crioceris asparagi*; figure of eggs, larvæ, and imago of the same.

525. [WALSH, B. D., and C. V. RILEY.] A popular delusion. <Amer. Ent., February, 1869, v. 1, p. 116.

No insect passes through all the stages of its growth within one day; life history of *Ephemeridæ*.

526. [WALSH, B. D., and C. V. RILEY.] The squirrel bot. <Amer. Ent., February, 1869, v. 1, p. 117.

Comments on paper by S. S. Rathvon; emasculation of the striped squirrel by *Cuterebra buccata*.

527. [WALSH, B. D., and C. V. RILEY.] [Periodical Cicada.] <Amer. Ent., February, 1869, v. 1, p. 117.

Comments on letter of R. H. Warder; oviposition of *Cicada* [= *Tibicen*] *septendecim* in evergreens.

528. [WALSH, B. D., and C. V. RILEY.] Transformations of insects. <Amer. Ent., February, 1869, v. 1, p. 118.

Brief statement of the stages of growth of insects.

529. [WALSH, B. D., and C. V. RILEY.] Do bees injure raspberries? <Amer. Ent., February, 1869, v. 1, p. 118.

Comments on discussion before New York Fruit Growers' Club as to the effects of bees on flowers and fruits.

530. [WALSH, B. D., and C. V. RILEY.] Best's fruit-tree invigorator again. <Amer. Ent., February, 1869, v. 1, p. 119.

Notice of invention of a new "invigorator" by B. Best.

531. [WALSH, B. D., and C. V. RILEY.] The insect extinguisher, by Joseph Treat, N. J. <Amer. Ent., February, 1869, v. 1, p. 119.

Critical review of pamphlet by J. Treat.

532. [WALSH, B. D., and C. V. RILEY.] More good words. <Amer. Ent., February, 1869, v. 1, p. 119.

Notice of favorable notices of the American Entomologist.

533. [WALSH, B. D., and C. V. RILEY.] Lacewing fly. <Amer. Ent., February, 1869, v. 1, p. 119.

Answer to inquiry of J. Huggins; characters of *Chrysopa* sp.; its hibernation as a pupa and imago.

534. [WALSH, B. D., and C. V. RILEY.] Gigantic water-bug. <Amer. Ent., February, 1869, v. 1, p. 119.

Answer to inquiry of S. E. Munford; food-habits of *Belostoma grandis* [= *americanum*].

535. [WALSH, B. D., and C. V. RILEY.] The white-marked tussock moth again. <Amer. Ent., February, 1869, v. 1, p. 120.

Answer to inquiry of A. S. Fuller; mention of seven parasites attacking *Orgyia leucostigma*.

536. [WALSH, B. D., and C. V. RILEY.] Grasshopper eggs—will they hatch? <Amer. Ent., February, 1869, v. 1, p. 120.

Answer to inquiry of C. J. Jones; frosts not likely to prevent the hatching of the eggs of *Caloptenus spretus*.

537. [WALSH, B. D., and C. V. RILEY.] Injured apple-trees. <Amer. Ent., February, 1869, v. 1, p. 120.

Answer to inquiry of G. C. Broadhead; means against *Chrysobothris femorata*.

538. [WALSH, B. D., and C. V. RILEY.] Bag worms. <Amer. Ent., February, 1869, v. 1, p. 120.
Answer to inquiry of W. W. Butterfield; means against *Thyridopteryx ephemeraformis*.
539. [WALSH, B. D., and C. V. RILEY.] Eggs of the apple-tree plant-louse. <Amer. Ent., February, 1869, v. 1, p. 120.
Answer to inquiry of M. W. Seaman; effect of frosts upon the eggs and larvæ of *Aphis mali*.
540. [WALSH, B. D., and C. V. RILEY.] Insects named. <Amer. Ent., February, 1869, v. 1, p. 120.
Answer to inquiry of J. B. Merwin; identification of insects sent; characters of *Vanessa antiopa* and *Cynthia* [= *Pyrameis*] *atalanta*.
541. [WALSH, B. D., and C. V. RILEY.] White grubs. <Amer. Ent., February, 1869, v. 1, p. 120.
Answer to inquiry of W. C. Holmes; undetermined white-grub injuring grass and osage orange.
542. [WALSH, B. D., and C. V. RILEY.] The polyphemus moth, *Attacus polyphemus*, Linn. <Amer. Ent., March, 1869, v. 1, pp. 121-122, fig. 95.
Attacus [= *Telea*] *polyphemus*, *A. cynthia*, and *Bombyx* [= *Sericaria*] *mori* as silk-producers; food-plants, description of larva, habits, and seasons of *A.* [= *T.*] *polyphemus*; figure of the imago; ravages of *A. cecropia*; antennæ mistaken for wings; mention of Lepidoptera having fissured wings.
543. [WALSH, B. D., and C. V. RILEY.] Wasps and their habits. <Amer. Ent., March, 1869, v. 1, pp. 122-143, figs. 96-112.
Structure, classification, and habits of North American predatory Hymenoptera; comparative characters of the digger and true wasps; figure to show the folding of the wing in true wasps; habits and figures of imagos of *Chlorion cæruleum*, *Bembex fasciata*, *Sphex ichneumonea*, *Ammophila pictipennis*, *Pepsis formosa*, *Stizus grandis* [= *Sphecius speciosus*], *S.* [= *S.*] *speciosus*, *Pelopæus lunatus* [= *cementarius*], *Agonia bombycina*, *Trypoxylon albittarse*, *Ceropales rufiventris*, *Eumenes fraternus*, *Vespa maculata*, and *Polistes rubiginosus*; figure of imago of *Cryptus* [= *Linoceras*] *juncus* and of several nests of wasps. (Sec No. 375.)
544. [WALSH, B. D., and C. V. RILEY.] Do toads eat worker bees? <Amer. Ent., March, 1869, v. 1, p. 144.
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545. [WALSH, B. D., and C. V. RILEY.] Best's invigorator once again. <Amer. Ent., March, 1869, v. 1, p. 145.
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546. [WALSH, B. D., and C. V. RILEY.] On our table. <Amer. Ent., March, 1869, v. 1, p. 146.
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547. [WALSH, B. D., and C. V. RILEY.] Sugar-tree borer. <Amer. Ent., March, 1869, v. 1, p. 146.
Answer to inquiry of E. Simms; characters and means against *Arhopalus* [= *Plagionotus*] *speciosus*.

548. [WALSH, B. D., and C. V. RILEY.] Swellings on apple scions. <Amer. Ent., March, 1869, v. 1, p. 146.
Answer to inquiry of W. Colwell; dipterous galls on apple scions and bass-wood twigs.
549. [WALSH, B. D., and C. V. RILEY.] Gas-waste vs. Curculio. <Amer. Ent., March, 1869, v. 1, p. 147.
Answer to inquiry of H.; merits of gas-waste as an insect destroyer.
550. [WALSH, B. D., and C. V. RILEY.] Eggs of the apple-tree plant-louse again. <Amer. Ent., March, 1869, v. 1, p. 147.
Answers to inquiries of C. Williams and W. L. French; means against *Aphis mali*.
551. [WALSH, B. D., and C. V. RILEY.] Drug-store pests. <Amer. Ent., March, 1869, v. 1, p. 147.
Answer to inquiry of J. M. Good; food-habits of *Lasioderma serricorne*. See No. 510.
552. [WALSH, B. D., and C. V. RILEY.] Small galls and minings on apple-twigs. <Amer. Ent., March, 1869, v. 1, p. 147.
Answer to inquiry of O. O. A. Gardner; characters of undetermined galls and borings in twigs of apple-trees.
553. [WALSH, B. D., and C. V. RILEY.] Stinking bugs. <Amer. Ent., March, 1869, v. 1, p. 147.
Answer to inquiry of C. L. Janney; habits of an undescribed *Brachyrhynchus*.
554. [WALSH, B. D., and C. V. RILEY.] Eggs in peach-twigs. <Amer. Ent., March, 1869, v. 1, p. 147.
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555. [WALSH, B. D., and C. V. RILEY.] Flat-headed apple-tree borer. <Amer. Ent., March, 1869, v. 1, p. 147.
Answer to inquiry of B. F. Mudge; means against *Chrysobothris femorata*.
556. [WALSH, B. D., and C. V. RILEY.] A bundle of entomological queries. <Amer. Ent., March, 1869, v. 1, p. 148.
Answer to inquiry of W. W. Butterfield; mentions several desirable entomological books.
557. [WALSH, B. D., and C. V. RILEY.] Grape-berry moth. <Amer. Ent., March, 1869, v. 1, p. 148.
Answer to inquiry of M. C. Read; means against *Penthina vitivorana* [= *Eudemis botrana*].
558. [WALSH, B. D., and C. V. RILEY.] Hairy caterpillar. <Amer. Ent., March, 1869, v. 1, p. 148.
Answer to inquiry of T. S. Gold; characters of the larva and imago of *Arctia* [= *Pyrrharetia*] *isabella*.
559. [WALSH, B. D., and C. V. RILEY.] Borer in plum-twigs. <Amer. Ent., March, 1869, v. 1, p. 148.
Answer to inquiry of W. Caldwell; undetermined borer, allied to the oak-pruner, in plum-twigs. See No. 606.

560. [WALSH, B. D., and C. V. RILEY.] Insects named. <Amer. Ent., March, 1869, v. 1, p. 148.
 Answer to inquiry of W. W. Butterfield; identification of insects sent; comparative characters of *Arhopalus* [= *Cyllene*] *pictus* and *A.* [= *C.*] *robinie*; variation in *Clytus* [= *Neoclytus*] *caprea*; generic characters of *Arhopalus* and *Clytus*. (See No. 582.)
561. [WALSH, B. D., and C. V. RILEY.] Pear-root borer. <Amer. Ent., March, 1869, v. 1, p. 148.
 Answer to inquiry of P. Earle; larva of *Prionus laticollis* injurious to the pear and grape.
562. [WALSH, B. D., and C. V. RILEY.] Insects named. <Amer. Ent., March, 1869, v. 1, p. 148.
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563. [WALSH, B. D., and C. V. RILEY.] The joint-worm (*Isosoma hordei* Harris). <Amer. Ent., April, 1869, v. 1, pp. 149-158, figs. 113-118.
 Natural history, variation, parasites, ravages, and means against *Isosoma hordei*; unity of habits in insects; generic classification of the joint-worm fly; figures male and female imago; figures ♂ and ♀ imagos of *Semiotellus chalcidiphagus* n. sp., *Eurytoma* sp., and *Decatoma* sp., and of ♀ imago of *Antigaster* [= *Eupelmus*] *mirabilis*.
564. [WALSH, B. D., and C. V. RILEY.] The wavy-striped flea-beetle. (*Haltica* [*Phyllotreta*] *striolata* Illiger). <Amer. Ent., April, 1869, v. 1, pp. 158-159, fig. 119.
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565. [WALSH, B. D., and C. V. RILEY.] Concerning certain smart bugs. <Amer. Ent., April, 1869, v. 1, p. 160.
 Preferences of *Phylloxera vitifoliae* [= *vastatrix*] and *Macrodactylus subspinosus* for certain varieties of grape-vines, of *Doryphora 10-lineata* and *Lema trilineata* for certain varieties of potato-vines, and of *Mytilaspis pomicorticis* [= *pomorum*] and *Carpocapsa pomonella* for certain varieties of apple.
566. [WALSH, B. D., and C. V. RILEY.] Curculio remedies. <Amer. Ent., April, 1869, v. 1, p. 161.
 Comments on essay of L. C. Francis on the plum; coal oil not effective against *Conotrachelus nenuphar*.
567. [WALSH, B. D., and C. V. RILEY.] How great wits jump together. <Amer. Ent., April, 1869, v. 1, p. 161.
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568. [WALSH, B. D., and C. V. RILEY.] On our table. <Amer. Ent., April, 1869, v. 1, p. 165.
 Notices of Harris's Insects injurious to Vegetation, L'Insectologie agricole, and several other works not entomological.

569. [WALSH, B. D., and C. V. RILEY.] Eggs of the oblong-winged katydid. <Amer. Ent., April, 1869, v. 1, p. 166, fig. 120.
Answer to inquiries of T. A. Thop, J. L. Rice, B. J. Campbell, H. Cheeney, and A. McMoore; eggs of *Phylloptera* [= *Amblycorypha*] *oblongifolia* compared with those of *Platyphyllum* [= *Cyrtophyllus*] *concaum*; figures of the eggs of *A. oblongifolia*.
570. [WALSH, B. D., and C. V. RILEY.] Mossy rose gall. <Amer. Ent., April, 1869, v. 1, p. 166.
Answer to inquiry of F. W. Collins; characters of *Rhodites rosæ* and its gall.
571. [WALSH, B. D., and C. V. RILEY.] Caterpillars on lombardy poplars. <Amer. Ent., April, 1869, v. 1, p. 166.
Answer to inquiry of J. F. Gurley; characters of larva, habits, food-plants, and parasites of *Acronycta accricola* [= *americana*].
572. [WALSH, B. D., and C. V. RILEY.] Museum pests. <Amer. Ent., April, 1869, v. 1, p. 166, fig. 121.
Answer to inquiries of F. W. Hoit, jr., G. M. L., and J. Huggins; figures larva, pupa, and imago of *Anthrenus* sp.; *A. varius* compared with *A. museorum*.
573. [WALSH, B. D., and C. V. RILEY.] Cockroach eggs. <Amer. Ent., April, 1869, v. 1, p. 166.
Answer to inquiry of H. C. Freeman; character of the egg-cases and adult of *Platamodes unicolor*; occurrence of *Ectobia germanica* in Illinois; ravages of species of *Blattidæ*.
574. [WALSH, B. D., and C. V. RILEY.] Apple-tree leaf-crumplers. <Amer. Ent., April, 1869, v. 1, p. 166.
Answer to inquiry of J. F. Jones; result of the work of the larvæ of *Phycita nebulo* [= *Acrobasis indiginella*] on the growth of apple-trees.
575. [WALSH, B. D., and C. V. RILEY.] A most precious bug. <Amer. Ent., April, 1869, v. 1, p. 167.
Answer to inquiry of E. S. Holmes; characters and variety of *Hylecæstus lugubris*; destructiveness of *Lymexylon navale*; use of the maxillary palpi in the ♂♂ of *Lymexylidæ*.
576. [WALSH, B. D., and C. V. RILEY.] Blackberry-cane borers. <Amer. Ent., April, 1869, v. 1, p. 167.
Answer to inquiry of C. Parry; characters and habits of larva of unnamed borer [= *Bembecia marginata*]; plants affected by species of *Ægeriadæ*.
577. [WALSH, B. D., and C. V. RILEY.] Rows of eggs in pear-twigs. <Amer. Ent., April, 1869, v. 1, p. 167.
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578. [WALSH, B. D., and C. V. RILEY.] An orchard giving out. <Amer. Ent., April, 1869, v. 1, p. 168.
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579. [WALSH, B. D., and C. V. RILEY.] Plant-louse eggs on apple and mountain ash. <Amer. Ent., April, 1869, v. 1, p. 168.
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580. [WALSH, B. D., and C. V. RILEY.] Gigantic rhinoceros beetle. <Amer. Ent., April, 1869, v. 1, p. 168.
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581. [WALSH, B. D., and C. V. RILEY.] Bee queries. <Amer. Ent., April, 1869, v. 1, p. 168.
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582. [WALSH, B. D., and C. V. RILEY.] Insects named. <Amer. Ent., April, 1869, v. 1, p. 168.
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584. [WALSH, B. D., and C. V. RILEY.] The chinch-bug (*Micropus leucopterus* Say). <Amer. Ent., 1869, v. 1, May, pp. 169-177, fig. 122; June, pp. 194-199, figs. 135-139. Reprint: <2d Ann. Rept. State Ent. Mo., March, 1870, pp. 15-37, figs. 1-10.
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669. [WALSH, B. D., and C. V. RILEY.] New insect-foe of the blackberry. <Amer. Ent., July, 1869, v. 1, p. 225.
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676. [WALSH, B. D., and C. V. RILEY.] Raspberry brand. <Amer. Ent., July, 1869, v. 1, p. 226.
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677. [WALSH, B. D., and C. V. RILEY.] Rose-worms. <Amer. Ent., July, 1869, v. 1, p. 226.
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683. [WALSH, B. D., and C. V. RILEY.] Plum-tree insects. <Amer. Ent., July, 1869, v. 1, p. 227.
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688. [WALSH, B. D., and C. V. RILEY.] The caterpillar of the forest. <Amer. Ent., July, 1869, v. 1, p. 227.

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689. [WALSH, B. D., and C. V. RILEY.] Strawberry destroyer. <Amer. Ent., July, 1869, v. 1, p. 227.

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690. [WALSH, B. D., and C. V. RILEY.] Eggs of bugs on strawberry. <Amer. Ent., July, 1869, v. 1, p. 227.

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691. [WALSH, B. D., and C. V. RILEY.] Frog-spittle insects. <Amer. Ent., July, 1869, v. 1, p. 228. Reprint: <Cultivator and Country Gentleman, 29 July, 1869, v. 34, p. 82.

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692. [WALSH, B. D., and C. V. RILEY.] Eggs of ground-beetle. <Amer. Ent., July, 1869, v. 1, p. 228.

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696. [WALSH, B. D., and C. V. RILEY.] Elm-tree borer. <Amer. Ent., July, 1869, v. 1, p. 228.

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701. [WALSH, B. D., and C. V. RILEY.] The close of the first volume. <Amer. Ent., August, 1869, v. 1, p. 229.
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702. [WALSH, B. D., and C. V. RILEY.] The Royal horned-caterpillar. (*Ceratocampa (Citheronia) regalis*, Fabr.). <Amer. Ent., August, 1869, v. 1, pp. 230-231, pl. 1.
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705. [WALSH, B. D., and C. V. RILEY.] Ash and mountain ash. <Amer. Ent., August, 1869, v. 1, pp. 243-244.
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706. [WALSH, B. D., and C. V. RILEY.] How the Curculio flies by night. <Amer. Ent., August, 1869, v. 1, p. 244.
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725. [WALSH, B. D., and C. V. RILEY.] Grape-vine insects. <Amer. Ent., August, 1869, v. 1, p. 248.
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735. [WALSH, B. D., and C. V. RILEY.] Miscellaneous. <Amer. Ent., August, 1869, v. 1, p. 249.
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744. [WALSH, B. D., and C. V. RILEY.] Apple-tree worms. <Amer. Ent., August, 1869, v. 1, p. 251.
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746. [WALSH, B. D., and C. V. RILEY.] Insects named. <Amer. Ent., August, 1869, v. 1, p. 251.
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758. [WALSH, B. D., and C. V. RILEY.] Rotten root. <Amer. Ent., August, 1869, v. 1, p. 252.
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759. [WALSH, B. D., and C. V. RILEY.] Large dragon-fly. <Amer. Ent., August, 1869, v. 1, p. 252.
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761. [WALSH, B. D., and C. V. RILEY.] Raspberry worms. <Amer. Ent., August, 1869, v. 1, p. 252.
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763. [WALSH, B. D., and C. V. RILEY.] Dark grape-worm. <Amer. Ent., August, 1869, v. 1, p. 252.
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765. [WALSH, B. D., and C. V. RILEY.] Caterpillar of polyphemus moth. <Amer. Ent., August, 1869, v. 1, p. 252.
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767. [WALSH, B. D., and C. V. RILEY.] Tortoise-beetles. <Amer. Ent., September-October, 1869, v. 2, pp. 2-5, figs. 1-3.
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768. [WALSH, B. D., and C. V. RILEY.] Scientific nomenclature. <Amer. Ent., September-October, 1869, v. 2, pp. 5-8.
Rules observed in giving specific names to animals and plants; the law of priority; nature and extent of generic subdivisions.

769. [WALSH, B. D., and C. V. RILEY.] Killing apple-worms by machinery. <Amer. Ent., September-October, 1869, v. 2, p. 9.
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770. [WALSH, B. D., and C. V. RILEY.] A potter wasp (*Odynerus flavipes*? Fabr.). <Amer. Ent., September-October, 1869, v. 2, p. 10, fig. 4.
 Method employed by *Eumenidæ* to provision their nests; construction of the same by species of *Odynerus*; habits of *O. flavipes* in provisioning a nest with several species of larvæ; figure of the imago of the same and of the nest of a species of *Odynerus*; structure of wings and habits of *Vespidæ*, *Eumenidæ*, and fossorial wasps.
771. [WALSH, B. D., and C. V. RILEY.] Tomato-worms not poisonous. <Amer. Ent., September-October, 1869, v. 2, p. 11.
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772. [WALSH, B. D., and C. V. RILEY.] Gooseberry and currant worms. <Amer. Ent., September-October, 1869, v. 2, pp. 12-22, figs. 5-11.
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773. [WALSH, B. D., and C. V. RILEY.] Striped cucumber beetle. <Amer. Ent., September-October, 1869, v. 2, p. 24, figs. 17-19.
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774. [WALSH, B. D., and C. V. RILEY.] Leafy oak-gall. <Amer. Ent., September-October, 1869, v. 2, p. 25, fig. 20.
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775. [WALSH, B. D., and C. V. RILEY.] Drop of gold. <Amer. Ent., September-October, 1869, v. 2, p. 25.
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776. [WALSH, B. D., and C. V. RILEY.] The luna moth. <Amer. Ent., September-October, 1869, v. 2, p. 25.
 Answer to inquiry of G. W. Kinney; characters of *Attacus* [= *Actias*] *luna*; food-plants of the larva of the same.
777. [WALSH, B. D., and C. V. RILEY.] Hag-moth larva. <Amer. Ent., September-October, 1869, v. 2, p. 25, fig. 21.
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778. [WALSH, B. D., and C. V. RILEY.] Stinging bug. <Amer. Ent., September–October, 1869, v. 2, p. 25.
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779. [WALSH, B. D., and C. V. RILEY.] Pear-tree worms. <Amer. Ent., September–October, 1869, v. 2, p. 25.
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780. [WALSH, B. D., and C. V. RILEY.] “Dobson.” <Amer. Ent., September–October, 1869, v. 2, p. 25.
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781. [WALSH, B. D., and C. V. RILEY.] White-pine weevil. <Amer. Ent., September–October, 1869, v. 2, p. 26, fig. 22.
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782. [WALSH, B. D., and C. V. RILEY.] Unnatural secretion of wax. <Amer. Ent., September–October, 1869, v. 2, p. 26.
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783. [WALSH, B. D., and C. V. RILEY.] Raspberry borer. <Amer. Ent., September–October, 1869, v. 2, p. 26.
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784. [WALSH, B. D., and C. V. RILEY.] Cocoon of horn-bug. <Amer. Ent., September–October, 1869, v. 2, p. 26.
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785. [WALSH, B. D., and C. V. RILEY.] Insects named. <Amer. Ent., September–October, 1869, v. 2, p. 26, fig. 23.
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786. [WALSH, B. D., and C. V. RILEY.] Cecropia moth caterpillar. <Amer. Ent., September–October, 1869, v. 2, p. 26.
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787. [WALSH, B. D., and C. V. RILEY.] How cut-worms originate. <Amer. Ent., September–October, 1869, v. 2, p. 26.
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788. [WALSH, B. D., and C. V. RILEY.] Red-humped caterpillar. <Amer. Ent., September–October, 1869, v. 2, p. 27, figs. 24–26.
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789. [WALSH, B. D., and C. V. RILEY.] Insects named. <Amer. Ent., September–October, 1869, v. 2, p. 27.

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790. [WALSH, B. D., and C. V. RILEY.] Gilt gold-beetle. <Amer. Ent., September–October, 1869, v. 2, p. 27.

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791. [WALSH, B. D., and C. V. RILEY.] The trumpet grape-gall. <Amer. Ent., September–October, 1869, v. 2, p. 28, fig. 27.

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792. [WALSH, B. D., and C. V. RILEY.] Grape-berry moth. <Amer. Ent., September–October, 1869, v. 2, p. 28.

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793. [WALSH, B. D., and C. V. RILEY.] Oak pruner. <Amer. Ent., September–October, 1869, v. 2, p. 28.

Answer to inquiry of T. J. Plumb; occurrence of *Elaphidion putator* [= *villosum*] at Madison, Wis.

794. [WALSH, B. D., and C. V. RILEY.] Potato-bugs. <Amer. Ent., September–October, 1869, v. 2, p. 28.

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795. [WALSH, B. D., and C. V. RILEY.] Blood-sucking cone-nose. <Amer. Ent., September–October, 1869, v. 2, p. 28.

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796. [WALSH, B. D., and C. V. RILEY.] Woolly slug-like worm on apple. <Amer. Ent., September–October, 1869, v. 2, p. 29.

Answer to inquiry of H. A. Green; food-plants and characters of larva of *Lagoa opercularis*; characters of the imago of the same; improper method of packing living insects.

797. [WALSH, B. D., and C. V. RILEY.] A water-bug. <Amer. Ent., September–October, 1869, v. 2, p. 29.

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798. [WALSH, B. D., and C. V. RILEY.] Goldenrod galls. <Amer. Ent., September–October, 1869, v. 2, p. 29.

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799. [WALSH, B. D., and C. V. RILEY.] Oak-leaf gall. <Amer. Ent., September–October, 1869, v. 2, p. 29.
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800. [WALSH, B. D., and C. V. RILEY.] Humble bees. <Amer. Ent., September–October, 1869, v. 2, p. 30.
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801. [WALSH, B. D., and C. V. RILEY.] Can land be insured against cut-worms and other insects? <Amer. Ent., September–October, 1869, v. 2, p. 30.
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802. [WALSH, B. D., and C. V. RILEY.] Beetles named. <Amer. Ent., September–October, 1869, v. 2, p. 30.
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803. [WALSH, B. D., and C. V. RILEY.] Royal horned-caterpillar. <Amer. Ent., September–October, 1869, v. 2, p. 30.
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804. [WALSH, B. D., and C. V. RILEY.] Parsnip caterpillar. <Amer. Ent., September–October, 1869, v. 2, p. 30.
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805. [WALSH, B. D., and C. V. RILEY.] Insects named. <Amer. Ent., September–October, 1869, v. 2, p. 31.
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806. [WALSH, B. D., and C. V. RILEY.] Beetle named. <Amer. Ent., September–October, 1869, v. 2, p. 31.
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807. [WALSH, B. D., and C. V. RILEY.] Moth named. <Amer. Ent., September–October, 1869, v. 2, p. 31.
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808. [WALSH, B. D., and C. V. RILEY.] Worm boring into cucumber. <Amer. Ent., September–October, 1869, v. 2, p. 31.
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809. [WALSH, B. D., and C. V. RILEY.] Caterpillar of the io moth. <Amer. Ent., September–October, 1869, v. 2, p. 31.
Answer to inquiry of Mrs. Tildesley; characters of larva and imago of *Saturnia* [= *Hyperchiria*] io; food-plant and urticating properties of the larva.
810. [WALSH, B. D., and C. V. RILEY.] Apple-tree worms. <Amer. Ent., September–October, 1869, v. 2, p. 32.
Answer to inquiry of H. K. Vickroy; habits and characters of larva of *Acrobasis* [= *Pempelia*] *hammondi*; habits of larva of *Phycita nebulo* [= *Acrobasis indiginella*].
811. [WALSH, B. D., and C. V. RILEY.] Stinging larvæ. <Amer. Ent., September–October, 1869, v. 2, p. 32.
Answer to inquiry of J. C. Falls; meaning of the vernacular and technical names of *Empretia stimulea*; urticating properties of lepidopterous larvæ.
812. [WALSH, B. D., and C. V. RILEY.] Lappet caterpillar on apple-tree. <Amer. Ent., September–October, 1869, v. 2, p. 32.
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813. [WALSH, B. D., and C. V. RILEY.] Spined spider. <Amer. Ent., September–October, 1869, v. 2, p. 32.
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814. [WALSH, B. D., and C. V. RILEY.] Dangerous looking. <Amer. Ent., September–October, 1869, v. 2, p. 32.
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815. [WALSH, B. D., and C. V. RILEY.] Bag-worms again. <Amer. Ent., September–October, 1869, v. 2, p. 32.
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816. [WALSH, B. D., and C. V. RILEY.] Large water-beetle. <Amer. Ent., September–October, 1869, v. 2, p. 32.
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817. [WALSH, B. D., and C. V. RILEY.] Beetles under dead fish. <Amer. Ent., September–October, 1869, v. 2, p. 32.
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818. [WALSH, B. D., and C. V. RILEY.] Universal remedies. <Amer. Ent., November, 1869, v. 2, pp. 33–35.
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819. [WALSH, B. D., and C. V. RILEY.] Tent-caterpillars and fall-web-worms. <Amer. Ent., November, 1869, v. 2, p. 39.
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820. [WALSH, B. D., and C. V. RILEY.] The boll-worm or corn-worm. 2d article. (*Heliothis armigera*, Hübner.) <Amer. Ent., November, 1869, v. 2, pp. 42-44, fig. 29.

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821. [WALSH, B. D., and C. V. RILEY.] Galls and their architects. 2d article. <Amer. Ent., 1869-1870, v. 2: November, pp. 45-50, figs. 30-32; December-January, pp. 70-74, figs. 45-47; February, pp. 103-106, figs. 68-71.

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822. [WALSH, B. D., and C. V. RILEY.] Toads in gardens. <Amer. Ent., November, 1869, v. 2, p. 50.

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823. [WALSH, B. D., and C. V. RILEY.] Notes on the Tarantula-killer. <Amer. Ent., November, 1869, v. 2, p. 52.

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824. [WALSH, B. D., and C. V. RILEY.] Swarms of lady-birds. <Amer. Ent., November, 1869, v. 2, p. 55.

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825. [WALSH, B. D., and C. V. RILEY.] The squash-bug does not touch the white bush scollop. <Amer. Ent., November, 1869, v. 2, p. 55.

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826. [WALSH, B. D., and C. V. RILEY.] [Scientific names.] <Amer. Ent., November, 1869, v. 2, p. 57.

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827. [WALSH, B. D., and C. V. RILEY.] On our table. <Amer. Ent., November, 1869, v. 2, pp. 57-58.

Notices of: Record of American entomology for the year 1868.—The Canadian entomologist.—The butterflies of North America, by W. H. Edwards.—Guide to the study of insects, by A. S. Packard, jr., etc.

828. [WALSH, B. D., and C. V. RILEY.] Locust borer. <Amer. Ent., November, 1869, v. 2, p. 58.
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829. [WALSH, B. D., and C. V. RILEY.] Saddle-back larva. <Amer. Ent., November, 1869, v. 2, p. 59, fig. 36.
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830. [WALSH, B. D., and C. V. RILEY.] Silk spiders. <Amer. Ent., November, 1869, v. 2, p. 59.
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831. [WALSH, B. D., and C. V. RILEY.] Entomological works. <Amer. Ent., November, 1869, v. 2, p. 59.
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832. [WALSH, B. D., and C. V. RILEY.] Insects named. <Amer. Ent., November, 1869, v. 2, p. 59.
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833. [WALSH, B. D., and C. V. RILEY.] A new bee enemy. <Amer. Ent., November, 1869, v. 2, p. 59.
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834. [WALSH, B. D., and C. V. RILEY.] Thousand-legged worms. <Amer. Ent., November, 1869, v. 2, p. 59.
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835. [WALSH, B. D., and C. V. RILEY.] Cabbage-worms. <Amer. Ent., November, 1869, v. 2, p. 60, figs. 37-38.
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836. [WALSH, B. D., and C. V. RILEY.] The rape butterfly. Amer. Ent., November, 1869, v. 2, p. 60.
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837. [WALSH, B. D., and C. V. RILEY.] Bad packing. <Amer. Ent., November, 1869, v. 2, p. 60.
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838. [WALSH, B. D., and C. V. RILEY.] Granddaddy long-legs. <Amer. Ent., November, 1869, v. 2, p. 60.
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839. [WALSH, B. D., and C. V. RILEY.] Borer in apple-twigg. <Amer. Ent., November, 1869, v. 2, p. 60.
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840. [WALSH, B. D., and C. V. RILEY.] Grape-vine leaf-galls. <Amer. Ent., November, 1869, v. 2, p. 61.
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841. [WALSH, B. D., and C. V. RILEY.] Maple-worms. <Amer. Ent., November, 1869, v. 2, p. 61.
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842. [WALSH, B. D., and C. V. RILEY.] Melancholy chafer in apples. <Amer. Ent., November, 1869, v. 2, p. 61, fig. 39.
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843. [WALSH, B. D., and C. V. RILEY.] Worms boring in cucumbers. <Amer. Ent., November, 1869, v. 2, p. 61.
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844. [WALSH, B. D., and C. V. RILEY.] Lilac-borer. <Amer. Ent., November, 1869, v. 2, p. 61.
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845. [WALSH, B. D., and C. V. RILEY.] Burying beetles. <Amer. Ent., November, 1869, v. 2, p. 61.
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846. [WALSH, B. D., and C. V. RILEY.] Wire-worms in potatoes. <Amer. Ent., November, 1869, v. 2, p. 62.
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891. RILEY, C. V. The chinch-bug. <Prairie Farmer, 3 March, 1866, [v. 33], n. s., v. 17, p. 133. S.-b. No. 1, p. 71.
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893. R[ILEY], C. V. Entomological. <Prairie Farmer, 24 March, 1866, [v. 33], n. s., v. 17, p. 192, figs. 5-6. S.-b. No. 1, p. 68.
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930. RILEY, C. V. Black-knot once more. <Gardeners' Mo. and Hortic., November, 1866, v. 8, pp. 331-332. S.-b. No. 2, p. 31.
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931. RILEY, C. V. Brimstone for borers. <Prairie Farmer, 8 December, 1866, [v. 34], n. s., v. 18, p. 365. S.-b. No. 2, p. 44.
Criticism of a communication by W.; sulphur inserted in trunks of trees ineffectual as a means against insects.
932. RILEY, C. V. The wire-worm. <Cultivator and Country Gentleman, 27 December, 1866, v. 28, p. 414. S.-b. No. 2, p. 34.
Critical review of J. D. Gros' "The wire-worm;" myriapods and the larvæ of *Elateridæ* are called wire-worms; separable by the number of their legs; means against them.
933. [RILEY, C. V.] Tilden tomato and the tobacco-worm. <Prairie Farmer, 5 January, 1867, [v. 35], n. s., v. 19, p. 5.
Remarks on communication of T. B.; tomato plants eaten by tobacco-worms [*Protoparce carolina*] in preference to tobacco plants; possibly the worms observed were tomato-worms [*P. celeris*].
934. [RILEY, C. V.] Remarks on *Saperda*, *Chrysobothris*, *Carpocapsa*, and *Conotrachelus*. <Prairie Farmer, 12 January, 1867, [v. 35], n. s., v. 19, p. 23.
Report of remarks made at the annual meeting of Southern Illinois Fruit Growers' Association.
935. [RILEY, C. V.] Bark-lice. <Prairie Farmer, 12 January, 1867, [v. 35], n. s., v. 19, p. 24.
Washing apple-trees with lye effective against bark-lice.
936. RILEY, C. V. Insects in the flower garden. A troublous time. <Prairie Farmer, 19 January, 1867, [v. 35], n. s., v. 19, p. 37. S.-b. No. 2, p. 45.
Answer to communication by Kate Sherman; describes larva of [*Heliothis phlogophagus*] injuring *Phlox*.
937. [RILEY, C. V.] Salt and vinegar for insects. <Prairie Farmer, 19 January, 1867, [v. 35], n. s., v. 19, p. 37. S.-b. No. 2, p. 45.
Review of T. Glover's Report of the U. S. Entomologist for 1865, T. Glover's Entomological exhibition in Paris, and W. C. Lodge's Fruits and fruit trees of the Middle States; use of salt and vinegar as means against insects; criticism of errors. See Nos. 222, 939, 942.

938. RILEY, C. V. Hickory bark borer, *Scolytus carya*, n. sp. <Prairie Farmer, 2 February, 1867, [v. 35], n. s., v. 19, pp. 68, 69, 6 figs. S.-b. No. 2, p. 50.
 Descriptions and figures of larva and imago of *Scolytus carya* n. sp. [=4-spinosus] and of its borings in bark and wood of *Carya*; habits and ravages; figure of the pupa of *S. destructor* of Europe.
939. [RILEY, C. V.] Correction. <Prairie Farmer, 2 February, 1867, [v. 35], n. s., v. 19, p. 69. S.-b. No. 2, p. 50.
 Correction of statement made in No. 937; T. Glover not responsible for calling *Saperda bivittata* [=candida] a butterfly. See Nos. 222, 937, 942.
940. RILEY, C. V. Dahlia and aster stalk-borer, *Gortyna nitela* Guenée. <Prairie Farmer, 23 February, 1867, [v. 35], n. s., v. 19, p. 116, 2 figs. S.-b. No. 2, p. 58.
 Description of larva, pupa, and imago of *Gortyna nitela*; habits of and means against this insect.
941. RILEY, C. V. Borers and canker-worms. <Prairie Farmer, 9 March, 1867, [v. 35], n. s., v. 19, p. 151. S.-b. No. 2, p. 61.
 Critical review of E. H. C.'s "Remedy for the borer" and of J. Huggins' "Canker-worm;" indefiniteness of the word borer; borers confined to particular trees according to species; relations between *Clytus* [=Cyllene] pictus and *C.* [=C.] robiniae; habits of and means against canker-worms. See No. 954.
942. [RILEY, C. V.] The critic criticised. <Prairie Farmer, 16 March, 1867, [v. 35], n. s., v. 19, p. 169. S.-b. No. 2, p. 58.
 Reply to B. D. Walsh's "The critic criticised;" insists upon the correctness of one criticism made; acknowledges incorrectness of another. See Nos. 222, 937, 939.
943. RILEY, C. V. [*Solenobia*.] <Prairie Farmer, 16 March, 1867, [v. 35], n. s., v. 19, p. 169. S.-b. No. 2, p. 58.
 Answer to inquiry of J. C. Plumb; brief description of the larva of ?*Solenobia*; habits of the genus.
944. RILEY, C. V. Bark-lice. Their history, together with sundry remedies. <Prairie Farmer, 23 March, 1867, [v. 35], n. s., v. 19, p. 184. S.-b. No. 2, pp. 61-62. Extract: <Cultivator and Country Gentleman, 23 May, 1867, v. 29, p. 334. <Pract. Ent., April, 1867, v. 2, pp. 81-82.
 Criticises several patent remedies for ravages of bark-lice, *Coccidae*; ignorance of entomology amongst intelligent writers; natural history of *Mytilaspis pomicorticis* [=pomorum].
945. RILEY, C. V. The phlox-worm. <Prairie Farmer, 6 April, 1867, [v. 35], n. s., v. 19, p. 219, 2 figs. S.-b. No. 2, pp. 63, 64.
 Describes and figures larva and imago of *Heliothis phloxiphaga*; describes pupa; seasons and habits.
946. RILEY, C. V. The potato-beetle. <Prairie Farmer, 6 April, 1867, [v. 35], n. s., v. 19, p. 219. S.-b. No. 2, p. 64.
 Answer to inquiries of H. Tilden; *Doryphora decemlineata* remains permanently in regions invaded by it; hibernates as an imago under ground.

947. RILEY, C. V. Meadow-worms. <Prairie Farmer, 6 April, 1867, [v. 35], n. s., v. 19, p. 219. S.-b. No. 2, p. 64.
Answer to inquiry of B. S.; habits of *Tipula* in all stages.
948. RILEY, C. V. Clover-worms. <Prairie Farmer, 1867, [v. 35], n. s., v. 19, 20 April, pp. 260-261, 10 figs.; 27 April, p. 279. S.-b. No. 2, pp. 67, 68.
Habits and ravages of *Pyralis olinalis* [= *Asopia costalis*]; figures and detailed descriptions of larva, pupa, cocoon, and imago.
949. RILEY, C. V. The apple-leaf crumpler. <Prairie Farmer, 27 April, 1867, [v. 35], n. s., v. 19, p. 279, 4 figs. S.-b. No. 2, p. 68.
Answer to inquiry of A. H.; description of pupa, figure of larva-case and imago of *Phycita nebulo* [= *Acrobasis indiginella*]; habits and means against the same.
950. RILEY, C. V. Cocoons on the flowering ash. <Prairie Farmer, 27 April, 1867, [v. 35], n. s., v. 19, p. 279. S.-b. No. 2, p. 68.
Answer to inquiry of A. B. Pierce; descriptions of larva, cocoon, and imago of *Attacus promethea*; food-plants of larva; method of emergence from cocoon.
951. RILEY, C. V. Scarred apple-trees. Prairie Farmer, 27 April, 1867, [v. 35], n. s., v. 19, p. 279. S.-b. No. 2, p. 68.
Answer to inquiry of P. M. Williamson; descriptions of the injuries to apple-trees caused by *Tettigonia* sp., *Coccus harrisii* [= *Chionaspis furfurus*], and *Mytilaspis pomicorticis* [= *pomorum*].
952. RILEY, C. V. Aphides. <Prairie Farmer, 18 May, 1867, [v. 35], n. s., v. 19, p. 332. S.-b. No. 2, p. 73.
Answer to inquiry of J. Taylor; color and propagation of *Aphis mali*; means against the same.
953. RILEY, C. V. Tree-cricket. Prairie Farmer, 18 May, 1867, [v. 35], n. s., v. 19, p. 332. S.-b. No. 2, p. 73.
Answer to inquiry of A. N. Prentiss; habits of *Aecanthus niveus*.
954. RILEY, C. V. Note. <Prairie Farmer, 18 May, 1867, [v. 35], n. s., v. 19, p. 332. S.-b. No. 2, p. 73.
Correction of No. 941; criticism unfounded.
955. RILEY, C. V. The strawberry-worm, *Emphytus maculatus* Norton. <Prairie Farmer, 25 May, 1867, [v. 35], n. s., v. 19, p. 348, 9 figs. S.-b. No. 2, p. 72.
Descriptions and figures of all stages, geographical distribution, seasons, habits, and oviposition of and means against *Emphytus* [= *Harpiphorus*] *maculatus*.
956. RILEY, C. V. White-pine worm: *Lophyrus abbotii*. <Prairie Farmer, 25 May, 1867, [v. 35], n. s., v. 19, p. 348, 7 figs. S.-b. No. 2, p. 72.
Description of imago of *Lophyrus abbotii*; figures larva, pupa, cocoon, ♀ imago and ♂ and ♀ antennæ; habits and seasons of larvæ.
957. [RILEY, C. V.] Stag-beetle. <Prairie Farmer, 25 May, 1867, [v. 35], n. s., v. 19, p. 348. S.-b. No. 2, p. 72.
Answer to inquiry of S. Barrier; habits of *Lucanus elaphus*.

958. [RILEY, C. V.] The Curculio. <Prairie Farmer, 1 June, 1867, [v. 35], n. s., v. 19, p. 368. S.-b. No. 2, p. 73.
Successful results from the use of machines for destroying *Conotrachelus nenuphar*; this insect hibernates in the imago state.
959. RILEY, C. V. Fifteen-spotted lady-bird. <Prairie Farmer, 8 June, 1867, [v. 35], n. s., v. 19, p. 381.
Answer to inquiry of A. B. Knowlton; food, variable coloration of imago, and usefulness of *Mysia* [*Anatis*] *15-punctata*.
960. RILEY, C. V. Cherry Aphis. <Prairie Farmer, 8 June, 1867, [v. 35], n. s., v. 19, p. 381.
Answer to inquiry of G. Lee; habits, ravages of and means against *Myzus cerasi*.
961. RILEY, C. V. Tree-cricket. <Prairie Farmer, 8 June, 1867, [v. 35], n. s., v. 19, p. 381.
Eggs of *Oecanthus nivens* deposited in raspberry canes cause the death of the wood above them.
962. RILEY, C. V. Apple-tree borer. <Prairie Farmer, 8 June, 1867, [v. 35], n. s., v. 19, p. 381.
Answer to inquiry of A. B. Campbell; commends D. B. Wier's remedy against the apple-tree borer; *Saperda bivittata* [= *candida*] goes through its transformations in two years, though commonly believed to require three years.
963. RILEY, C. V. Insects affecting apple-tree roots. <Prairie Farmer, 15 June, 1867, [v. 35], n. s., v. 19, p. 397. S.-b. No. 2, p. 100.
Letter from O. B. Galusha, with answer; descriptions of young and mature wingless individuals of the root-inhabiting form, *Pemphigus pyri*, of *Schizoneura lanigera*; habits, seasons, and reproduction of this form; its gall-making and means against it; description of larva of *Cecidomyia* species found with the lice; and of larva and imago of *Mycetophila persica* [n. sp. ?]; seasons of the latter; larva of *Saperda calcarata* bores in roots of apple; larva of *Helops micans* feeds on decaying apples; *Julus* [*Spirobolus*] *marginatus* infested with *Gamasus juloides*.
964. RILEY, C. V. A chapter on cut-worms. <Prairie Farmer, 22 June, 1867, [v. 35], n. s., v. 19, pp. 413-414, 7 figs. S.-b. No. 2, pp. 79-80.
Extract from J. Townley's "Do cut-worms destroy tree buds?". Buds of fruit trees destroyed by the larvæ of *Agrotididæ*; other ravages and means against the same; descriptions of the larvæ of *Agrotis subgothica* [= *A. herilis* and *A. tricola*], *A. telifera* [= *A. ypsilon*], and *Celæna* [= *Hadena*] *renigera*; description of *A. cochranis* n. sp. [= *A. messoria*]; figures larva and imago of *A. cochranis*, *A. telifera*, and *Celæna renigera*; and imago of *A. subgothica*; habits, seasons, and vernacular names of *Agrotididæ*.
965. [RILEY, C. V.] Strawberry-worm. <Prairie Farmer, 22 June, 1867, [v. 35], n. s., v. 19, p. 414. S.-b. No. 2, p. 80.
Answer to inquiry of A. R. Whitney; geographical distribution of *Emphytus* [= *Harpiphorus*] *maculatus*.
966. RILEY, C. V. Insects stripping the bur-oak. <Prairie Farmer, 13 July, 1867, [v. 36], n. s., v. 20, p. 21. S.-b. No. 2, p. 81.
Answer to inquiry of A. B. Price; habits of *Lachnosterna pilosicollis* [= *tristis*.]

967. RILEY, C. V. Borers. <Prairie Farmer, 13 July, 1867, [v. 36], n. s., v. 20, p. 21. S.-b. No. 2, p. 81.
Answer to inquiry of J. Wentworth; means against *Clytus* [= *Cyllene*] *robiniae* and *Xyleutes* [= *Cossus*] *robiniae*.
968. RILEY, C. V. Potato-beetle. <Prairie Farmer, 13 July, 1867, [v. 36], n. s., v. 20, p. 21. S.-b. No. 2, pp. 81-82.
Answer to inquiries of J. L. W. and G. L. Merriwether; *Doryphora 10-lineata* three-brooded; its occurrence at Shipman, Ill.
969. [RILEY, C. V.] Smith's patent Curculio trap. <Prairie Farmer, 13 July, 1867, [v. 36], n. s., v. 20, p. 21. S.-b. No. 2, p. 82.
Communication from N. C. Coffinan, with reply; condemns J. Smith's Curculio trap.
970. RILEY, C. V. [*Aphis ribis*.] <Prairie Farmer, 3 August, 1867, [v. 36], n. s., v. 20, p. 69. S.-b. No. 2, p. 81.
Answer to inquiry of C. J. Eckhart; means against *Myzus ribis*.
971. RILEY, C. V. *Mantis carolina*. <Prairie Farmer, 3 August, 1867, [v. 36], n. s., v. 20, p. 69. S.-b. No. 2, p. 81.
Answer to communication of J. H. Graves; eggs of *Mantis* [= *Phasmomantis*] *carolina* found in Ogle County, Ill.
972. RILEY, C. V. Lappet caterpillars on the apple. <Prairie Farmer, 3 August, 1867, [v. 36], n. s., v. 20, p. 69. S.-b. No. 2, p. 81.
Answer to communication of Perkins and Congdon; description of the larva, pupa, cocoon, and imago of *Gastropacha* [= *Tolyte*] *velleda*.
973. RILEY, C. V. Apple-bark lice on pears. <Prairie Farmer, 3 August, 1867, [v. 36], n. s., v. 20, p. 69. S.-b. No. 2, p. 81.
Mytilaspis pomicorticis [= *pomorum*] on the fruit of pear-trees; said to occur on currants, plum, and black oak.
974. RILEY, C. V. Currant-bush borer. <Prairie Farmer, 3 August, 1867, [v. 36], n. s., v. 20, p. 69. S.-b. No. 2, p. 81.
Answer to inquiry of H. B. Kinne; habits, description, and means against *Egeria tipuliformis*.
975. RILEY, C. V. Apple-leaf crumpler. <Prairie Farmer, 3 August, 1867, [v. 36], n. s., v. 20, p. 69. S.-b. No. 2, p. 81.
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976. RILEY, C. V. Tomato-stalk borer. <Prairie Farmer, 3 August, 1867, [v. 36], n. s., v. 20, p. 69. S.-b. No. 2, p. 81.
Answer to inquiry of O. G. Nevins; food-plants of *Gortyna nitela*.
977. RILEY, C. V. A few errors corrected. <Wisc. Farmer, 17 August, 1867. S.-b. No. 2, p. 83.
Habits of *Doryphora 10-lineata* and of *Carpocapsa pomonella*.
978. RILEY, C. V. Curculio. <Prairie Farmer, 7 September, 1867, [v. 36], n. s., v. 20, p. 148. S.-b. No. 2, p. 82.
Answer to inquiry of J. Shearer; means against *Couotrachelus nenuphar*.
979. RILEY, C. V. Hop-vine caterpillars. <Prairie Farmer, 7 September, 1867, [v. 36], n. s., v. 20, p. 148. S.-b. No. 2, p. 82.
Communication from J. H. Graves, with answer; *Mantis* [= *Phasmomantis*] *carolina* breeds as far north as Ogle County, Ill. Description of larva and imago of *Hypena humuli* [= *scabra*]; means against it.

980. RILEY, C. V. Wheat-worms. <Prairie Farmer, 7 September, 1867, [v. 36], n. s., v. 20, p. 148. S.-b. No. 2, p. 82.
Communication from C. Campbell, with answer; description of larva and imago and habits of *Pyralis* [= *Asopia*] *farinalis*; ravages of *Tenebrio molitor*; means against both species.
981. RILEY, C. V. [Root-borer.] <Prairie Farmer, 7 September, 1867, [v. 36], n. s., v. 20, p. 148. S.-b. No. 2, p. 82.
Communication from S. T. Kelsey, with answer; ravages of an unknown cerambycid larva which destroys the roots of various plants.
982. RILEY, C. V. Bark-lice on the pear. <Prairie Farmer, 7 September, 1867, [v. 36], n. s., v. 20, p. 148. S.-b. No. 2, p. 82.
Letter from T. D. Plumb, with answer; *Mytilaspis pomicorticis* [= *pomorum*] lives on fruit of pear and crab-apple; the scale a secretion; extent of injuries caused by this insect.
983. RILEY, C. V. A nuisance made useful. <Prairie Farmer, 7 September, 1867, [v. 36], n. s., v. 20, p. 148. S.-b. No. 2, p. 82.
Means against *Doryphora 10-lineata* discredited.
984. RILEY, C. V. Strawberry leaf-roller. <Prairie Farmer, 5 October, 1867, [v. 36], n. s., v. 20, p. 212. S.-b. No. 2, p. 100.
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985. RILEY, C. V. False caterpillars on the pine. <Prairie Farmer, 5 October, 1867, [v. 36], n. s., v. 20, p. 212. S.-b. No. 2, p. 101.
Answer to inquiry of A. S. Fuller; habits and description of *Lophyrus lecontei*.
986. RILEY, C. V. An unknown worm. <Prairie Farmer, 5 October, 1867, [v. 36], n. s., v. 20, p. 212. S.-b. No. 2, p. 101.
Extract from Beaver Dam Citizen, with comments; habits and description of *Eristalis* sp.
987. [RILEY, C. V.] Bark-louse. <Prairie Farmer, 19 October, 1867, [v. 36], n. s., v. 20, p. —. S.-b. No. 2, p. 75.
Benzine and soap as a means against bark-lice.
988. [RILEY, C. V.] Editorial excursion to the Rocky Mountains. <Prairie Farmer, 7 December, 1867, [v. 36], n. s., v. 20, pp. 353–354. S.-b. No. 2, pp. 112–113.
List of plants, insects, and mammals observed.
989. RILEY, C. V. Bark-lice. <Prairie Farmer, 21 December, 1867, [v. 36], n. s., v. 20, p. 389. S.-b. No. 2, p. 112.
Answer to inquiries of G. Backster and J. C. Cobbe; means against *Mytilaspis pomicorticis* [= *pomorum*].
990. RILEY, C. V. Root Aphis. <Prairie Farmer, 21 December, 1867, [v. 36], n. s., v. 20, p. 389. S.-b. No. 2, p. 112.
Answer to inquiry of J. M. Jordan; means against the root and stem forms of *Schizoneura lanigera*.
991. [RILEY, C. V.] The Colorado potato-beetle. <Prairie Farmer, 21 December, 1867, [v. 36], n. s., v. 20, p. 389. S.-b. No. 2, p. 112.
Communications from C. W. Murtfeldt asserting the possession of poisonous qualities by the larvæ of *Doryphora 10-lineata*.

992. RILEY, C. V. Cut-worm. Fall and spring plowing. <Moore's Rural New Yorker, ———, 1867. S.-b. No. 2, p. 94.
Criticism of article by Agricola.
993. RILEY, C. V. Entomology. <Prairie Farmer Annual [No. 1 for 1868], 1867, pp. 53–59, 6 figs. S.-b. No. 2, pp. 125–126; No. 14, pp. 216–219.
Descriptions and figures of larva, pupa, and imago of *Coptoecyela* [= *Cassida*] *bivittata*; habits, seasons, and means against it; list of *Cassididae* injurious to sweet-potato. Descriptions of larva, nidus, and imago of *Desmia maculalis*, figures pupa; habits and seasons of and means against it. Figures *Colaspis flavida*; describes its supposed habits. Food-plants of *Heliothis armigera*. Figures larva and imago of *Gortyna nitela*; its food-plants, seasons, and hibernation. Figures larva and imago of *Heliothis phlogophagus*; synonymy, geographical distribution, and means against it; remarks on the balance of nature. Figures larva, pupa, cocoon, and imago of *Asopia costalis*; its synonymy and ravages.
994. RILEY, C. V. Bark-lice. <Prairie Farmer, 15 February, 1868, [v. 37], n. s., v. 21, p. 100. S.-b. No. 2, p. 118.
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995. RILEY, C. V. Potato-beetle. <Prairie Farmer, 22 February, 1868, [v. 37], n. s., v. 21, p. 117. S.-b. No. 2, p. 119; No. 3, p. 58.
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996. RILEY, C. V. Apple-tree plant-lice. <Prairie Farmer, 22 February, 1868, [v. 37], n. s., v. 21, p. 117. S.-b. No. 2, p. 119; No. 3, p. 58.
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997. RILEY, C. V. Apple-root blight. <Prairie Farmer, 22 February, 1868, [v. 37], n. s., v. 21, p. 117. S.-b. No. 2, p. 119; No. 3, p. 58.
Answer to inquiry of C. S. J.; *Schizoneura lanigera* not the cause of "rotten root."
998. RILEY, C. V. Apple leaf-crumpler. <Prairie Farmer, 22 February, 1868, [v. 37], n. s., v. 21, p. 117. S.-p. No. 2, p. 119; No. 3, p. 58.
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999. RILEY, C. V. Tree-cricket. <Prairie Farmer, 14 March, 1868, [v. 37], n. s., v. 21, p. 164. S.-b. No. 2, p. 120; No. 3, p. 58.
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1000. RILEY, C. V. Egg-masses and cocoons on apple-trees. <Prairie Farmer, 14 March, 1868, [v. 37], n. s., v. 21, p. 164. S.-b. No. 2, p. 120; No. 3, p. 58.
Answer to inquiry of a correspondent; description of egg-masses and of larva of *Orygia leucostigma*; beneficial influence and means of encouraging parasites.

1001. RILEY, C. V. Hop insects; Hop Aphis. <Prairie Farmer, 21 March, 1868, [v. 37], n. s., v. 21, p. 184. S.-b. No. 3, p. 58.
Brief account of and means against *Hyppena humuli* [= *scabra*] and *Phorodon humuli*.
1002. RILEY, C. V. Supposed eggs of the preying Mantis. <Prairie Farmer, 28 March, 1868, [v. 37], n. s., v. 21, p. 201. S.-b. No. 2, p. 121; No. 3, p. 59.
Answer to inquiry of J. H. Graves; cocoons of *Rhogas* sp. attached in a mass to twigs of an apple-tree.
1003. RILEY, C. V. Oak-tree borer. <Prairie Farmer, 28 March, 1868, [v. 37], n. s., v. 21, p. 201. S.-b. No. 2, p. 121; No. 3, p. 59.
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1004. RILEY, C. V. Maple-bark lice. <Prairie Farmer, 28 March, 1868, [v. 37], n. s., v. 21, p. 201. S.-b. No. 2, p. 121; No. 3, p. 59.
Lecanium sp. found on twigs of sugar-maple.
1005. RILEY, C. V. Eggs of the katydid. <Prairie Farmer, 28 March, 1868, [v. 37], n. s., v. 21, p. 201. S.-b. No. 2, p. 121; No. 3, p. 59.
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1006. RILEY, C. V. Eggs of tree-cricket in raspberry canes. <Prairie Farmer, 28 March, 1868, [v. 37], n. s., v. 21, p. 201. S.-b. No. 2, p. 121; No. 3, p. 59.
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1007. RILEY, C. V. Bark-lice. <Prairie Farmer, 28 March, 1868, [v. 37], n. s., v. 21, p. 201. S.-b. No. 2, p. 121; No. 3, p. 59.
Answer to inquiry of C. D. Robinson; means against *Mytilaspis pomicorticis* [= *pomorum*].
1008. RILEY, C. V. Bark-lice again; the native species. <Prairie Farmer, 28 March, 1868, [v. 37], n. s., v. 21, p. 201. S.-b. No. 2, p. 121; No. 3, p. 59.
Letter from N. Coleman, with answer; comparative characters of *Mytilaspis pomicorticis* [= *pomorum*] and *Diaspis harrisii* [= *Chionaspis furfurus*]; food-plants of the latter.
1009. RILEY, C. V. Dahlia-stalk borer. <Prairie Farmer, 28 March, 1868, [v. 37], n. s., v. 21, p. 201. S.-b. No. 2, p. 121; No. 3, p. 59.
Answer to inquiry of S. M. Wierman; means against *Gortyna nitela*.
1010. RILEY, C. V. Apple-worm. <Prairie Farmer, 28 March, 1868, [v. 37], n. s., v. 21, p. 201. S.-b. No. 2, p. 121; No. 3, p. 59.
Answer to communication of S. J. C.; *Carpocapsa pomonella* hibernates as a larva within the cocoon.

1011. RILEY, C. V. False caterpillars on the Scotch and Austrian pines. <Prairie Farmer, 2 May, 1868, [v. 37], n. s., 21, p. 285, fig.
Description and figures of larva, cocoon and imago, and of male antenna of *Lophyrus lecontei*; food-plants and habits of larva; value of technical science.
1012. RILEY, C. V. Prevention of bark-lice. <Prairie Farmer, 9 May, 1868, [v. 37], n. s., v. 21, p. 301. S.-b. No. 3, p. 60.
Means against *Mytilaspis pomicorticis* [= *pomorum*] and *Phycita nebulo* [= *Acrobasis indiginella*]; figure of the latter.
1013. RILEY, C. V. Beetles in stomach of meadow-lark. <Prairie Farmer, 9 May, 1868, [v. 37], n. s., v. 21, p. 301. S.-b. No. 3, p. 60.
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1014. RILEY, C. V. Beetle on sugar-maple. <Prairie Farmer, 9 May, 1868, [v. 37], n. s., v. 21, p. 301. S.-b. No. 3, p. 60.
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1015. RILEY, C. V. White worms in wells. <Prairie Farmer, 9 May, 1868, [v. 37], n. s., v. 21, p. 301. S.-b. No. 3, p. 60.
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1016. RILEY, C. V. Tanzy for borers. <Prairie Farmer, 9 May, 1868, [v. 37], n. s., v. 21, p. 301. S.-b. No. 3, p. 60.
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1017. RILEY, C. V. Peach-borer. <Prairie Farmer, 9 May, 1868, [v. 37], n. s., v. 21, p. 301. S.-b. No. 3, p. 60.
Refers to articles on means against *Egeria* [= *Sannina*] *exitiosa*.
1018. RILEY, C. V. Black grape-vine caterpillars. <Prairie Farmer, 9 May, 1868, [v. 37], n. s., v. 21, p. 301. S.-b. No. 3, p. 60.
Descriptions of larva and imago of *Thyreus abbotii*; the abundance of parasites prevents serious injury by the larva.
1019. RILEY, C. V. The potato-beetle. <Cultivator and Country Gentleman, 21 May, 1868, v. 31, p. 378.
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1020. RILEY, C. V. The May-beetle; white grub. <Journ. of Agric., 1868, 4 figs. S.-b. No. 3, p. 10.
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1021. RILEY, C. V. Canker-worm. <Colman's Rural World, 1868. S.-b. No. 3, p. 16.
Habits of and means against *Anisopteryx* [= *Paleacrita*] *vernata*.
1022. RILEY, C. V. The apple-worm or codling-moth. <Colman's Rural World, 1868, fig. S.-b. No. 3, p. 16.
Seasons of and means against *Carpocapsa pomonella*; figures all stages except egg.

1023. RILEY, C. V. Remedy for the apple-borer. <Colman's Rural World, 1868. S.-b. No. 3, p. 16.
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1024. RILEY, C. V. Grape-vine hoppers. <Colman's Rural World, 1868. S.-b. No. 3, p. 16.
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1025. RILEY, C. V. Thousand-legged worm. <Colman's Rural World, 1868. S.-b. No. 3, p. 16.
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1029. RILEY, C. V. Will unimpregnated eggs hatch? <Prairie Farmer, 27 June, 1868, [v. 37], n. s., v. 21, p. 410. S.-b. No. 3, p. 60.
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1031. [RILEY, C. V.] [Pear-slug and currant-worm.] <Prairie Farmer, 27 June, 1868, [v. 37], n. s., v. 21, p. 410. S.-b., No. 3, p. 60.
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1033. RILEY, C. V. Large gray straight-horned snout-beetle. <Prairie Farmer, 4 July, 1868, [v. 38], n. s., v. 22, p. 2-3, figs. S.-b. No. 3, pp. 31, 56.
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1036. RILEY, C. V. Bag-worms. <Prairie Farmer, 11 July, 1868, [v. 38], n. s., v. 22, p. 10. S.-b. No. 3, pp. 31, 56.
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Answer to inquiry of J. Cochrane; balsam-fir injured by *Lachnus strobi*?; means against it.
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1043. RILEY, C. V. Ephemera flies; a hard story. <Prairie Farmer, 15 August, 1868, [v. 38], n. s., v. 22, p. 50. S.-b. No. 3, pp. 36, 57.
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1044. RILEY, C. V. Driving potato-beetles. <Prairie Farmer, 15 August, 1868, [v. 38], n. s., v. 22, p. 50. S.-b. No. 3, pp. 36.
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1045. RILEY, C. V. Gregarious walnut caterpillar. <Prairie Farmer, 15 August, 1868, [v. 38], n. s., v. 22, p. 50. S.-b. No. 3, pp. 36, 57.
Answer to inquiry of "a subscriber;" leaves of walnut destroyed by larvæ of *Datana ministra*; habits and means against the same.

1046. RILEY, C. V. Bugs on grape-vines. <Prairie Farmer, 15 August, 1868, [v. 38], n. s., v. 22, p. 50. S.-b. No. 3, p. 36.
Letter from J. H. Bingham, with answer; new growth of stems and leaves of grape-vines injured by *Corimelana pulicaria*; means against it.
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Answer to inquiry of J. M. Devore; description of *Papilio turnus*, ♀, form *glaucus*, which pupated on trunk of apple-tree.
1049. RILEY, C. V. White-pine trees killed by borers. <Prairie Farmer, 26 September, 1868, [v. 38], n. s., v. 22, p. 98.
1050. RILEY, C. V. Swarms of butterflies. <Prairie Farmer, 26 September, 1868, [v. 38], n. s., v. 22, p. 98.
1051. RILEY, C. V. Worms feeding on the hawthorn. <Prairie Farmer, 26 September, 1868, [v. 38], n. s., v. 22, p. 98.
1052. RILEY, C. V. Twig borers, sack-bearers, etc. <Prairie Farmer, 19 December, 1868, [v. 38], n. s., v. 22, p. 194.
1053. RILEY, C. V. Oil beetles. <Prairie Farmer, 19 December, 1868, [v. 38], n. s., v. 22, p. 194.
1054. RILEY, C. V. Apple-tree caterpillars. <Prairie Farmer, 19 December, 1868, [v. 38], n. s., v. 22, p. 194.
1055. RILEY, C. V. Twigs punctured by periodical Cicada. <Prairie Farmer, 19 December, 1868, [v. 38], n. s., v. 22, p. 194.
1056. RILEY, C. V. Report of committee on entomology. <Trans. Ill. Hortic. Soc. for 1867, 1868, n. s., v. 1, pp. 105-107, figs. 1-8.
Criticism of previous reports; effect of cold on *Aphis mali*; distribution, food-plants, and means against *Doryphora 10-lineata*; distinctions between *D. 10-lineata* and *D. juncta*; ravages of *Lytta* [= *Epicauta*] *vittata*, L. [= *E.*] *cinerea*, and *L. atrata* [= *E. pennsylvanica*] on potato, and *L.* [= *Pomphopœa*] *enca* on fruit-trees; means against them; ravages of *Halicta* [= *Crepidodera*] *cucumeris* on potato; habits, ravages, and specific characters of *Cassididae* found on sweet potato; *Saperda bivittata* [= *candida*] biennial; history and development of *Mytilaspis pemicorticis* [= *pomorum*]; its food-plants, supposed hermaphroditism [parthenogenesis] and mode of production of scale of this species; difficulty of explaining the production of galls; habits, characters, food-plants, and ravages of *Conotrachelus nenuphar*, *Carpocapsa pomonella*, *Heliothis armigera*, *Gortyna nitela*, *Mamestra picta*, *Procris* [= *Harrisina*] *americana*, *Selandria vitis* [= *Blennocampa pygmaea*], *Darapsa* [= *Ampelophaga myron*, and *Desmia maculalis*; notes on other insects injurious to grape, apple, and wheat, and on *Mycetophila persica*, *Emphytus* [= *Harpiphorus*] *maculatus*, *Agrotis* [= *Hadena*] *devastatrix*, and *Hadena juncta*; note on recent writings by the author.

1057. RILEY, C. V. Entomology. <Prairie Farmer Annual [No. 2 for 1869], 1868, pp. 30-41, 6 figs. S.-b. No. 14, pp. 220-226.

Directions for collecting and preserving insects; descriptions of apparatus and cabinets; means against cabinet pests; descriptions and figures of all stages, except egg, of *Lophyrus abbotii* and *L. lecontei*; habits and food-plants of and means against both species; figures of eggs, pupæ, and imago of *Cicada* [= *Tibicen*] *septendecim* and of twig punctured by imago; dates and localities of occurrence of this species and of *C.* [= *T.*] *tredecim*; *C.* [= *T.*] *cassinii* a form of this insect; figures larva, puparium, and imago of *Cephalemyia* [= *Æstrus*] *ovis*; habits and ravages of and means against it; imago viviparous in the nostrils of sheep.

1058. RILEY, C. V. The American Meromyza, *Meromyza americana*, Fitch. Attacking wheat just before it ripens. <Moore's Rural New Yorker, 30 January, 1869, v. 20, p. 71, fig. S.-b. No. 3, p. 83.

Habits and ravages of *Meromyza americana*; figures larva, pupa, and injured stalk of wheat; related European species have similar habits; remedies and natural enemies.

1059. RILEY, C. V. First annual report on the noxious, beneficial, and other insects of the State of Missouri, made to the State Board of Agriculture, pursuant to an appropriation for this purpose from the legislature of the State. <4th Ann. Rept. State Board of Agric. for 1868, March, 1869, pp. 182-187, 98 figs. Separate: <Jefferson City, Mo., March, 1869, pp. 182-187, 2 pl., 98 figs. Notice: <Amer. Ent., April, 1869, v. 1, p. 165.

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1060. RILEY, C. V. Eggs of the Mantis or rear-horse. <Moore's Rural New Yorker, 10 April, 1869, v. 20, p. 234, 2 figs. S.-b. No. 3, p. 52.

Answer to inquiry of T. C. Bartle; description of *Mantis* [= *Phasmomantis*] *carolina*; its food, habits, oviposition, and parasites; figures its egg-masses and those of *Phylloptera* [*Amblycorypha*] *oblouifolia*.

1061. RILEY, C. V. Native bark-lice on apple-trees. <Prairie Farmer, 17 April, 1869, [v. 39], n. s., v. 23, p. 122, 1 fig. S.-b. No. 3, p. 57.

Answer to inquiry of T. B. Gardner; life history of and means against *Diaspis harrisii* [= *Chionaspis furfurus*]; figure of the same.

1062. RILEY, C. V. Curculio. <Prairie Farmer, 17 April, 1867, [v. 39], n. s., v. 23, p. 122. S.-b. No. 3, p. 57.

Answer to inquiry of James Weed; habits of and means against *Conotrachelus nenuphar*.

1063. RILEY, C. V. Cherry-tree borers. <Prairie Farmer, 17 April, 1869, [v. 39], n. s., v. 23, p. 122. S.-b. No. 3, p. 57.

Answer to inquiry of Onarga Horticultural Society; larvæ of *Buprestis* [= *Dircera*] *divaricata* and of *Trochilium* sp., injurious to cherry-trees; soft-maple attacked by *T.* [= *Egeria*] *acerni*; means against these insects.

1064. RILEY, C. V. White-grub fungus. <Prairie Farmer, 15 May, 1869, [v. 39], n. s., v. 23, p. 154. S.-b. No. 3, p. 76.
Letter from D. W. Tindall, with answer; ravages of *Lachnosterna quercina* [= *fusca*] in Clinton County, Mo., in 1868; *Torrubia* growing on the larvæ in 1869.
1065. RILEY, C. V. The canker-worm, *Anisopteryx vernata* Peck. <Moore's Rural New Yorker, 29 May, 1869, v. 20, p. 345, figs. S.-b. No. 3, p. 73.
Description, figures, and natural history of canker-worms; the two species are confounded.
1066. RILEY, C. V. The seed-corn maggot, *Anthomyia zeas*, Riley. Destroying the seed after it is planted. <Moore's Rural New Yorker, June, 1869, fig. S.-b. No. 3, p. 81. Advance print, with changes: <1st Ann. Rept. State Ent. Mo., March, 1869, pp. 154-156, figs. 86-87.
See No. 1059 for synopsis of contents.
1067. RILEY, C. V. Cherry-tree plant-lice. <Moore's Rural New Yorker, 10 July, 1869, v. 20, p. 443. S.-b. No. 3, p. 83.
Answer to inquiry of G. J. Magee; means against *Aphis* [= *Myzus*] *cerasi*.
1068. RILEY, C. V. Gooseberry span-worms. <Moore's Rural New Yorker, 10 July, 1869, v. 20, p. 443. S.-b. No. 3, p. 83.
Letter from A. Yancey, with answer; occurrence of *Eufitchia ribearia* in Iowa; habits and means against it; habits of and influence of weather on *Blissus leucopterus*; scarcity of *Doryphora 10-lineata* in Iowa.
1069. RILEY, C. V. Apple-leaf crumpler mistaken for Curculio. <Prairie Farmer, 10 July, 1869, [v. 40], n. s., v. 24, p. 218, fig. S.-b. No. 3, p. 80.
Letter from B. T. Taylor; improper use of the word Curculio; figures larva-case and imago of *Phycita nebulo* [= *Acrobasis indiginella*]; means against it; outline figure of *Conotrachelus nenuphar*.
1070. RILEY, C. V. Peach-tree borer. <Prairie Farmer, 10 July, 1869, [v. 40], n. s., v. 24, p. 218. S.-b. No. 3, p. 80.
Answer to inquiry of C. Allen; habits of and means against *Aegeria* [= *San-nina*] *exitiosa*.
1071. RILEY, C. V. To protect plums from Curculio. <Prairie Farmer, 10 July, 1869, [v. 40], n. s., v. 24, p. 218. S.-b. No. 3, p. 80.
Answer to inquiry of H. H. S.; recommends the collection of the imago of *Conotrachelus nenuphar* by jarring.
1072. RILEY, C. V. White-grub; information wanted. <Prairie Farmer, 28 August, 1869, [v. 40], n. s., v. 24, p. 274, 4 figs. S.-b. No. 3, p. 95.
Letter from A. T. V., with answer; habits of and means against *Lachnosterna quercina* [= *fusca*]; figures of larva and imago.
1073. RILEY, C. V. Unknown corn pest. <Prairie Farmer, 28 August, 1869, [v. 40], n. s., v. 24, p. 274. S.-b. No. 3, p. 95.
Letter from E. B. Hickey, with answer; ravages of cut-worms and of an unknown pest on maize; brief description and habits of the latter.

1074. RILEY, C. V. Larva of the grape-vine flea-beetle. <Moore's Rural New Yorker, 28 August, 1869, v. 20, p. 555. S.-b. No. 3, pp. 100, 103.

Answer to inquiry of D. D. Vosburgh; habits, ravages, and means against *Graptodera* [= *Haltica*] *chalybea*.

1075. RILEY, C. V. Rose bug. <Moore's Rural New Yorker, 28 August, 1869, v. 20, p. 555. S.-b. No. 3, pp. 100, 103.

Answer to inquiry of a subscriber; description of imago, transformations of, and means against *Macroductylus subspinosus*.

1076. RILEY, C. V. Large green caterpillar on the apple. <Moore's Rural New Yorker, 28 August, 1869, v. 20, p. 555. S.-b. No. 3, p. 100.

Answer to inquiry of S. E. A. Palmer; descriptions of larva and imago of *Attacus cecropia*; its habits and seasons.

1077. RILEY, C. V. Conical galls on leaves of wild grape-vine. <Moore's Rural New Yorker, 28 August, 1869, v. 20, p. 555. S.-b. No. 3, p. 100.

Answer to inquiry of D. McClaine; description of galls of *Cecidomyia vitis-viticola*; characters of the larvæ of *Cecidomyia*.

1078. RILEY, C. V. A strange bug. <Moore's Rural New Yorker, 28 August, 1869, v. 20, p. 555. S.-b. No. 3, p. 100; No. 4, p. 3.

The insects described in North Carolina's "A strange bug," were probably *Psocus venosus*; habits of the genus *Psocus*.

1079. RILEY, C. V. Currant-worms and black-currants. <Moore's Rural New Yorker, 28 August, 1869, v. 20, p. 555. S.-b. No. 3, p. 100; No. 4, p. 3.

Critical review of Addi on currant-worms; in North America three species of larvæ feed on the leaves of currants, and two species of borers live within the stem.

1080. RILEY, C. V. Curculio. <Moore's Rural New Yorker, 28 August, 1869, v. 20, p. 555. S.-b. No. 3, p. 100; No. 4, p. 3.

Commendation of an editorial criticism of Northwest's article on the Curculio.

1081. [RILEY, C. V.] Insects injurious to the grape-vine. [No. 1.] <Amer. Ent., August, 1869, v. 1, pp. 231-234, figs. 169-173. Reprint, with slight changes: <2d Ann. Rept. State Ent. Mo., March, 1870, pp. 87-91, figs. 60-63.

Treats of *Prionus laticollis* and *P. imbricornis*. See No. 1127 for synopsis of contents.

1082. [RILEY, C. V.] Insects infesting the sweet-potato. <Amer. Ent., August, 1869, v. 1, pp. 234-238, figs. 174-181. Reprint, with slight changes: <2d Ann. Rept. State Ent. Mo., March, 1870, pp. 56-64, figs. 26-38.

Treats of tortoise-beetles, *Cassididae*. See No. 1127 for synopsis of contents.

1083. RILEY, C. V. The borers. <Western Rural, September, 1869. S.-b. No. 4, p. 2.

Means against *Egeria cucurbitæ* [= *Melittia ceto*].

1084. RILEY, C. V. Supposed bark-lice eggs in Missouri. <Prairie Farmer, 4 September, 1869, [v. 40], n. s., v. 24, p. 282. S.-b. No. 3, p. 95.
Letter from J. Reed, with answer; eggs of a moth mistaken for those of *Mytilaspis pomicorticis* [= *pomorum*]; the latter unknown in Missouri.
1085. RILEY, C. V. New York weevil on apple-trees. <Prairie Farmer, 4 September, 1869, [v. 40], n. s., v. 24, p. 282, 3 figs. S.-b. No. 3, p. 95.
Letter from R. M. Guy, with answer; figures of larva and imago, description of imago, geographical distribution, methods of oviposition, food-plants, and means against *Ithycerus noveboracensis*.
1086. [RILEY, C. V.] Insects injurious to the grape-vine. No. 2. <Amer. Ent., September–October, 1869, v. 2, pp. 22–24, figs. 12–16. Reprint, with slight changes. <2d Ann. Rept. State Ent. Mo., March, 1870, pp. 71–73, figs. 44–48.
Treats of *Charocampa pampinatrix* [= *Ampelophaga myron*]; see No. 1127 for synopsis of contents.
1087. RILEY, C. V. Larva of the imperial moth. <Prairie Farmer, 9 October, 1869, [v. 40], n. s., v. 24, p. 322. S.-b. No. 3, p. 92.
Letter of C. H. Thayer, with answer; description of larva, pupa, and imago of *Ceratocampa* [= *Eacles*] *imperialis*; food-plants of the same and of *C.* [= *Citheronia*] *regalis*.
1088. RILEY, C. V. Apple snout-beetle or four-humped Curculio. <Prairie Farmer, 9 October, 1869, [v. 40], n. s., v. 24, p. 322. S.-b. No. 3, p. 92.
Letter from R. W. Gandy, with answer; habits and description of *Anthonomus quadrigibbus*; recommends jarring.
1089. RILEY, C. V. That venomous potato-worm! <Moore's Rural New Yorker, 20 November, 1869, v. 20, p. —. S.-b. No. 3, pp. 107; 112.
Critical review of several recent articles upon tomato-worms; structure and harmlessness of larvæ of *Sphingidæ*; geographical distribution of *Sphinx* [= *Protoparce*] *carolina* and *S. quinquemaculata* [= *P. celeus*].
1090. [RILEY, C. V.] The bag-worm, *alias* basket-worm, *alias* drop-worm, *Thyridopteryx ephemeræformis*, Haw. <Amer. Ent., November, 1869, v. 2, pp. 35–38, fig. 24.
Geographical distribution, food-plants, seasons, transformations, parasites, copulation, and oviposition of and means against *Thyridopteryx ephemeræformis*; figures and descriptions of larva, larva-cases, pupa, and imago; description of eggs; abodes constructed by insects.
1091. [RILEY, C. V.] Insects injurious to the grape-vine. No. 3. <Amer. Ent., November, 1869, v. 2, pp. 54–55, figs. 33–35. Reprint, with slight changes. <2d Ann. Rept. State Ent. Mo., March, 1870, pp. 74–76, figs. 49–51.
Treats of *Philampelus achemon*; see No. 1127 for synopsis of contents.
1092. RILEY, C. V. The saddle-back caterpillar. <Moore's Rural New Yorker, 4 December, 1869, v. 20, p. —, fig. S.-b. No. 3, p. 103.
Letters from A. W. Baker and G. T. Cost, with answer; figures and characterization of the larva of *Empretia stimulea*; food-plants, urticating properties, and transformations; description of the imago.

1093. RILEY, C. V. The seventeen-year Cicada. <Prairie Farmer, ——— 1869. S.-b. No. 3, p. 55.
Answer to communication of W. J. B., concerning *Cicada* [= *Tibicen*] *septendecim*.
1094. RILEY, C. V. Death of a hen. <Rural New Yorker, ——— 1869, fig. S.-b. No. 3, p. 75.
Occurrence of *Goniocotes hologaster* in great numbers on a hen; means against the same; figure of it.
1095. RILEY, C. V. Cut-worm eggs. <Prairie Farmer, ——— 1869. S.-b. No. 3, p. 81.
Habits and place of oviposition of *Agrotis inermis* [= *saucia*]; description of its eggs and larvæ.
1096. RILEY, C. V. Potato bugs. <Prairie Farmer, ——— 1869. S.-b. No. 3, p. 81.
Means against *Doryphora 10-lineata*.
1097. RILEY, C. V. That glow-worm. <Cultivator and Country Gentleman, 6 January, 1870, v. 35, p. 5, fig. S.-b. No. 4, p. 23.
Reprint: <Amer. Ent., October, 1880, v. 3, n. s., v. 1, p. 254, fig.
Figures larva and imago of *Photuris pennsylvanica*; *Photinus pyralis* also luminous in larval and adult stages; comparison with *Lampyrus noctiluca*.
1098. [RILEY, C. V.] In memoriam. <Amer. Ent., December, 1869–January, 1870, v. 2, pp. 65–68.
Biographical and obituary notice of B. D. Walsh.
1099. [RILEY, C. V.] The harlequin cabbage-bug, *Strachia histrionica*, Hahn. <Amer. Ent., December, 1869–January, 1870, v. 2, pp. 79–80, fig. 56.
Enumeration of the enemies of the cabbage in the United States; methods of their injury; importation and spread of some species; figures of the imago; description of eggs, habits, geographical distribution, seasons, and odors of *Strachia* [= *Murgantia*] *histrionica*; extract from G. Linneæum's "Texan cabbage-bug."
1100. [RILEY, C. V.] An entomologist caught napping. <Amer. Ent., December, 1869–January, 1870, v. 2, p. 84.
Criticism of the view that trees, grasses, or any other particular forms of vegetation are the natural coverings of the earth; this criticism applied especially to John Curtis.
1101. [RILEY, C. V.] Poisonous qualities of the Colorado potato-bug. <Amer. Ent., December, 1869–January, 1870, v. 2, pp. 85–86.
Extract from "Winona Republican," with remarks upon the poisonous nature of the blood of *Doryphora 10-lineata*.
1102. [RILEY, C. V.] Insects injurious to the grape-vine. No. 4. <Amer. Ent., December, 1869–January, 1870, v. 2, pp. 89–90, figs. 58–59. Reprint, with slight changes: <2d Ann. Rept. State Ent. Mo., March, 1870, pp. 76–78, figs. 52–53.
Treats of *Philampelus satellitia* [= *pandorus*]; see No. 1127 for synopsis of contents.

1103. [RILEY, C. V.] Toads *vs.* bugs. <Amer. Ent., December, 1869–January, 1870, v. 2, p. 91.
Translation of extracts from Fogg's "Noxious and beneficial animals;" existence of a commerce in toads between France and England; usefulness, tameness, and gratitude of toads.
1104. [RILEY, C. V.] The tomato-worm again. <Amer. Ent., December, 1869–January, 1870, v. 2, pp. 91–92.
Reprint, with comments, of article entitled "The tomato-worm," from Syracuse Standard; absurd nature of newspaper accounts of insects.
1105. [RILEY, C. V.] Mr. Walsh's successor. <Amer. Ent., December, 1869–January, 1870, v. 2, pp. 92–93.
Condition in which B. D. Walsh left the office of State Entomologist of Illinois at his death; plans of his intended second report; provisions for the preparation of the same and the filling of the office.
1106. [RILEY, C. V.] To our subscribers. <Amer. Ent., December, 1869–January, 1870, v. 2, p. 93.
Proposed change in the character of the American Entomologist.
1107. [RILEY, C. V.] The Walsh entomological collection. <Amer. Ent., December, 1869–January, 1870, v. 2, pp. 93–94.
Statement of the conditions under which the Walsh collection of insects is to be sold; expression of preferences in regard to its disposition; extent and method of preservation of the collection.
1108. [RILEY, C. V.] A State entomologist for Minnesota. <Amer. Ent., December, 1869–January, 1870, v. 2, p. 94.
Commendation of resolutions passed by the Minnesota State Horticultural Society recommending the appointment of a state entomologist; promotion of entomological studies by appropriations from the several States.
1109. RILEY, C. V. [Field for the entomologist in the South.] <Amer. Ent., v. 2, December, 1869–January, 1870, p. 94; February, 1870, p. 121.
Extent and novelty of entomological work in the southern United States; J. P. Stelle at work in this field.
1110. [RILEY, C. V.] On our table. <Amer. Ent., December, 1869–January, 1870, v. 2, pp. 95, 96.
Notices of J. T. C. Ratzburg's works on "Forest trees" and "Weeds of Germany and Switzerland."
1111. [RILEY, C. V.] Information wanted. <Amer. Ent., December, 1869–January, 1870, v. 2, p. 96.
Answer to inquiry of M. A. Kendall; habits of *Xylocopa carolina* [= *virginica*], *Rhyssa* [= *Thalessa*] *lunator*, and *Spectrum* [= *Diapheromera*] *femorata*.
1112. [RILEY, C. V.] The Cecropia moth, *Attacus cecropia*, Linn. <Amer. Ent., February, 1870, v. 2, pp. 97–102, fig. 59 [bis]–67.
Descriptions and figures of larva, cocoon and imago of *Attacus cecropia*; figure of pupa; descriptions of egg and of young larva at its several stages; nomenclature, food-plants, and parasites; its value as a silk-worm; figures and descriptions of *Ophion macrurum*, *Exorista cecropiae* n. sp., and *Chalcis* [= *Spilochalcis*] *mariae* n. sp.; figure of larva of *Ophion macrurum* and of cocoons of *Cryptus nureius*; habits of these parasites; *Exorista cecropiae* considered a variety of *E. militaris* [= *Nemoræa leucaniæ*].

1113. RILEY, C. V. Report of the committee on entomology. Read . . . before the Missouri State Horticultural Society. < Amer. Ent., February, 1870, v. 2, pp. 106-109. Reprint: < 2d Ann. Rept. State Ent. Mo., March, 1870, pp. 5-8, 13-15.

See No. 1127 for synopsis of contents.

1114. [RILEY, C. V.] Silk-worm eggs. < Amer. Ent., February, 1870, v. 2, p. 109.

Seventy-eight packages of silk-worm eggs, valued at \$800 per package and weighing two tons, shipped from Yokohama to France via California and the Pacific Railroad.

1115. RILEY, C. V. Imported insects and native American insects. < Amer. Ent., February, 1870, v. 2, pp. 110-112, fig. 72-75. Reprint: < 2d Ann. Rept. State Ent. Mo., March, 1870, pp. 8-12.

See No. 1127 for synopsis of contents.

1116. [RILEY, C. V.] The trumpet grape-gall, *Vitis viticola* O. S. < Amer. Ent., February, 1870, v. 2, pp. 113-114, fig. 76.

Figure of the gall of *Cecidomyia vitis-viticola*. *C. v.-lituus* a synonym; occurrence of similar gall in England on *Tilia* probably caused by mites.

1117. [RILEY, C. V.] The goat-weed butterfly, *Paphia glycerium* Doubleday. < Amer. Ent., February, 1870, v. 2, pp. 121-123, figs. 81-83. Reprint, with slight changes. < 2d Ann. Rept. State Ent. Mo., March, 1870, pp. 124-128, figs. 94-96.

See No. 1127 for synopsis of contents.

1118. [RILEY, C. V.] Insects injurious to the grape-vine. No. 5. < Amer. Ent., February, 1870, v. 2, pp. 123-124, fig. 84. Reprint, with slight changes. < 2d Ann. Rept. State Ent. Mo., March, 1870, pp. 78-79, fig. 54.

Treats of *Thyreus abbotii*; see No. 1127 for synopsis of contents.

1119. [RILEY, C. V.] Scorpion in Kansas. < Amer. Ent., February, 1870, v. 2, p. 126.

Answer to inquiry of K. Kelsey; occurrence of *Buthus carolinianus* in Texas, Missouri, and Kansas.

1120. [RILEY, C. V.] The grain Bruchus of Europe just imported. < Amer. Ent., February, 1870, v. 2, pp. 126-127, fig. 85.

Answer to inquiry of A. S. Fuller; notice of the recent importation into New York of the European *Bruchus granarius*; danger of and remedy for such importation; habits and ravages of and means against the beetle in Europe as described in J. Curtis's, "Farm Insects;" figure of the imago and of infested beans; figures of larva, pupa, and imago of *B. pisi* and of infested pea.

1121. [RILEY, C. V.] Locust borer. < Amer. Ent., February, 1870, v. 2, pp. 127-128, figs. 86-89.

Answer to inquiry of J. M. Shaffer; habits, food-plants, seasons, and ravages of and means against *Xyleutes* [= *Cossus*] *robiniae*; figures larva, pupa, and male and female imagos.

1122. [RILEY, C. V.] Eggs of snowy tree-cricket on raspberry canes. <Amer. Ent., February, 1870, v. 2, p. 128.
- Answer to inquiry of J. B. Root; oviposition of and means against *Ecanthus niveus*.
1123. [RILEY, C. V.] Spotted rove-beetle. <Amer. Ent., February, 1870, v. 2, p. 128.
Answer to inquiry of J. Huggins; habits of *Staphylinus maculosus* and of rove-beetles in general.
1124. [RILEY, C. V.] Raspberry gouty gall. <Amer. Ent., February, 1870, v. 2, p. 128, fig. 90.
Answer to inquiry of C. Carpenter; ravages of and means against *Agrilus ruficollis*; description and figure of larva.
1125. [RILEY, C. V.] Parasitic cocoons. <Amer. Ent., February, 1870, v. 2, p. 128, fig. 91.
Answer to inquiry of G. C. Brackett; figures cocoons and conjectures as to the habits of [*Microplitis ceratoniæ* var. *actuosus*].
1126. [RILEY, C. V.] The pigeon Tremex in apple. <Amer. Ent., February, 1870, v. 2, p. 128.
Answer to inquiry of J. Huggins; habits and food-plants of *Tremex columba*; description of imago; *Rhyssa* [= *Thalessa*] *lunator* destroys the larva.
1127. RILEY, C. V. Second annual report on the noxious, beneficial, and other insects of the State of Missouri, made to the State Board of Agriculture, pursuant to an appropriation for this purpose from the legislature of the State. <5th Ann. Rept. State Board of Agric. for 1869, March, 1870, pp. 136 + 6, 99 figs. Separate: <Jefferson City, Mo., March, 1870, pp. 136 + 6, 99 figs.

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1128. [RILEY, C. V.] Mr. Walsh's portrait. <Amer. Ent., March, 1870, v. 2, p. 129.

Remarks accompanying the portrait of B. D. Walsh; resolutions passed on the death of Walsh by the London branch of the Entomological Society of Ontario; by the American Entomological Society, the Illinois State Horticultural Society, and by the Kansas State Horticultural Society.

1129. RILEY, C. V. The plum Curculio, *Conotrachelus nenuphar* Herbst. <Amer. Ent., March, 1870, v. 2, pp. 130-137, fig. 92.

Paper read before the Illinois State Horticultural Society at its 14th annual meeting; summary of established facts and discussion of mooted points in the life-history of *Conotrachelus nenuphar*; seasons, habits, transformations, food-plants, enemies of and means against the same; descriptions and figures of larva and imago; figure of pupa; hibernation and the effects of climate on the prolongation of the life of insects.

1130. RILEY, C. V. Insects injurious to the grape-vine. No. 6. <Amer. Ent., March, 1870, v. 2, pp. 150-153, figs. 100-102. Reprint, with slight changes: <2d Ann. Rept. State Ent. Mo., March, 1870, pp. 80-82, fig. 55.

Treats of *Alypia octomaculata*; see No. 1127 for synopsis of contents.

1131. [RILEY, C. V.] Pithy blackberry gall. <Amer. Ent., March, 1870, v. 2, pp. 159-160, fig. 103.
 Answer to inquiry of C. W. ["S. C."] Spaulding; descriptions and figures of larva and gall of *Diastrophus nebulosus*; figure of pupa; seasons, food-plant, guest-fly [*Periclistus sylvestris*], and parasite [*Eurytoma diastrophii*] and means against this species; the genus *Diastrophus* confined to *Rosaceæ*, *Cynips* to *Cupuliferæ* and *Antistrophus* to *Compositæ*.
1132. [RILEY, C. V.] Clover-worms. <Amer. Ent., March, 1870, v. 2, p. 160.
 Answer to inquiry of G. Pauls; geographical distribution, food-habits, vernacular names and synonymy of and means against *Asopia costalis*.
1133. [RILEY, C. V.] Seed-ticks under bark of apple-trees. <Amer. Ent., March, 1870, v. 2, p. 160.
 Answer to inquiry of O. B. Galusha; character of insects as regards the number of legs; occurrence of *Ixodes unipunctata* under outer bark of apple-trees at Morris, Ill.
1134. [RILEY, C. V.] Parasitic cocoons. <Amer. Ent., March, 1870, v. 2, p. 160.
 Answer to inquiry of S. W. Beckworth; occurrence of a mass of cocoons of [*Microplitis ceratomiæ* var. *actuosus*] under red-oak at South Pass, Ill.
1135. [RILEY, C. V.] Is any knowledge useless? <Amer. Ent. and Bot., April, 1870, v. 2, pp. 164-166.
 Reprint of article from Manufacturer and Builder, November, 1869; minute investigations in science may be of great practical importance; cases in which a knowledge of life-history of *Galeruca californiensis* [= *xanthomelena*], *Conotrachelus nenuphar*, and *Lymexylon navale* was or might have been of great value.
1136. [RILEY, C. V.] Tomato fruit-worm. <Amer. Ent. and Bot., April, 1870, v. 2, p. 172.
 Notice of statement by J. J. Weir that *Heliothis armigera* was bred from larvæ which fed on the fruit of tomato in England; food-plants of this insect.
1137. RILEY, C. V. Insects injurious to the grape-vine. No. 7. <Amer. Ent. and Bot., April, 1870, v. 2, pp. 173-174, figs. 107-108.
 Reprinted, with slight changes, from <2d Ann. Rept. State Ent. Mo., March, 1870, pp. 85-87, figs. 58-59.
 Treats of *Procris* [= *Harrisina*] *americana*; see No. 1127 for synopsis of contents.
1138. [RILEY, C. V.] The death web of young trout. <Amer. Ent. and Bot., April, 1870, v. 2, p. 174.
 Reprint, with review, of Seth Green's "An enemy to young trout;" young trout and young white-fish killed by the web of an unknown aquatic larva, probably one of the caddis-flies; habits of the larvæ of *Phryganeidæ*. See No. 1160.
1139. [RILEY, C. V.] "Scab" in apple v. apple-tree plant-lice. <Amer. Ent. and Bot., April, 1870, v. 2, p. 178.
 Notes the freedom of apple-trees in 1870 from the eggs of *Aphis mali*, and the opportunity to test the question of the connection of these insects with the "scab."

1140. [RILEY, C. V.] Insects named. <Amer. Ent. and Bot., April, 1870, v. 2, p. 179.
Answer to inquiry of M. Hobart; identification of several insects; food-plants of *Grapta comma*, *Geometra* [= *Zerene*] *catenaria*, *Serica vespertina*, and *Tetraopes 5-maculatus*; geographical distribution of *Grapta comma*; description of larva of *Ecpantheria scribonia*.
1141. [RILEY, C. V.] Supposed trout enemy. <Amer. Ent. and Bot., April, 1870, v. 2, pp. 179-180.
Answer to inquiry of F. Mather; identification of several insects; habits and occurrence of *Capnia minima*; occurrence of *Piophila casci* and *Ptinus brunneus* at Honeoye Falls, N. Y.
1142. [RILEY, C. V.] Food for trout. <Amer. Ent. and Bot., April, 1870, v. 2, p. 180.
Answer to inquiry of Seth Green and Collins; with knowledge of the character of the worms which forms a desirable food for young trout, it may be possible to suggest some method of propagating the worms artificially.
1143. [RILEY, C. V.] Hair-snakes. <Amer. Ent. and Bot., April, 1870, v. 2, p. 180.
Answer to inquiry of E. W. M.; parasitic habits, abodes and prolificacy, and classificatory relations of *Gordius varius* and *G. aquaticus*.
1144. [RILEY, C. V.] Egg-sack of some unknown spider. <Amer. Ent. and Bot., April, 1870, v. 2, p. 180.
Answer to inquiry of A. Engelmann; figure of egg-sack of *Epeira* sp.?
1145. [RILEY, C. V.] Do worker bees sting the drones to death? <Amer. Ent. and Bot., April, 1870, v. 2, p. 180.
Answer to inquiry of M. W. V.; there is no good reason to doubt that worker bees sting the drones to death when the mission of the latter is ended.
1146. [RILEY, C. V.] Red spider. <Amer. Ent. and Bot., April, 1870, v. 2, p. 180.
Answer to inquiry of R. H. Warder; *Trombidium* [= *Tetranychus*] *telarius* imported from Europe; size, color, and abodes of and means against the same.
1147. [RILEY, C. V.] Insect named. <Amer. Ent. and Bot., April, 1870, v. 2, p. 180.
Answer to inquiry of M. Barrett; food-habits of *Psocus venosus* and other *Psocidæ*.
1148. [RILEY, C. V.] To destroy plant-lice. <Amer. Ent. and Bot., April, 1870, v. 2, p. 180.
Answer to inquiry of B. F. Lazear; means against *Aphididæ* on house plants.
1149. [RILEY, C. V.] Raspberry root-gall. <Amer. Ent. and Bot., April, 1870, v. 2, p. 181, fig. 110.
Answer to inquiry of K. Parsons; description and figure of gall of *Rhodites radicum* occurring on roots of *Rosacæ*; genera of parasites raised from it; interest of the question of the manner and extent of parasitization of this gall.
1150. [RILEY, C. V.] Spined slug-worm. <Amer. Ent. and Bot., April, 1870, v. 2, p. 181.
Answer to inquiry of L. G. Saffer and A. R. Bodley; brief description of the larva of *Limacodes* sp.

1151. [RILEY, C. V.] Apple-tree insects. <Amer. Ent. and Bot., April, 1870, v. 2, p. 181.
Answer to inquiry of L. Camfield; identification of specimens and directions for the destruction of *Orgyia leucostigma* and *Phycita nebulo* [= *Acrobasis indiginella*].
1152. [RILEY, C. V.] Native apple-tree bark-lice. <Amer. Ent. and Bot., April, 1870, v. 2, p. 181, fig. 111.
Answer to inquiry of A. C. Hammond; food-plants of and means against *Diaspis harrisii* [= *Chionaspis furfurus*]; figure of infested twig of apple; the presence of enemies and parasites prevent this species becoming a formidable pest.
1153. [RILEY, C. V.] The hedge-hog caterpillar. <Amer. Ent. and Bot., April, 1870, v. 2, p. 182, fig. 112.
Answer to inquiry of H. Burt; descriptions and figures of larva and imago of *Arctia* [= *Pyrrharcia*] *isabella*; figure of pupa and cocoon; habits and hibernation; its larva and that of *Epantheria scribonia* called "fever-worm," and ignorantly supposed to cause malarial fevers; food-habits of *Horinus* [= *Merinus*] *lævis*.
1154. [RILEY, C. V.] Chick-weed Geometer. <Amer. Ent. and Bot., April, 1870, v. 2, p. 182.
Answer to inquiry of J. Huggins; identification of specimens; reference to account of *Hæmatopis grataria*; *Cermatia forceps* common in houses in the latitude of St. Louis, Mo.; the sulphur remedy for canker-worms absurd.
1155. [RILEY, C. V.] Bean-weevil. <Amer. Ent. and Bot., April, 1870, v. 2, p. 182.
Answer to inquiry of G. W. Copley; specimens identified; occurrence and ravages of *Bruchus obsoletus* in Illinois.
1156. [RILEY, C. V.] Bag-worm at South Pass, Ill. <Amer. Ent. and Bot., April, 1870, v. 2, p. 182.
Answer to inquiry of G. H. Baker; occurrence of *Thyridopteryx ephemerae-formis* at South Pass, Ill.; importance of its destruction.
1157. [RILEY, C. V.] Eggs of oblong-winged katy-did. <Amer. Ent. and Bot., April, 1870, v. 2, p. 182.
Answer to inquiry of E. D. Ladd; differences between the eggs of *Phylloptera* [= *Amblycorypha*] *oblongifolia* and those of *Platyphyllum* [= *Cyrtophyllus*] *conceavus*; the former occur on currant and various trees.
1158. [RILEY, C. V.] Insects injurious to the grape-vine. No. 8. <Amer. Ent. and Bot., May, 1870, v. 2, pp. 208-209, fig. 127.
Reprint, with slight changes: <3d Ann. Rept. State Ent. Mo., April, 1871, pp. 61-63, fig. 24.
Treats of *Desmia maculalis*; see No. 1301 for synopsis of contents.
1159. [RILEY, C. V.] The periodical Cicada alias the 17-year and 13-year locust. <Amer. Ent. and Bot., May, 1870, p. 211.
Quotes, from the 1st Ann. Rept. State Ent. Mo., the localities in which *Cicada* [= *Tibicen*] *septendecim* and *C.* [= *T.*] *tredecim* will appear in 1870, with request for reports of the occurrence of these insects.
1160. [RILEY, C. V.] The death-web of young trout. <Amer. Ent. and Bot., May, 1870, v. 2, p. 211.
Supplementary to No. 1138; the larvæ mentioned belong to the genus *Simulium*.

1161. [RILEY, C. V.] Worms under mulch hay. <Amer. Ent. and Bot., May, 1870, v. 2, p. 212.
Answer to inquiry of J. F. Flagg; description, season, habits, and ravages of and means against the larvæ of *Tipula* sp.
1162. [RILEY, C. V.] A new pear-tree insect. <Amer. Ent. and Bot., May, 1870, v. 2, p. 212, fig. 129.
Answer to inquiry of E. J. Ayres; food-habits and ravages of and means against *Platycerus quercus*; figure of imago.
1163. [RILEY, C. V.] Apple-twigg borer. <Amer. Ent. and Bot., May, 1870, v. 2, p. 212.
Answer to inquiry of J. B. Myers; *Bostrichus* [= *Amphicerus*] *bicaudatus* bores into the axil of limbs of pear-trees.
1164. [RILEY, C. V.] Cocoons of polyphemus moth. <Amer. Ent. and Bot., May, 1870, v. 2, 212.
Answer to inquiry of H. J. Dunlap; cocoon of *Attacus* [= *Telea*] *polyphemus* found on Morello cherry-tree.
1165. [RILEY, C. V.] Galls on supposed dock. <Amer. Ent. and Bot., May, 1870, v. 2, p. 212.
Answer to inquiry of S. V. Summers; *Gelechia gallæ-solidaginis* forms galls on stems of *Solidago*; *Gastrophysa* [= *Gastroidea*] *cyanea* breeds on *Rumex*.
1166. [RILEY, C. V.] Mossy rose-gall. <Amer. Ent. and Bot., May, 1870, v. 2, p. 213, fig. 130.
Answer to inquiry of W. M. Locke; description of gall, larva, and imago of *Rhodites rosæ*; figure of the gall; description of a parasitic larva.
1167. [RILEY, C. V.] Punctures on the rose-twigg. <Amer. Ent. and Bot., May, 1870, v. 2, p. 213, fig. 131.
Answer to inquiry of G. W. Copley; punctures in rose-stem; eggs, probably of a cricket, imbedded in pith of the same; description of the egg and figure of injured stem.
1168. [RILEY, C. V.] Snout-beetle. <Amer. Ent. and Bot., May, 1870, v. 2, p. 213.
Answer to inquiry of Mary Treat; *Hylobius confusus* a timber borer and usually in pine.
1169. [RILEY, C. V.] The oyster-shell bark-louse in Missouri. <Amer. Ent. and Bot., May, 1870, v. 2, pp. 213-214, fig. 132.
Answer to inquiry of B. P. Hanan; occurrence of *Aspidiotus conchiformis* [= *Mytilaspis pomorum*] in Missouri; importance of the thorough extirpation of the insect; figure of a piece of bark infested by the same.
1170. [RILEY, C. V.] The pod-like willow-gall. <Amer. Ent. and Bot., May, 1870, v. 2, p. 214, fig. 133.
Answer to inquiry of J. R. Muhleman; description and figure of the gall of *Cecidomyia salicis-siliqua*; figure of larva; food-plants, synonymy, and description of the pupa of the same.
1171. [RILEY, C. V.] Bee-nest. <Amer. Ent. and Bot., 1870, v. 2; May, p. 214, fig. 134; September, p. 307.
Answer to inquiry of J. R. Muhleman; description and figure of larva of *Prosopis affinis* in hot, low currant-stem; probability that *Ceratina dupla* breeds twice a year.

1172. [RILEY, C. V.] Beetles named. <Amer. Ent. and Bot., May, 1870, v. 2, p. 214.
Answer to inquiry of S. V. Summers; specimens identified; difference between *Canthon lavis* and *C. chalcites*.
1173. [RILEY, C. V.] Great discovery: Curculio extermination possible! <Amer. Ent. and Bot., June, 1870, v. 2, pp. 225-227. Notice: <Cultivator and Country Gentleman, 9 June, 1870, v. 35, p. 361.
Reprint of articles by J. E. Chamberlain and Mrs. H. Wier on the destruction of the Curculio; letter from W. B. Ransom; criticism of the same; means against *Conotrachelus nenuphar*; distinctions between *C. nenuphar* and *Anthonomus quadrigibbus*.
1174. [RILEY, C. V.] The death-web of young trout. <Amer. Ent. and Bot., June, 1870, v. 2, pp. 227-228, figs. 143-144.
Value and progress of fish-culture; habits of *Simulium piscicidium*, with the observations of Seth Green and Sara J. McBride; figures larva and pupa of *S. piscicidium* and the imago of *S. molestum*.
1175. [RILEY, C. V.] Insects injurious to the grape-vine. No. 9. <Amer. Ent. and Bot., June, 1870, v. 2, pp. 234-235, fig. 148. Reprint, with slight changes: <3d Ann. Rept. State Ent. Mo., April, 1871, pp. 65-68, fig. 27.
Treats of *Pterophorus* [= *Oxyptilus*] *periscelidactylus*; see No. 1301 for synopsis of contents.
1176. [RILEY, C. V.] The apple Curculio. <Amer. Ent. and Bot., June, 1870, v. 2, p. 243, fig. 152.
Figures of the imago of *Anthonomus quadrigibbus*.
1177. [RILEY, C. V.] The new Curculio remedy. <Amer. Ent. and Bot., June, 1870, v. 2, p. 243.
Results of experiments in the use of Ransom chip-trap for *Conotrachelus nenuphar*.
1178. [RILEY, C. V.] Tarantula of Texas. <Amer. Ent. and Bot., June, 1870, v. 2, p. 244.
Answer to inquiry of L. J. Stroop; the figure of *Mygale hentzii* given in volume one is somewhat incorrect.
1179. [RILEY, C. V.] Ailanthus silk-worm naturalized. <Amer. Ent. and Bot., June, 1870, v. 2, p. 244.
Answer to inquiry of A. S. Fuller; introduction and naturalization of *Attacus cynthia*.
1180. [RILEY, C. V.] Cypress-gall. <Amer. Ent. and Bot., June, 1870, v. 2, p. 244, fig. 153.
Answer to inquiry of J. P. Stelle; description and figures of gall and description of gall and imago of *Cecidomyia cupressi-ananassa* n. sp. on cypress; figures breast-bone of the larva.
1181. [RILEY, C. V.] Tent-caterpillar of the forest. <Amer. Ent. and Bot., June, 1870, v. 2, p. 245.
Answer to the inquiries of A. M. Brown and J. H. Evans; habits, food-plants, and ravages of *Clisiocampa sylvatica* [= *disstria*] and *C. americana*.

1182. [RILEY, C. V.] Worm-boring into peach. <Amer. Ent. and Bot., June, 1870, v. 2, p. 245.
Answer to inquiries of W. C. Flagg, A. C. Hammond, and M. M. Hooton; food-plants and description of larva of *Xylina cinerea* [= *Lithophane antennata*].
1183. [RILEY, C. V.] Insects named. <Amer. Ent. and Bot., June, 1870, v. 2, p. 245.
Answer to inquiry of A. Engelman; descriptions of *Smilia auriculata* and *Membracis ampelopsidis*; both species common on grape-vines.
1184. [RILEY, C. V.] Lice on "snow-balls. <Amer. Ent. and Bot., June, 1870, v. 2, p. 245.
Answer to inquiry of Mrs. C. L. Seymour; means against *Aphididae*.
1185. [RILEY, C. V.] Twig-borer. <Amer. Ent. and Bot., June, 1870, v. 2 p. 245, fig. 154.
Answer to inquiries of S. H. Kriedelbaugh and G. F. Merriam; figures of male and female *Bostrichus* [= *Amphicerus*] *bicaudatus*, which bore into the axils of grape-buds.
1186. [RILEY, C. V.] Bee enemy. <Amer. Ent. and Bot., June, 1870, v. 2, p. 245.
Answer to inquiry of F. Brewer; *Staphylinus maculosus*, found eating a bee, is rather a scavenger than an insect of prey.
1187. [RILEY, C. V.] Knots on apple-tree roots caused by root-lice. <Amer. Ent. and Bot., June, 1870, v. 2, p. 246.
Answer to inquiry of B. N. McKinstry; ravages of and means against *Schizoneura lanigera* on roots of young apple-trees.
1188. [RILEY, C. V.] Beetles named. <Amer. Ent. and Bot., June, 1870, v. 2, p. 246.
Answer to inquiry of W. W. Daniells; *Ithycerus noveboracensis* injures apple-leaves.
1189. [RILEY, C. V.] Bag-worm. <Amer. Ent. and Bot., June, 1870, v. 2, p. 246.
Answer to inquiry of M. M. Hooten; occurrence of young larva of *Thyridopteryx ephemeraformis* on peach-trees; manner in which they carry their cases.
1190. [RILEY, C. V.] The larder-beetle. <Amer. Ent. and Bot., June, 1870, v. 2, p. 246.
Answer to inquiry of S. H. Kriedelbaugh; food-habits and description of the larva and imago of *Dermestes lardarius*.
1191. [RILEY, C. V.] Water-bug. <Amer. Ent. and Bot., June, 1870, v. 2, p. 246.
Answer to inquiry of W. H. Harrington; habits and description of *Ranatra fusca*.
1192. [RILEY, C. V.] Gregarious worms on horse-chestnut. <Amer. Ent. and Bot., June, 1870, v. 2, p. 246.
Answer to inquiry of W. R. Howard; oviposition, food-plant, and parasite of *Tortrix* [= *Cacoecia*] *rileyana*.
1193. [RILEY, C. V.] Pupa of the disippus butterfly. <Amer. Ent. and Bot., June, 1870, v. 2, p. 246, fig. 155.
Answer to inquiry of T. Montgomery; figure and colors of pupa of *Limenitis disippus*; food-plants and hibernations of larva.

1194. [RILEY, C. V.] Prickly-rose gall. <Amer. Ent. and Bot., June, 1870, v. 2, p. 246.
Answer to inquiry of J. Cochrane and J. P. Stelle; brief description of the gall of *Rhodites bicolor* on wild rose.
1195. [RILEY, C. V.] Insects feeding on sap of black-walnut. <Amer. Ent. and Bot., June, 1870, v. 2, p. 246.
Answer to inquiry of M. Barrett; food-habits of *Psocus venosus*.
1196. [RILEY, C. V.] Locust-borer. <Amer. Ent. and Bot., June, 1870, v. 2, p. 246.
Answer to inquiry of "Arbor;" means against *Arhopalus* [= *Cyllene*] *robiniae*.
1197. [RILEY, C. V.] To exterminate cockroaches. <Amer. Ent. and Bot., June, 1870, v. 2, p. 246.
Answer to inquiry of R. F. Weitbree; means against cockroaches.
1198. [RILEY, C. V.] The white-lined morning Sphinx. (*Deilephila lineata*, Fabr.) <Amer. Ent. and Bot., July-August, 1870, v. 2, pp. 257-258, figs. 162-164. Reprint, with additions and slight changes: <3d Ann. Rept. State Ent. Mo., April, 1871, pp. 140-142, figs. 60-62.
Treats of *Deilephila lineata*; see No. 1301 for synopsis of contents.
1199. [RILEY, C. V.] Descriptive entomology. <Amer. Ent. and Bot., July-August, 1870, v. 2, pp. 258-261. Abstract: <Cultivator and Country Gentleman, 6 April, 1871, v. 36, p. 218.
Critical review of a remark by J. A. Lintner; calculation of the cost, labor, and extent of a work containing the description and figure of every existing species of insect.
1200. [RILEY, C. V.] The tent-caterpillar of the forest. (*Clisiocampa sylvatica*, Harr.) <Amer. Ent. and Bot., July-August, 1870, v. 2, pp. 261-266, figs. 165-168. Reprint, with additions and slight changes: <3d Ann. Rept. State Ent. Mo., April, 1871, pp. 121-129, figs. 52-54.
Treats of *Clisiocampa sylvatica* [= *disstria*]; see No. 1301 for synopsis of contents.
1201. [RILEY, C. V.] The Ransom Curculio remedy. <Amer. Ent. and Bot., July-August, 1870, v. 2, pp. 268-271.
Discussion of the efficacy of the Ransom chip-trap against *Conotrachelus nenuphar*; extracts from and criticism of articles by E. S. Hull, W. B. Ransom, and others on this subject.
1202. [RILEY, C. V.] Insects injurious to the grape-vine. No. 10. <Amer. Ent. and Bot., July-August, 1870, v. 2, pp. 272-273, fig. 170. Reprint, with additions and slight changes. <3d Ann. Rept. State Ent. Mo., April, 1871, pp. 68-69, fig. 28.
Treats of *Spilosoma virginica*; see No. 1301 for synopsis of contents.
1203. [RILEY, C. V.] The Walsh entomological cabinet. <Amer. Ent. and Bot., July-August, 1870, v. 2, p. 275.
Remarks on the purchase and disposal of the entomological collection of B. D. Walsh.

1204. [RILEY, C. V.] The currant-worm! <Amer. Ent. and Bot., July-August, 1870, v. 2, p. 275.
Comments upon the confusing way in which some horticultural publications treat of the currant-worm, without discrimination of species.
1205. [RILEY, C. V.] Water larva. <Amer. Ent. and Bot., July-August, 1870, v. 2, p. 275.
Answer to inquiry of F. Mather; habits of the larvæ of *Ephemeridæ*.
1206. [RILEY, C. V.] Large black potato-beetles. <Amer. Ent. and Bot., July-August, 1870, v. 2, p. 275.
Answer to inquiry of R. S. Elliott; *Epicauta corvina*? injuring potato-vines in Kansas.
1207. [RILEY, C. V.] Destroying cherry plant-lice. <Amer. Ent. and Bot., July-August, 1870, v. 2, p. 275.
Answer to inquiry of G. C. Brackett; means against *Myzus cerasi*.
1208. [RILEY, C. V.] Caterpillars on grape-vines. <Amer. Ent. and Bot., July-August, 1870, v. 2, p. 275.
Answer to inquiry of G. A. Watson; larvæ of *Alypia octomaculata* and *Acronycta oblongata* found on grape-vines; food-plants of the latter species.
1209. [RILEY, C. V.] Ash-gray blister-beetle. <Amer. Ent. and Bot., July-August, 1870, v. 2, p. 275.
Answer to inquiry of P. H. Foster; *Lytta cinerea* [= *Macrobasis unicolor*] feeding on the three-thorned Acacia.
1210. [RILEY, C. V.] Specimens lost. <Amer. Ent. and Bot., July-August, 1870; v. 2, p. 276.
Answer to inquiry of C. H. Roberts; food-habits and description of larva of *Gortyna nitela* and of an undetermined moth on peach-trees.
1211. [RILEY, C. V.] White willow worm. <Amer. Ent. and Bot., July-August, 1870, v. 2, p. 276.
Answer to inquiry of S. H. K.; food-plants and description of larva of and means against *Nematus ventralis*.
1212. [RILEY, C. V.] Bark-lice on grape-vine and raspberry saw-fly. <Amer. Ent. and Bot., July-August, 1870, v. 2, p. 276.
Answer to inquiry of S. Thompson; *Lecanium* [= *Pulvinaria*] *vitis* common on grape-vines in Europe and North America; its oviposition and occurrence in Illinois; description and means against the larva of *Selandria* [= *Monophadnus*] *rubi*.
1213. [RILEY, C. V.] Apple-tree borer; variations in the two-striped Saperda. <Amer. Ent. and Bot., July-August, 1870, v. 2, p. 276.
Answer to inquiry of D. B. Wier; colorational variations in *Saperda bivittata* [= *candida*]; abundance and ravages of *Capsus oblineatus* [= *Lygus pratensis*].
1214. [RILEY, C. V.] The plum Curculio breeds in apple. <Amer. Ent. and Bot., July-August, 1870, v. 2, p. 276.
Answer inquiry of E. Leming; *Conotrachelus nenuphar* breeds in the fruit of apple.

1215. [RILEY, C. V.] Cecropia worm. <Amer. Ent. and Bot., July-August, 1870, v. 2, p. 276.
Answer to inquiry of J. F. Thompson; occurrence and ravages of the larva of *Attacus cecropia* on apple-trees.
1216. [RILEY, C. V.] Gigantic rhinoceros beetle. <Amer. Ent. and Bot., July-August, 1870, v. 2, p. 276.
Answer to inquiry of L. G. Saffer; variations in coloration of *Dynastes tityus*.
1217. [RILEY, C. V.] Roman-nosed pupa. <Amer. Ent. and Bot., July-August, 1870, v. 2, p. 276.
Answer to inquiry of E. D. Van Winkle; food-habits of *Limenitis ursula* and *L. disippus*; the pupæ of the two species are alike.
1218. [RILEY, C. V.] The onward march of the Colorado potato-beetle. A word to our Canadian neighbors. <Amer. Ent. and Bot., September, 1870, v. 2, pp. 289-291, fig. 181.
Remarks on the spread of *Doryphora decemlineata* into Ontario, and means of checking it; efficacy and proper use of Paris green; other remedies; *Lebia grandis* a natural enemy of the larvæ.
1219. [RILEY, C. V.] The tarnished plant-bug. (*Capsus oblineatus*, Say). <Amer. Ent. and Bot., September, 1870, v. 2, pp. 291-293, fig. 182. Reprinted, with additions and slight changes, from <2d Ann. Rept. State Ent. Mo., March, 1870, pp. 113-115, fig. 83.
Treats of *Capsus oblineatus* [= *Lygus pratensis*]; see No. 1127 for synopsis of contents.
1220. [RILEY, C. V.] Osage orange for the mulberry silk-worm. <Amer. Ent. and Bot., September, 1870, v. 2, p. 293.
Reprint and critical review of S. Cornaby's article on the above; important articles should not be published anonymously.
1221. [RILEY, C. V.] Insects injurious to the grape-vine. No. 11. <Amer. Ent. and Bot., September, 1870, v. 2, p. 295, fig. 185. Reprint with slight changes. <3d Ann. Rept. State Ent. Mo., April, 1871, pp. 77-79, fig. 34.
Treats of *Pelidnota punctata*; see No. 1301 for synopsis of contents.
1222. [RILEY, C. V.] The slug on pear and cherry trees. <Amer. Ent. and Bot., September, 1870, v. 2, p. 296.
Reprint and critical review of "Addi" on the above; ravages of and means against *Selandria* [= *Eriocampa*] *cerasi*.
1223. [RILEY, C. V.] Appendix to joint-worm article published in vol. 1, No. 8 <Amer. Ent. and Bot., September, 1870, v. 2, pp. 296-297.
Introduction to and explanation of the preparation and publication of Walsh's *Eurytomides*. See No. 384.
1224. [RILEY, C. V.] Entomology indeed run mad! <Amer. Ent. and Bot., September, 1870, v. 2, p. 305.
Critical review of Mark Miller's article on the currant-worm; *Nematus ventricosus* [= *ribesii*] confounded with *Eufitchia ribecaria*.
1225. [RILEY, C. V.] Red spider. <Amer. Ent. and Bot., September, 1870, v. 2, p. 305.
Ravages and transformations of *Tetranychus telarius*.

1226. [RILEY, C. V.] Insects named. <Amer. Ent. and Bot., September, 1870, v. 2, p. 306.

Answer to inquiry of J. K. Kidd; food-habits of *Silpha peltata* [= *americana*] and allied forms, of *Calosoma scrutator* and of *Laphria* [= *Dasyllis*] *thoracica*; mimicry between *Laphria* and *Bombus* and its use.

1227. [RILEY, C. V.] Caterpillar of white-marked tussock moth. <Amer. Ent. and Bot., September, 1870, v. 2, p. 306, fig. 186.

Answer to inquiry of G. C. Brackett; figure of larva and description of imago of *Orgyia leucostigma*; posture of male in repose; habits of female; *Saperda bivittata* [= *candida*] usually perishes if it has not changed to a pupa before the death of the tree; *Chrysobothris femorata* lives for weeks on dead wood.

1228. [RILEY, C. V.] Does the apple Curculio go underground to transform? <Amer. Ent. and Bot., September, 1870, v. 2, p. 306.

Answer to inquiry of W. Muir; *Anthonomus quadrigibbus* transforms within the fruit; it does not attack stone fruit.

1229. [RILEY, C. V.] Walnut caterpillars. <Amer. Ent. and Bot., September, 1870, v. 2, p. 306.

Answer to inquiry of G. M. Levette; seasons, habits, and food-plant of and means against *Datana ministra*; description of larva.

1230. [RILEY, C. V.] Striped blister-beetle. <Amer. Ent. and Bot., September, 1870, v. 2, p. 306, fig. 187.

Answer to inquiry of A. Galt; means against *Epicauta vittata* and other *Meloidæ* on potato vines; figure of *Epicauta vittata*.

1231. [RILEY, C. V.] Grape-vine Fidia. <Amer. Ent. and Bot., September, 1870, v. 2, p. 307, fig. 188.

Answer to inquiry of J. Hetzel; habits, ravages, and food-plants of and means against *Fidia viticida*; figure of this species.

1232. [RILEY, C. V.] Some interesting insects. <Amer. Ent. and Bot., September, 1870, v. 2, p. 307.

Answer to inquiry of A. S. Fuller; ravages of *Bruchus obsoletus* in Lima beans; of *Butalis cerealella* in flint corn in stems and of *Lobesia* [= *Endemis*] *botrana* in blossoms of blackberry; description of the larva case of *Phycita nebulo* [= *Acrobasis indiginella*] and of galls of *Cecidomyia tubicola* on *Carya*.

1233. [RILEY, C. V.] The green hag-moth. <Amer. Ent. and Bot., September, 1870, v. 2, p. 307.

Answer to inquiry of S. B. Shaw; food-plants, and synonymy of *Callochloa viridis* [= *Parasa chloris*]; description of larva and imago; the larva described by Reakirt does not belong to this species.

1234. [RILEY, C. V.] The antiopa butterfly. <Amer. Ent. and Bot., September, 1870, v. 2, p. 307.

Answer to inquiry of A. S. Moss; description of larva and imago of *Vanessa antiopa*; the larva feeds on willow; vernacular name and comparative abundance.

1235. [RILEY, C. V.] Rose-gall and pupa of archippus butterfly. <Amer. Ent. and Bot., September, 1870, v. 2, p. 307, fig. 189.

Answer to inquiry of L. B. Custar; figure of pupa of *Danaïs archippus*; descriptions of three undetermined galls on rose-leaf formed by *Rhodites* sp.?

1236. [RILEY, C. V.] White grubs in strawberry beds. <Amer. Ent. and Bot., September, 1870, v. 2, p. 307.
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1237. [RILEY, C. V.] Larva of the thoas swallow-tail. <Amer. Ent. and Bot., September, 1870, v. 2, p. 308.
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1238. [RILEY, C. V.] Larva of clubbed tortoise-beetle. <Amer. Ent. and Bot., September, 1870, v. 2, p. 308.
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1244. [RILEY, C. V.] Small reddish snout-beetle on apple. <Amer. Ent. and Bot., September, 1870, v. 2, p. 30.
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1245. [RILEY, C. V.] Prickly rose-gall. <Amer. Ent. and Bot., September, 1870, v. 2, p. 309, fig. 192.
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1246. [RILEY, C. V.] Questions answered. <Amer. Ent. and Bot., September, 1870, v. 2, p. 309.
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1255. [RILEY, C. V.] Insects injurious to the grape-vine. No. 12. <Amer. Ent. and Bot., October, 1870, v. 2, pp. 327-328, figs. 204-205. Reprint, with slight changes: <3d Ann. Rept. State Ent. Mo., April, 1871, pp. 79-81, figs. 35, 36; Cultivator and Country Gentleman, 1 June, 1871, v. 36, p. 343.
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1283. [RILEY, C. V.] The so-called web-worm of young trout. <Amer. Ent. and Bot., December, 1870, v. 2, pp. 366-367.
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1292. [RILEY, C. V.] Gigantic rhinoceros beetle. <Amer. Ent. and Bot., December, 1870, v. 2, p. 374, fig. 224.
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1300. [RILEY, C. V.] Sugaring for moths; preserving larvæ. <Amer. Ent. and Bot., December, 1870, v. 2, p. 374.
Answer to inquiry of H. S. Boutwell; occurrence of *Papilio thoas* [= *cresphontes*] in Illinois; directions for the preparation of a fluid for preserving caterpillars.

1301. RILEY, C. V. Third annual report on the noxious, beneficial, and other insects of the State of Missouri, made to the State Board of Agriculture, pursuant to an appropriation for this purpose from the legislature of the State. <6th Ann. Rept. State Board of Agric. for 1870, April, 1871, pp. 176+7, 73 figs. Separate: Jefferson City, Mo., April, 1871, pp. 176+7, 73 figs.

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1302. RILEY, C. V. Snout-beetles injurious to fruits. <Trans. Ill. Hort. Soc. for 1870, 1871, n. s., v. 4, pp. 89–124, figs. 1–11. Reprint, with additions and omissions: <3d Ann. Rept. State Ent. Mo., April, 1871, pp. 5–44, figs. 1, 3, 4, 7–14.

See No. 1301 for synopsis of contents.

1303. RILEY, C. V. Bark-lice on rose bushes. <Moore's Rural New Yorker, 24 June, 1871, v. 23, p. 393. S.-b. No. 4, p. 3.

Answer to inquiry of W. A. French; occurrence of and means against *Lecanium rosæ* [= *oleæ*] and *Diaspis rosæ* on rose bushes.

1304. RILEY, C. V. Canker-worms; not army-worms. <Moore's Rural New Yorker, 24 June, 1871, v. 23, p. 393.

1305. RILEY, C. V. How to distinguish between *Limenitis disippus* Godt., and *L. ursula* Fabr., in their preparatory states. <Ca. Ent., July, 1871, v. 3, pp. 52–53, fig. 24.

Description and figures of structural characters distinguishing the larva and pupa of *Limenitis disippus* from those of *L. ursula*; see No. 1306.

1306. RILEY, C. V. Friendly notes. <Ca. Ent., September, 1871, v. 3, pp. 117–119.

Distinctive structural characters of pupæ of *Limenitis disippus* and *L. ursula*; criticism of W. Couper's articles; description, food, and habits of *Gelechia* [= *Holcocera*] *glandulella* n. sp.; review of statements concerning the dimorphism of *Grapta interrogationis*.

1307. RILEY, C. V. Friendly criticism. <Gardener's Mo. and Hort., November, 1871, v. 13, p. 341.

Inefficacy of the roller remedy for potato-beetles and grasshoppers; identifies "*Melolontha philophaga*" as *Lachnosterna quercina* [= *fusca*].

1308. RILEY, C. V. Parasites on fowls. The chicken mite. <Moore's Rural New Yorker, 16 December, 1871. S.-b. No. 5, p. 31.

Answer to inquiry of H. Hales; injuries to fowls caused by *Dermanyssus gallinæ*? [= *avium*].

1309. RILEY, C. V. The American Entomologist. <Cultivator and Country Gentl., 21 December, 1871, v. 36, p. 809. Reprint: <Gardener's Mo. and Hort., January, 1872, v. 14, p. 23. <Ca. Ent., January, 1872, v. 4, p. 19.

Announcement of the continued suspension of publication of the American Entomologist.

1309a. [RILEY, C. V.] (*Ixodes bovis*.) <Rept. Comm. of Agric. on the diseases of cattle. Washington, 1871, p. 118, fig.

Description and figure of *Ixodes bovis* n. sp.

1310. RILEY, C. V. The acorn moth. *Holcocera glandulella*, n. sp. <Ca. Ent., January, 1872, v. 4, pp. 18, 19.

Description of larva and imago of *Holcocera glandulella* n. sp.; habits of larva; food-plant and description of larva of *Balaninus rectus*.

1311. RILEY, C. V. Fourth annual report on the noxious, beneficial, and other insects of the State of Missouri, made to the State Board of Agriculture, pursuant to an appropriation for this purpose from the legislature of the State. <7th Ann. Rept. State Board of Agric. for 1871, April, 1872, pp. 146+6, 66 figs. Separate: <Jefferson City, Mo., April, 1872, pp. 146+6, 66 figs. Notice: <Horticulturist, August, 1872, v. 27, p. 251. <Ent. Mo. Mag., July, 1872, v. 9, p. 47.

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* Extract in <Sci. Amer., 25 May, 1872, v. 25, p. 351.

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1312. RILEY, C. V. Thomas Wier's apple-worm trap. <Amer. Agric., April, 1872, v. 31, pp. 142-143, 1 fig.
 Description and figure of Wier's apple-worm trap.
1313. [RILEY, C. V.] Remarkable parasitic fungus. <Sci. Amer., 25 May, 1872 [v. 40], n. s., v. 26, p. 347.
 Description and figure of unidentified fungus infesting the larva of the white grub, *Lachnosterna fusca*.
1314. RILEY, C. V. Cut-worm lion. <Colman's Rural World, 15 June, 1872, fig. S.-b. No. 5, p. 47.
 History of the larva and imago of *Calosoma calidum*, an enemy to cut-worms.
1315. RILEY, C. V. Cut-worms. <Cultivator and Country Gentleman, 20 June, 1872, v. 37, p. 392.
 Dandelions and other weeds furnish food for young cut-worms which hatch in the fall; land should be kept clear of weeds at that season.
1316. RILEY, C. V. Flat-headed apple tree-borer in horse chestnut. <Colman's Rural World, 22 June, 1872, fig. S.-b. No. 5, p. 47.
 Answer to inquiry of S. S. R.; natural history of larva and imago of *Chrysobothris femorata*.
1317. RILEY, C. V. A new insect. <Western Planter, 29 June, 1872. S.-b. No. 5, p. 49.
 Answer to inquiry of F. Halsinger; *Nysius* n. sp., very destructive to potatoes.
1318. RILEY, C. V. Codling-moth; jarring down infested fruit. <Cultivator and Country Gentleman, 4 July, 1872, v. 37, p. 422.
 Excrement outside of the fruit indicates the exit of the worm, with some varieties; with others the worm may be often found after the excrements are visible.

1319. RILEY, C. V. Food for silkworms. <Colman's Rural World, 13 July, 1872. S.-b. No. 5, p. 40.
Osage orange superior to red-mulberry.
1320. RILEY, C. V. The apple maggot-fly, *Trypeta pomonella* Walsh. <Amer. Agric., July, 1872, v. 31, pp. 263-264, 2 figs.
Answer to letter of J. H. Spatter; comparative descriptions and figures of larvæ, pupæ, and imagos of *Trypeta pomonella* and *Carpocapsa pomonella*; figures showing injuries of both species; distribution and means against *Trypeta pomonella*.
1321. RILEY, C. V. Worms on Dutchman's pipe. <Colman's Rural World, 3 August, 1872, fig. S.-b. No. 5, p. 136.
Answer to inquiry of J. T. C.; life-history of *Papilio philenor*.
1322. RILEY, C. V. Apple-leaf worm. The apple-leaf skeletonizer. <Colman's Rural World, 10 August, 1872, fig. S.-b. No. 5, p. 138.
Answer to inquiry of L. R. Bryant; habits and times of appearance of *Pempelia hammondi*.
1323. RILEY, C. V. Eggs in grape-canec and apple-twigs. <Amer. Agric., August, 1872, v. 31, p. 302, figs. 1-7.
Figures of eggs and of twigs punctured by *Orocharis saltator*, *Acanthus niveus*, and *Ceresa bubalus*; figures imagos of the same; habits, descriptions of eggs, and imagos of the three species.
1324. RILEY, C. V. Borers in evergreens. <Gardener's Mo. and Hortic., December, 1872, v. 14, p. 373.
Larvæ of *Monohammus titillator* the worst enemy of the white-pine; another species of *Cerambycidæ* injurious to red-cedars; a host of bark-borers affect all kinds of evergreens.
1325. RILEY, C. V. Einige unserer schädlicherer Insekten. <St. Louis, Mo., 1872, p. 35, il. S.-b. No. 19, pp. 174-190.
Causes of the decadence of viticulture in the United States; habits, ravages, specific identity, and figures of several stages of the leaf-inhabiting and root-inhabiting forms of *Phylloxera vastatrix*; identity of the European and American grape *Phylloxera*; susceptibility of the different species of grape to the attacks of the same; principal manifestations of attack; preventive and remedial measures; description and figures of *Conotrachelus nenuphar*; habits, ravages, parasites, enemies, and means against it; description of Ransom's trap, Hull's, Ward's, and Hooten's machines for capturing the imagos; figures of the machines. Natural history, food-plants, distribution, enemies, parasites, and means against *Doryphora decemlineata*; figures of all stages of the same; use of Paris green and other powders; mechanical devices for collecting the insects.
1326. RILEY, C. V. Harvest mites. <Amer. Nat., January, 1873, v. 7, pp. 16-19, fig. 5. Extract: <Colman's Rural World, 21 June, 1876, 2 figs. S.-b. No. 10, pp. 170, 171.
List of insect parasites on man; description, figures, habits of and means against *Leptus* [= *Tetranychus*] *americanus* n. sp. and *L.* [= *T.*] *irritans* n. sp.
1327. RILEY, C. V. *Vanessa antiopa*. <Ent. Mo. Mag., January, 1873, v. 9, p. 195.
Habits and food-plants of *Vanessa antiopa*.

1328. RILEY, C. V. Entomological correction. <Cultivator and Country Gentleman, 6 March, 1873, v. 38, p. 149.

Lema trilineata does not occur in southwestern Missouri, as stated by W. R. Howard.

1329. RILEY, C. V. Fifth annual report on the noxious, beneficial, and other insects of the State of Missouri, made to the State Board of Agriculture, pursuant to an appropriation for this purpose from the legislature of the State. <8th Ann. Rept. State Board of Agric. for 1872, 18 April, 1873, pp. 160+8, 75 figs. Separate: <Jefferson City, Mo., 18 April, 1873, pp. 160+8, 75 figs. Review by A. S. Packard, jr.: <Amer. Nat., August, 1873, v. 7, pp. 471-477, figs. 115-130. Reply to Packard and rejoinder by Packard: <Amer. Nat., March, 1874, v. 8, pp. 181-188.

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NOTE.—Pages 1-44 were also printed as a separate, with title-page cover.
 <Jefferson City, Mo., 1873. S.-b. No. 19, pp. 150-173.

1330. RILEY, C. V. New York without a State entomologist. <Moore's Rural New Yorker, 5 May, 1873. S.-b. No. 8, p. 103.

Needs of a State entomologist for New York; *Salix humilis* infested with larva of *Plectrodera scalator*.

1331. RILEY, C. V. Tent-caterpillar of the forest. <N. Y. Tribune, 23 May, 1873. S.-b. No. 8, pp. 64-65.

Answer to inquiry of S. T. Gilbert; means against eggs of *Clisiocampa sylvatica* [= *disstria*].

1332. RILEY, C. V. Apple-tree borer. <N. Y. Tribune, 23 May, 1873, S. b. No. 8, p. 64.

Answer to inquiry of J. Durbin; means against *Saperda bivittata* [= *candida*].

1333. RILEY, C. V. Punctured grape-canec. <N. Y. Tribune, 23 May, 1873. S.-b. No. 8, p. 64.

Answer to inquiry of E. Snyder; food-habits and means against *Ecanthus niveus*.

1334. RILEY, C. V. The codling-moth. Weir's trap. <Amer. Agric., May, 1873, v. 32, p. 184, figs.

Unsatisfactory results of experiments with the Weir trap; relative value of materials used; criticism of J. S. Parker's theory for the extermination of *Carpocapsa pomonella*; this species breeds in apples, wild crabs, pears, peaches, and plums; figures females and the abdomen of the males of *Pimpla annulipes* and *Macrocentrus delicatus* parasitic upon the apple-worm.

1335. RILEY, C. V. Influence of extreme cold on the Curculio. <Gardener's Mo. and Hortie., May, 1873, v. 15, pp. 137-139.

Critical review of T. T. Southwick's article of same title; extract from 3d Ann. Rept. State Ent. Mo.

1336. RILEY, C. V. On a new genus in the lepidopterous family *Tineida*, with remarks on the fertilization of *Yucca*. <Trans. Acad. Sci. St. Louis, June, 1873, v. 3, pp. 55-64, 2 figs. Reprinted, with omissions and slight changes, from <5th Ann. Rept. State Ent. Mo., 18 April, 1873, pp. 150-160, figs. 74-75. Review by P. C. Zeller: <Verh. k.-k. zool.-bot. Ges. Wien, 1876, Jahrg. 1875, Bd. 25, pp. 340-342. Reply to Zeller: <Trans. Acad. Sci. St. Louis, January-March, 1876, v. 3, pp. 325-326.

Description and figures of *Pronuba* n. g. and of larva and imago of *P. yuccasella* n. sp. See No. 1329 for synopsis of contents.

1337. RILEY, C. V. Supplementary notes on *Pronuba yuccasella*. <Trans. Acad. Sci. St. Louis, June, 1873, v. 3, pp. 178-180, fig. 3. Extract: <6th Ann. Rept. State Ent. Mo., April, 1874, pp. 131-135, fig. 3.

Descriptions and figures of male and female pupa of *Pronuba yuccasella*; hibernation, imagination, seasons, and distribution of the same; species of *Yucca* pollinated by it.

1338. RILEY, C. V. [To destroy the cotton-worm.] <Ill. Jour. of Agric., June, 1873. Reprint: <Colman's Rural World, 1873; <Rural Alabamian, July, 1873, v. 2, pp. 289-293; <Mobile Register, 1873; <Farmer's Advocate, 1873. Extract: <6th Ann. Rept. State Ent. Mo., 1874, pp. 17-18.

Ravages of *Aletia argillacea* [= *xylina*] in the cotton fields of Southern United States; inefficiency of measures hitherto employed against them; recommends the use of Paris green; directions for its use; natural history, description of egg, larva, and imago of the *Aletia*; hibernation of the imago.

1339. RILEY, C. V. [Imported plants and insects.] <Trans. Acad. Sci. St. Louis, July, 1873, v. 3, pp. 42-43 Proc.

Verbal communication; inequality of the exchange of plants and insects between Europe and North America; extent and causes of the same.

1340. RILEY, C. V. [Mimicry and protective resemblances.] <Trans. Acad. Sci. St. Louis, July, 1873, v. 3, pp. 44-45 Proc.

Verbal communication; mimicry of *Danaus archippus* by *Limenitis disippus* and consequent greater abundance of the latter than of *L. ursula*.

1341. RILEY, C. V. [Silk-worms fed with osage orange.] <Trans. Acad. Sci. St. Louis, July, 1873, v. 3, p. 47 Proc.

Verbal communication; successful rearing of silk-worms on *Maclura aurantiaca*; exhibition of cocoons made by these worms.

1342. RILEY, C. V. [On the cause of deterioration in some of our native grape-vines.] <Trans. Acad. Sci. St. Louis, July, 1873, v. 3, pp. 51-52 Proc.

Verbal communication; abstract from 4th Ann. Rept. State Ent. Mo.; failure of grape-vines attributed largely to the ravages of *Phylloxera vastatrix*.

1343. RILEY, C. V. [Insects affecting the ailanthus.] <Trans. Acad. Sci. St. Louis, July, 1873, v. 3, pp. 53-54 Proc.

Mentions *Æta compta* [= *punctella*] and *Attacus cyntia*.

1344. RILEY, C. V. [Posthumous papers by B. D. Walsh.] <Trans. Acad. Sci. St. Louis, July, 1873, v. 3, p. 77 Proc.
Verbal communication; disposition of sundry entomological manuscripts left by B. D. Walsh.
1345. RILEY, C. V. [Remarks on *Simulium piscicidium*.] <Trans. Acad. Sci. St. Louis, July, 1873, v. 3, p. 79 Proc.
Verbal communication; nature and supposed ravages of *Simulium piscicidium*.
1346. RILEY, C. V. [On *Antheræa yama-mai* as a silk-producer.] <Trans. Acad. Sci. St. Louis, July, 1873, v. 3, p. 84 Proc.
Verbal communication; superiority of *Antheræa yama-mai* to other silkworms tried as substitutes for *Sericaria mori*.
1347. RILEY, C. V. [On galls growing on wild sage.] <Trans. Acad. Sci. St. Louis, July, 1873, v. 3, p. 84 Proc.
Verbal communication; occurrence of three distinct undescribed galls on *Artemisia tridentata* in Utah.
1348. RILEY, C. V. [On a larva of *Scenopinus* sp. from the human lungs.] <Trans. Acad. Sci. St. Louis, July, 1873, v. 3, p. 90 Proc.
Verbal communication; a larva of *Scenopinus* sp. found in human expectoration; usual food-habits of the larvæ of this genus.
1349. RILEY, C. V. Agricultural editorial excursion. <Prairie Farmer, 1873, v. 44: 2 August, p. 241; 9 August, p. 248; 16 August, p. 256; 23 August, p. 265; 30 August, p. 273; 6 September, p. 281. Reprint: <Colman's Rural World, 1873, 2, 9, 16, 23, and 30 August, 6 and 13 September. See: <Colorado Mountaineer, 1 August, 1877. S.-b. No. 14, p. 102.
Brief notes on locusts.
1350. RILEY, C. V. Enemies of the elm. <N. Y. Tribune, 7 August, 1873. S.-b. No. 8, pp. 56-57. Reprint: <Gardener's Mo. and Hortic., August, 1876, v. 18, p. 246.
Answer to inquiry of T. S. Watson; natural history of and means against *Galeruca californiensis* [= *xanthomelæna*].
1351. RILEY, C. V. Entomological information. <N. Y. Tribune, 16 August, 1873. S.-b. No. 8, p. 58.
Answer to inquiry of J. W.; description of a number of traps for alluring and destroying insects.
1352. RILEY, C. V. "Controlling sex in butterflies." <Amer. Nat., September, 1873, v. 7, pp. 513-521. Separate: <Salem, Mass., August, 1873, pp. 9.
Critical review of Mary Treat's article of same title; females require more nourishment than males; sex determined in the egg; oviposition of *Papilio* and *Anisota* [= *Dryocampa*]; larvæ can not be forced to eat more than is natural to them; experiments on *Thyridopteryx ephemæraformis*, *Orgyia leucostigma*, *Clisiocampa americana*, *Hyperchiria io*, *Hemileuca maia*, and *Anisota* [= *Dryocampa*] *rubicunda* to determine the effect of the stinting of food upon the determination of sex; effect of this upon the number of molts and the longevity of *Orgyia leucostigma* and *Megatoma serra*; note on alternation of generations in *Cynips* [= *Andricus*] *quercus-operator* and *C.* [= *A.*] *quercus-operatola*; nature of parthenogenesis.

1353. RILEY, C. V. Cotton caterpillar.—Boll-worm. <Rural Alabamian, October, 1873. S.-b. No. 16, p. 121.

Criticism of recent articles on *Anomis* [= *Aletia*] *xylina*, *Heliothis armigera*, and *Phylloxera vastatrix*.

1354. RILEY, C. V. On the oviposition of the Yucca moth. <Amer. Nat., October, 1873, v. 7, pp. 619–623. Abstract: <Trans. Acad. Sci. St. Louis, 10 December, 1873—25 April, 1874, v. 3, pp. 208–210. Reprint, with slight changes and omissions. <6th Ann. Rept. State Ent. Mo., April, 1874, pp. 131–135, fig. 38.

See No. 1363 for synopsis of contents.

1355. RILEY, C. V. *Phylloxera*: correction. <Gardener's Mo. and Hortic., November, 1873, v. 15, p. 342.

Critical review of report of remarks before Academy of Natural Sciences of Philadelphia.

1356. RILEY, C. V. Hackberry butterflies. Descriptions of the early stages of *Apatura lycaon*, Fabr., and *Apatura herse*, Fabr.; with remarks on their synonymy. <Trans. Acad. Sci. St. Louis, 10 December, 1873, v. 3, pp. 193–208, figs. 3–6. Reprint, with slight changes. <6th Ann. Rept. State Ent. Mo., April, 1874, pp. 136–148, figs. 39–42.

Treats of *A. lycaon* [= *celtis*] and *A. herse* [= *clyton*]. See No. 1363 for synopsis of contents.

1357. RILEY, V. C. Economic entomology. <Trans. Kansas State Board Agric. for 1872, 1873, pp. 292–325, 18 figs.

Extract: <Sci. Amer.

Characterization of entomology; importance of and means against noxious insects; list of imported noxious insects and plants; chapters on *Anisota* [= *Dryocampa rubicunda*], *Eriosoma pyri* [= *Schizoneura lanigera*], *Paleacrita vernata*, *Galleria cereana*, *Æstrus ovīs*, *Bruchus pisi*, *Macroductylus subspinosus*, *Conotrachelus nenuphar*, and *Nysius destructor* [= *angustatus*]. In general, descriptions and figures of the several stages and accounts of the habits and food-plants of and means against these insects, with some accounts and figures of their enemies and parasites, are given. Describes especially larva of *Anisota* [= *D.*] *rubicunda* and of *Paleacrita vernata* and of all active stages of *Nysius destructor* [= *angustatus*]. Figures larva, puparium, and imago of *Pipiza radicum*, imagos of *Nothrus ovivorus*, *Microgaster* [= *Apanteles*] *militaris*, *Calosoma scrutator*, *C. calidum*, and *Blissus leucopterus* and imago and nests of *Eumenes fraternus*.

Some of the chapters are based upon and some are reprinted from the 1st, 2d, and 3d Ann. Repts. State Ent. Mo.

1358. RILEY, C. V. Curculios on pears. <Ill. Journ. Agric., 1873. S.-b. No. 16, pp. 109–110, figs. 1–2.

Habits, history, and means against *Conotrachelus nenuphar*, *C. cratægi*, and *Anthonomus quadrigibbus*; figures the two last-named species.

1359. RILEY, C. V. Length of thread of the silk-worm. <Popular Sci. Monthly, February, 1874, v. 4, p. 508.

Correction of statements in A. de Quatrefage's "Silk-worms and sericulture" as to the length and weight of the fiber in a single cocoon of *Sericaria mori*.

1360. RILEY, C. V. A new (?) ægerian maple-borer. <Amer. Nat., February, 1874, v. 8, pp. 123-124.

Critical review of P. Gennadius's "A new ægerian maple-borer." *Trochilium acericolum* is the well-known *Ægeria aceris*, injurious to maple-trees.

1361. RILEY, C. V. Entomology in Missouri. <Amer. Nat., March, 1874, v. 8, pp. 181-188.

Reply to criticisms of A. S. Packard; discussion on the number of segments in the head of an insect, on classification, and on *Mytilaspis pomicorticis* [= *pomorum*].

1362. RILEY, C. V. Economic entomology. <Amer. Nat., March, 1874, v. 8, pp. 189-190.

Demand for more attention to and better representation of the agricultural interests of the country. Inadequacy of measures propounded for the wholesale destruction of noxious insects.

1363. RILEY, C. V. Sixth annual report on the noxious, beneficial, and other insects of the State of Missouri, made to the State Board of Agriculture, pursuant to an appropriation for this purpose from the legislature of the State. <9th Ann. Rept. State Board of Agric. for 1873, March, 1874, pp. 169+12, 55 figs. Separate: <Jefferson City, Mo., March, 1874, pp. 169+12, 55 figs.

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1364. RILEY, C. V. The Colorado potato-beetle abroad. <N. Y. Tribune, 1 April, 1874. S.-b. No. 10, p. 37.

Criticism of some articles on *Doryphora decemlineata* published in Europe; danger of the importation of the insect into Europe, and suggestion of means to prevent such introduction.

1365. RILEY, C. V. Cabbage-lice. <N. Y. Tribune, 8 April, 1874. S.-b. No. 10, pp. 33-34.

Answer to letter from Mrs. M. Walker; means against *Aphis brassicae*.

1366. RILEY, C. V. Peach-borers. <N. Y. Tribune, 8 April, 1874. S.-b. No. 10, p. 34.

Answer to letter from W. J. Clary; a peach-tree whose base was surrounded by ice in winter was free from borers; this observation of slight significance.

1367. RILEY, C. V. Apply soap. <N. Y. Tribune, 8 April, 1874. S.-b. No. 10, p. 34.

Answer to letter from T. H. Wakeley; means against *Saperda bivittata* [= *candida*] and *Chrysobothris femorata*.

1368. RILEY, C. V. Meadow enemy. <N. Y. Tribune, 8 April, 1874. S.-b. No. 10, p. 34.

Answer to letter from D. Freeman; ravages of a species of *Tipula* in grass lands in California; characters of the genus; habits of and means against the same.

1369. RILEY, C. V. A remedy for the cotton-worm. <N. Y. Tribune, 22 April, 1874. S.-b. No. 10, pp. 25-26. Reprint: <Vicksburg Herald, 1 May, 1874.

Experiments with Paris green; advocacy of its use against *Aletia argillacea* [= *xylina*]; directions for and successful results of this use.

1370. RILEY, C. V. Descriptions of two new subterranean mites. <Trans. Acad. Sci. St. Louis, 25 April, 1874, v. 3, pp. 215-216, figs. 8-9.

Description and figures of *Tyroglyphus phylloxerae* n. sp. [p. 215] and of *Hoplophora arcata* n. sp. [p. 216]; food-habits of the same.

1371. RILEY, C. V. The habits of *Polistes* and *Pelopæus*. <Amer. Nat., April, 1874, v. 8, pp. 229-231.
Critical review of P. R. Uhler's article "On a remarkable wasp's nest found in a stump in Maryland;" probably the nests and specimens of *Pelopæus lunatus* [= *cementarius*] were mistaken for those of *Polistes fuscatus* [= *metricus*], in which case the observations criticised present no remarkable features.
1372. RILEY, C. V. The plum Curculio; natural history and how to catch him. <N. Y. Semi-weekly Tribune, 1 May, 1874. S.-b. No. 10, pp. 18-19; 38-40. Extract: <Cultivator and Country Gentleman, 14 May, 1874, v. 39, p. 310. <New England Farmer, 18 July, 1874, [v. 53,] n. s., v. 29, p. 1. See: <Indust. Record, 5 February, 1875. S.-b. No. 16, pp. 46-48.
Natural history of and means against *Conotrachelus nenuphar*; figures of the several stages of the insect and of machines for catching the same.
1373. RILEY, C. V. The apple-worm; natural history; remedies. <N. Y. Tribune, 20 May, 1874. S.-b. No. 10, pp. 8-9; 37-38.
Description and figures of the several stages of *Carpocapsa pomonella*; habits of and means against the same.
1374. RILEY, C. V. The grape Phylloxera. <Popular Sci. Monthly, May, 1874, v. 5, pp. 1-16, 7 figs. Reprinted, with slight changes, from <6th Ann. Rept. State Ent. Mo., April, 1874, pp. 30-46.
See No. 1363 for synopsis of contents.
1375. RILEY, C. V. Rose chafers on grape-vines. <Colman's Rural World, 20 June, 1874, fig. S.-b. No. 17, pp. 103, 104.
Natural history and means against *Macrodactylus subspinosus*; figure of the same.
1376. RILEY, C. V. More about the grape-vine pest. <Popular Sci. Monthly, June, 1874, v. 5, pp. 158-170, 10 figs. Reprinted, with changes and omissions, from <6th Ann. Rept. State Ent. Mo., April, 1874, pp. 47-60, 64-65.
See No. 1363 for synopsis of contents.
1377. RILEY, C. V. Scale insects on magnolia. <N. Y. Tribune, 15 July, 1874. S.-b. No. 10, p. 24.
Answer to inquiry of R. H. Day; occurrence of an undescribed *Lecanium* sp.? on the leaves of *Magnolia fuscata*.
1378. RILEY, C. V. Confounding friend with foe. <N. Y. Tribune, 15 July, 1874, 2 figs. S.-b. No. 10, p. 24.
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1379. RILEY, C. V. The Colorado potato-beetle in New York. <N. Y. Tribune, 15 July, 1874. S.-b. No. 10, p. 24.
Answer to letter from J. H. P.; eastern limit of the range of *Doryphora decemlineata* in 1873 and 1874.

1380. RILEY, C. V. Large willow-worm. <N. Y. Tribune, 15 July, 1874. S.-b. No. 10, p. 24.
Answer to letter of J. H. P.; food-plants, habits, and means against *Cimber laportei* [= *americana*].
1381. RILEY, C. V. Black blister-beetles on potatoes. <N. Y. Tribune, 22 July, 1874. S.-b. No. 10, p. 17.
Answer to inquiry of A. Barr; ravages of and means against *Epicauta puncticollis*.
1382. RILEY, C. V. Pear-tree slug. <N. Y. Tribune, 22 July, 1874. S.-b. No. 10, p. 17.
Answer to letter of C. S. B.; means against *Selandria* [= *Eriocampa*] *cerasi*.
1383. RILEY, C. V. The plug-ugly theory. <N. Y. Tribune, 22 July, 1874. S.-b. No. 10, p. 17.
Answer to letter of O. J. B.; insertion of sulphur, calomel, and similar powders in the trunks of trees has no effect upon the sap or upon the insects which injure the trees.
1384. RILEY, C. V. Cockscomb elm-gall. <N. Y. Tribune, 22 July, 1874. S.-b. No. 10, p. 17.
Answer to inquiry of J. S. Ruby; *Thelaxes* [= *Colopha*] *ulmicola* forms excrescences on the American elm.
1385. RILEY, C. V. Pitcher-plant insects. <Hartford [Conn.] Daily Courant, 15 August, 1874, v. 38, No. 195, p. 1. See: <N. Y. Tribune Extra: Lecture and Letter series No. 21, August, 1874, pp. 56-58, fig. Reprint: <Nature, 8 October, 1874, v. 10, pp. 463-465, figs. 1-2. Abstract: <Sci. Amer., 12 September, 1874 [v. 45], n. s., v. 31, p. 168. <Amer. Nat., November, 1874, v. 8, pp. 684-687. Reprint of abstract: <Hardwicke's Science Gossip, December, 1874, v. 10, pp. 272-275, figs. 179-182. Extract: <Ca. Ent., November, 1874, v. 6, pp. 207-214, figs. 25-26. Reprint of extract: <Proc. Amer. Assoc. Adv. Sci. for 1874, June, 1875, v. 23, pp. 18-25, 2 figs. Separate of reprint: <Salem, Mass., December, 1874, pp. 18-25, figs.
Insect-catching habits of *Sarracenia variolaris*; list of its victims; habits and figures of all stages of *Xanthoptera* [= *Exyra*] *semicrocea* and *Sarcophaga sarraceniæ*; capture of insects by other plants.
1386. RILEY, C. V. On the habits and transformations of *Canthon hudsonias*, Forst.; the common "tumbledung." <Hartford [Conn.] Daily Courant, 18 August, 1874, No. 11162, v. 38, No. 197, p. 2. Reprint: <N. Y. Tribune Extra: Lecture and Letter series, No. 21, August, 1874, pp. 75-76.
Breeding habits and oviposition of *Canthon hudsonias* [= *lævis*].
1387. RILEY, C. V. On the larval habits of the cantharid genera *Epicauta* and *Henous*. <Hartford [Conn.] Daily Courant, 18 August, 1874, No. 11162, v. 38, No. 197, p. 2. See: <N. Y. Tribune Extra: Lecture and Letter series, No. 21, August, 1874, p. 76.
Habits and hypermetamorphosis of *Meloe angusticollis*; probably parasitic food-habits of young larvæ of *Epicauta* and *Henous*; the imagoes phytophagous.

1388. RILEY, C. V. Humming-bird moths caught by the tongue. <Moore's Rural New Yorker, 29 August, 1874, v. 30, p. 140.
Method of capture of insects, particularly moths by the flowers of *Physianthus albens*; capture of insects by other flowers.
1389. RILEY, C. V. The io moth (*Saturnia io*). <Illust. Journ. Agric., August, 1874, figs.
Answer to inquiry of G. Barter; natural history of *Saturnia* [= *Hyperchiria*] *io*; figures larva and ♂ and ♀ imagos.
1390. RILEY, C. V. Descriptions and natural history of two insects which brave the dangers of *Sarracenia variolaris*. <Trans. Acad. Sci. St. Louis, 1 September, 1874, v. 3, pp. 235-240, figs. 10-11.
Description of leaf of *Sarracenia variolaris* and its function of entrapping and digesting insects; description and figures of eggs, larva, chrysalis, and imago of *Xanthoptera* [= *Exyra*] *semi-crocea* and larva, puparium and imago of *Sarcophaga sarraceniæ* n. sp.; habits of the two species; comparison of *S. sarraceniæ* with *S. carnaria* and of the genera *Musca*, *Calliphora*, and *Sarcophaga*; notice of A. S. Packard's "Transformation of the common house-fly."
1391. [RILEY, C. V.] [Discussion on entomology.] <Trans. Ill. State Hortic. Soc. for 1873, 1874, n. s., v. 7, pp. 100-104.
Description, habits, and means against *Anisopteryx*; effect of late plowing; enemies of *Doryphora 10-lineata*; habits of *Gastrophilus equi*.
1392. [RILEY, C. V.] Note on leaf-hopper. <Trans. Ill. State Hortic. Soc. for 1873, 1874, n. s., v. 7, p. 138.
Means against *Erythroneura* [= *Typhlocyba*] *vitis*.
1393. [RILEY, C. V.] [Notes on the strawberry crown borer.] <Trans. Ill. State Hortic. Soc. for 1873, 1874, n. s., v. 7, p. 147.
Description, habits, and means against *Tyloclerum fragariæ*.
1394. RILEY, C. V. Lecture on entomology. <Trans. Ill. Hortic. Soc. for 1873, 1874, n. s., v. 7, pp. 172-178, figs. 1-3. Reprint: <3d Ann. Rept. Sec. State Pomol. Soc. Mich. for 1873, 1874, pp. 443-448. Abstract: <Rept. U. S. Commis. Agric. for 1873, 1874, [30 March, 1875], pp. 389-390.
Habits of and means against *Carpocapsa pomonella*; habits, transformations, prolificacy of and means against *Phylloxera vastatrix*; description and figures of leaf-galls; figures of root- and gall-forms; history and meaning of the word "*Phylloxera*;" statement by D. B. Wier concerning the invention and use of Wier's apple-worm trap.
1395. RILEY, C. V. "Walking-sticks or specters" becoming injurious. <N. Y. Weekly Tribune, 11 November, 1874, fig. S. b. No. 23, p. 103.
Ravages in Yates County, N. Y., vernacular names, habits of, and means against *Diaperomera femorata*; description of its eggs; figure of imago.
1396. RILEY, C. V. Entomological notes. <Sci. Amer., 5 December, 1874 [v. 45], n. s., v. 31, p. 356.
Pemphigus imbricator found on beech; vesicatory potato-beetles, *Meloidæ*; cow manure and cow urine one of the earliest supposed remedies for *Phylloxera*.

1397. RILEY, C. V. The bark-louse. <Beach, A. E. The Science Record for 1874, N. Y., 1874, p. 356.
Discovery of the male of *Mytilaspis conchiformis* [= *pomorum*].
1398. RILEY, C. V. Codling-moth heresies. <N. Y. Tribune, 2 January, 1875. S.-b. No. 13, p. 163.
Criticism of paper of S. B. Peck; *Carpocapsa pomonella* confines its attacks to one apple and does not enter the ground.
1399. RILEY, C. V. Shall we scrape our trees? <N. Y. Tribune, 6 February, 1875. S.-b. No. 10, p. 10.
Careful scraping of trees early in spring is beneficial as a safeguard against the attacks of many injurious insects.
1400. RILEY, C. V. What are army-worms? <N. Y. semi-weekly Tribune, 6 February, 1875.
Differences between *Laphygma frugiperda* and *Leucania unipuncta*.
1401. RILEY, C. V. The hickory bark-borer, *Scolytus caryæ*. <Colman's Rural World, 6 February, 1875. S.-b. No. 17, p. 105.
Natural history of *Scolytus caryæ* [= *4-spinosus*].
1402. RILEY, C. V. Genuine vs. bogus chinch-bugs. <N. Y. Tribune, 10 February, 1875, figs. S.-b. No. 10, p. 10.
Answer to inquiry of C. H. Cushing; food-habits and figures of *Nysius destructor* [= *angustatus*] and *Blissus leucopterus*; larva of *Deilephila lineata* feeds on purslane.
1403. RILEY, C. V. Remedies for Phylloxera. <N. Y. Tribune, 10 February, 1875. S.-b. No. 10, p. 22.
At present no insecticide is effective against *Phylloxera vastatrix*; grafting of more susceptible varieties on the roots of the least susceptible advised.
1404. RILEY, C. V. Newest facts of grape Phylloxera. <N. Y. Tribune, 10 February, 1875. S.-b. No. 10, pp. 21-22.
Succession of different forms of individuals in the cycle of development of *Phylloxera* described; seasons at which the different forms appear; places in which eggs are laid by the winged females.
1405. RILEY, C. V. Is the Colorado beetle poisonous? <N. Y. Weekly Tribune, 17 February, 1875. S.-b. No. 10, p. 9.
Insists upon the poisonous nature of the fumes from scalded or burning masses of *Doryphora decemlineata*, in opposition to statements by Prof. T. J. Burrill.
1406. RILEY, C. V. Notes of Phylloxera. <N. Y. Tribune, 4 March, 1875. S.-b. No. 10, pp. 20-21.
Critical review of A. S. Fuller's "Distribution of the grape-louse;" maintains the specific identity of the so-called gall-inhabiting and root-inhabiting forms of *Phylloxera*, and the North American origin of this insect.
1407. [RILEY, C. V.] The Colorado potato-beetle abroad. <N. Y. Weekly Tribune, 17 March, 1875. S.-b. No. 10, pp. 14-15.
Statement and criticism of measures adopted by several European Governments to prevent the introduction of *Doryphora decemlineata* into their countries.

1408. RILEY, C. V. Bud-eating insects. <Cultivator and Country Gentleman, 25 March, 1875, v. 40, p. 183.
Habits, food-plants, and means against *Agrotis scandens*; means against field cut-worms.
1409. RILEY, C. V. Description of a new species of *Agrotis*. <Proc. Bost. Soc. Nat. Hist., March, 1875, v. 17, pp. 286-288.
Description of *Agrotis morrisoniana* n. sp. [p. 286].
1410. RILEY, C. V. On the summer dormancy of the larva of *Phyciodes nycteis*, Doubleday, with remarks on the natural history of the species. <Proc. Amer. Assoc. Adv. Sci. for 1874, 4 June, 1875, v. 23, pp. 108-112. Separate: <Salem, Mass., March, 1875, pp. 108-112. Abstract: <Hartford [Conn.] Daily Courant, 18 August, 1874, No. 11162, v. 38, No. 197, p. 2. See: <N. Y. Tribune Extra: Lecture and Letter series, No. 21, August, 1874, p. 75.
Observations on *Phyciodes nycteis* and *Argynnis bellona*; significance of the same; detailed description of the larva and pupa of *P. nycteis*.
1411. RILEY, C. V. Descriptions of two new moths. <Trans. Acad. Sci. St. Louis, 1 February [March], 1875, v. 3, pp. 240-242, figs. 12-13.
Descriptions and figures of *Xanthoptera* [= *Exyra*] *ridingsii* n. sp. and *Cerura multiscripta* n. sp.
1412. RILEY, C. V. The climate for *Doryphora*. <N. Y. Tribune, 2 April, 1875. S.-b. No. 10, p. 16.
Comments on letter from D. L. Garver; *Doryphora decemlineata* would be likely to thrive as well in the climates of Europe as in North America; its transportation across the ocean is not improbable.
1413. RILEY, C. V. [On an *Acridium* eaten out by ants.] <Trans. Acad. Sci. St. Louis, 6 April, 1875, v. 3, p. 102 Proc.
Verbal communication; inner soft parts of an *Acridium americanum* eaten out by *Myrmica minuta*.
1414. RILEY, C. V. [On the chrysalis of *Pronuba yuccasella*.] <Trans. Acad. Sci. St. Louis, 6 April, 1875, v. 3, p. 106 Proc.
Verbal communication; adaptation of pupa of *Pronuba yuccasella* to its needs of prying its ways through the soil.
1415. RILEY, C. V. [On regulating sex in insects.] <Trans. Acad. Sci. St. Louis, 6 April, 1875, v. 3, p. 108 Proc.
Verbal communication; critical review of Mrs. Treat's "Controlling sex in butterflies"; female insects need more nourishment than the males, but sex is determined in all animals at conception.
1416. RILEY, C. V. [On the peculiarities of *Nephila plumipes*.] <Trans. Acad. Sci. St. Louis, 6 April, 1875, v. 3, p. 109 Proc.
Verbal communication; comparison of the structure of male and female *Nephila plumipes*; habits and silk-production of the female.
1417. RILEY, C. V. [On the peculiarities of the Mexican honey-ant.] <Trans. Acad. Sci. St. Louis, 6 April, 1875, v. 3, p. 109 Proc.
Verbal communication; structural and functional division of the neuters of *Myrmecocystus mexicanus* into two distinct kinds.

1418. RILEY, C. V. [On the peculiarities of *Physianthus albens*.] <Trans. Acad. Sci. St. Louis, 6 April, 1875, v. 3, p. 109 Proc.
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1419. RILEY, C. V. [On the capture of moths by *Physianthus albens*.] <Trans. Acad. Sci. St. Louis, 6 April, 1875, v. 3, p. 115 Proc.
Reprinted, with changes, from <Moore's Rural New Yorker, 29 August, 1874, v. 30, p. 140.
Verbal communication; method of capture of insects, particularly moths, by the flowers of *Physianthus albens*; records the capture of a number of *Noctuidæ* and of *Sphingidæ*, especially *Deilephila lineata*; *Nerium oleander* and *Oenothera grandiflora* are said to capture Sphinx-moths in Europe.
1420. RILEY, C. V. [On the Yucca borer.] <Trans. Acad. Sci. St. Louis, 6 April, 1875, v. 3, p. 139 Proc.
Verbal communication; entomological interest attaching to the Yucca; abode and synonymy of *Megathymus yuccæ*.
1421. RILEY, C. V. [New biological facts regarding the grape Phylloxera.] <Trans. Acad. Sci. St. Louis, 6 April, 1875, v. 3, pp. 147-148 Proc.
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1422. RILEY, C. V. [On the connection of locust invasions with the occurrence of drought.] <Trans. Acad. Sci. St. Louis, 6 April, 1875, v. 3, p. 163 Proc.
Verbal communication; no connection between the occurrence of drought and of locust invasions.
1423. RILEY, C. V. Seventh annual report on the noxious, beneficial, and other insects of the State of Missouri, made to the State Board of Agriculture pursuant to an appropriation for this purpose from the legislature of the State. <10th Ann. Rept. State Board of Agric. for 1874, April, 1875, pp. 7 + 196 + 4, 40 figs. Separate: <Jefferson City, Mo., April, 1875, pp. 7 + 196 + 4, 40 figs.
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Figure of the larva-case of an undetermined species of *Psychida* and of the several stages of *Thyridopteryx ephemeraformis*; habits of and means against the latter.

1425. [RILEY, C. V.] [Poisonous qualities of the Colorado potato-beetle.] <N. Y. Tribune, 14 April, 1875. S.-b. No. 10, p. 17, 34.

Mentions instances of poisoning from the fumes given out by scalded or crushed masses of *Doryphora decemlineata*.

1426. [RILEY, C. V.] Cure for canker-worm. <N. Y. Tribune, 21 April, 1875. S.-b. No. 10, p. 25.

Paris green recommended for destruction of canker-worms when other remedies are lacking. Paris green not to be used against all insects.

1427. [RILEY, C. V.] Paris green: Its effects on plants and soils, and through them on man. <N. Y. Tribune, 12 May, 1875. S.-b. No. 10, pp. 15-16; 34-35.

Paris green is not injurious to plants or the soil, nor dangerous to man when properly applied.

1428. [RILEY, C. V.] Swellings on roots of *Ampelopsis*. <Colman's Rural World, 5 June, 1875. S.-b. No. 10, p. 1.

Answer to letter of H. Hilker; swellings on roots of *Ampelopsis* possibly occasioned by root-lice, but not by *Phylloxera*.

1429. RILEY, C. V. Apple-tree plant-lice. <Colman's Rural World, 5 June, 1875.

Answer to letter of A. Moyer; occurrence of and means against *Aphis mali*.

1430. RILEY, C. V. [*Torrubia elongata*, the white-grub fungus.] <Colman's Rural World, 12 June, 1875, v—, p—.

Torrubia elongata proposed as the name for the white-grub fungus; figures of the same.

1431. RILEY, C. V. The Colorado potato-beetle, *Doryphora decemlineata*. <Garden [London], 24 July, 1875, v. 8, pp. 71-72, 5 figs. S.-b. No. 23, p. —.

Description and figures of all stages of *Doryphora decemlineata* and *D. juncta*; migrations, habits, prolificacy, enemies, and parasites of *D. decemlineata*; means against it; the use of Paris green; probability and probable method of its introduction into Europe and means of preventing such introduction; figures *Lydella* [= *Exorista*] *doryphoræ*, *Harpactor* [= *Milyas*] *cinctus*, *Arma* [= *Podisus*] *spinosus*, and *Hippodamia convergens*.

1432. RILEY, C. V. Locusts vs. chinch-bugs. <N. Y. Tribune, 4 August, 1875. S.-b. No. 10, p. 40.

Locust ravages are likely to prevent serious injury by *Blissus leucopterus*; the latter more noticeable than usual; excessive rains in 1875, also unfavorable to the development of *Blissus leucopterus*.

1433. RILEY, C. V. No locust injury in Kansas and Missouri this fall. <N. Y. Tribune, 1 September, 1875. S.-b. No. 10, p. 166.

Predicts immunity from attacks of *Caloptenus spretus* in the fall of 1875 in Kansas and Missouri.

1434. RILEY, C. V. Prof. Riley and the locusts. <St. Louis Daily Globe-Democrat, 4 September, 1875, v. 1, No. 108, p. 3. S.-b. No. 10, pp. 158-159.

Reply to C. A. Davis's "Prof. Riley and the locusts;" food-plants, habits, parasites, and period of development of *Caloptenus spretus*; need of more extended investigation of this insect in its native haunts and breeding places.

1435. RILEY, C. V. The grape-leaf gall. <Cultivator and Country Gentleman, 9 September, 1875, v. 40, p. 567.

Identity of the root and leaf-forms of *Phylloxera vastatrix*.

1436. RILEY, C. V. White-grub fungus. <N. Y. Tribune, 6 October, 1875. S.-b. No. 10, p. 26.

Answer to inquiry of A. C. G.; brief history of *Torrubia elongata*, a parasite of *Lachnosterna fusca*.

1437. RILEY, C. V. Flying locusts in Illinois. <Cultivator and Country Gentleman, 25 October, 1875, v. 40, p. 679.

Caloptenus spretus confounded with *C. femur-rubrum* by B. F. J.; *C. spretus* does not occur in Illinois.

1438. RILEY, C. V. Remarks on canker-worms and description of a new genus of *Phalænida*. <Trans. Acad. Sci. St. Louis, 5 November, 1875, v. 3, pp. 273-280, figs. 14-21. Separate: <St. Louis, Mo., 1875, pp. 8, figs. Reprint: <8th Ann. Rept. State Ent. Mo., May, 1876, pp. 12-18, figs. 3-10. Notice: <Ca. Ent., November, 1875, v. 7, p. 219. <Proc. Bost. Soc. Nat. Hist., February, 1876, v. 18, p. 201.

Treats of *Paleacrita* [n. g.] *vernata* and *Anisopteryx pometaria*; see No. 1482 for synopsis of contents.

1439. RILEY, C. V. Notes on the natural history of the grape Phylloxera, *Phylloxera vastatrix*, Planchon. <Trans. Acad. Sci. St. Louis, 5 November, 1875, v. 3, pp. 281-287, fig. 22. Extract: <Amer. Nat., June, 1881, v. 15, pp. 483-484.

Discovery of the nidus in which eggs are deposited by the winged female of *Phylloxera vastatrix*; development, habits, description, and figures of the same; description of the male and of the impregnated egg; figure of the male of *P. caryocaulis*; summary of the natural history of *P. vastatrix*.

1440. [RILEY, C. V.] Grubs and guess-work. <N. Y. Semi-weekly Tribune, 12 November, 1875. S.-b. No. 10, pp. 17-18.

Characterizes some subdivisions of the *Lamellicornia* by their habits; contrasts the larvæ, imago, and habits of *Lachnosterna quercina* [= *fusca*] and *Lygyrus relictus*; means against the former.

1441. R[ILEY], C. V. Entomological. Apple-tree borers; timber encourages them; new bag-worm. <Colman's Rural World, 13 November, 1875. S.-b. No. 10, p. 188.

Timber-trees near apple orchards increase the likelihood of the attacks of *Saperda bivittata* [= *candida*] upon the apple-trees; habits and food-plants of *Psyche confederata*.

1442. RILEY, C. V. The army-worm; an important point yet to ascertain in its history. How it comes and goes; its natural enemies; preventive measures. <N. Y. Tribune, 16 November, 1875, 8 figs. S.-b. No. 10, pp. 29-31; 31-33.

Various applications of the name "army-worm;" seasons, habits, and natural enemies of and means against *Leucania unipuncta*; supposed method of oviposition; figures of it in its several stages, of *Exorista flavicauda*, *Microgaster* [= *Apanteles*] *militaris*, *Ophion purgatum*, and *Pezomachus minimus*, and of cocoons of the last; habits of these parasites.

1443. RILEY, C. V. The flying locusts in Illinois. <Cultivator and Country Gentleman, 25 November, 1875, v. 40, p. 744.

Extent of swarms flying south over Kansas and Nebraska on September (4th?).

1444. R[ILEY], C. V. Scabby potatoes. <N. Y. Tribune, 15 December, 1875. S.-b. No. 10, pp. 20, 29.

The scab in potatoes is caused by imperfectly studied *Acarina*.

1445. [RILEY, C. V.] Not the Hessian-fly. <N. Y. Tribune, 15 December, 1875. S.-b. No. 10, pp. 20, 29.

Answer to inquiry of J. H. K.; significance of the name and habits of *Aphodius inquinatus*.

1446. R[ILEY], C. V. How to destroy locusts. <Colman's Rural World, 23 December, 1875. S.-b. No. 10, p. 185.

Answer to letter of C. Herschel; means against *Acrididæ*; recommends flooding and ditching.

1447. RILEY, C. V. Paris green as an insect destroyer. <N. Y. Tribune, 28 December, 1875. S.-b. No. 10, pp. 13-14; 28-29.

Paris green as a means against *Doryphora decemlineata*; R. C. Kedzie's investigations show that Paris green is not deleterious to the soil or the crops.

1448. RILEY, C. V. Oak apple. <Amer. Cyclopædia, 1875, v. 12, pp. 558-559, 3 figs. S.-b. No. 14, pp. 47-48.

Description of galls of *Cynips terminalis*, C. [= *Amphibolips*] *quercus-spongifica*, and C. [= *A.*] *q.-inanis*; manner of their formation; figures the latter two galls and a parent fly; nature of galls and problems involved in their study.

1449. [RILEY, C. V.] Phylloxera. <Amer. Cyclopædia, 1875, v. 13, pp. 477-480, figs. 1-8. S.-b. No. 10, pp. 84-87.

Habits, food-plants, and characters of the genus *Phylloxera*; natural history of *P. vastatrix*; figures its several forms and the galls formed by it; history of the ravages in the vineyards of France.

1450. [RILEY, C. V.] Potato-bug. <Amer. Cyclopædia, 1875, v. 13, pp. 768-771, fig. 1-7. S.-b. No. 10, pp. 89-92.

Food-plants, original home, geographical distribution, natural history, enemies of, and means against *Doryphora decemlineata*; figures of it and of *Lydella* [= *Exorista*] *doryphora*, *Arma* [= *Podisus*] *spinosus*, *Harpactor* [= *Milyas*] *cinctus*, *Mysia* [= *Anatis*] *15-punctata*, and *Doryphora juncta*.

1451. RILEY, C. V. Rocky Mountain locust. <Amer. Cyclopædia, 1875, v. 14, pp. 371-374, figs. 1-10.

Ravages, description, natural history, migrations, and enemies of and means against *Caloptenus spretus*; figures of it with details of its structure and habits; figures *C. femur-rubrum*, *Astoma gryllarium* [= *Trombidium locustarum*], *Trombidium scriceum*, and *Sarcophaga carnaria*.

1452. RILEY, C. V. The hateful or Rocky Mountain locust, *Caloptenus spretus*. <N. Y. Tribune, 1875. Reprint: <Trans. Kans. State Hortic. Soc. for 1874, 1875, v. 4, pp. 172-176.

Answer to inquiry of Z. F. Hopkins; probable limit of the ravages and range of *Caloptenus spretus* in Kansas, Missouri, and neighboring States in 1875; means against and vernacular name of this species; vernacular names of *Acrididae* and *Locustidae* in general.

1453. RILEY, C. V. Prairie fires and hateful locusts: is there any connection between them? <N. Y. Tribune, 1875. Reprint: <Trans. Kans. State Hortic. Soc. for 1874-'75, v. 4, pp. 176-180.

Criticism of the effects of the drought, hot winds, locusts, and short crops in Kansas caused by the burning of the prairie grasses as stated in Kansas Farmer, 23 September, 1874; benefits resulting from prairie fires by the destruction of hibernating *Blissus leucopterus*, *Nysius destructor* [= *angustatus*], etc.; relations of prairie fires to the origin and maintenance of prairies.

1454. RILEY, C. V. [Address on entomology.] <Trans. Ill. State Hortic. Soc. for 1874, 1875, n. s., v. 8, pp. 103-111. Partial reprint: <Trans. Kans. State Hortic. Soc. for 1874, 1875, v. 4, pp. 103-104.

Ægeria rubi [= *Bembecia marginata*] injurious to blackberry and raspberry; the cause and cure of scab in apples; ravages, food-plants, seasons, habits, and means against *Chrysobothris femorata*; evidence for the identity of the leaf-and root-forms of *Phylloxera vastatrix*; means against the same.

1455. RILEY, C. V. Discussion of the honey-bee. <Trans. Ill. State Hortic. Soc. for 1874, 1875, n. s., v. 8, pp. 131-132.

Apis mellifica as an enemy to horticulture; importance of insects in the fertilization of flowers.

1456. RILEY, C. V. Notes on locusts. <Trans. Ill. State Hortic. Soc. for 1874, 1875, n. s., v. 8, pp. 136-137.

Native habitat of *Caloptenus spretus*.

1457. RILEY, C. V. Nonsense about the Phylloxera. <Colman's Rural World, 12 January, 1876. S.-b. No. 10, p. 3. See: <N. Y. Tribune, 1876. S.-b. No. 10, p. 27.

There is no such species as the American corn-grape, which is reported capable of resisting the attacks of *Phylloxera vastatrix*.

1458. RILEY, C. V. Small borer in apple-twigg. <Colman's Rural World, 26 January, 1876. S.-b. No. 10, p. 1.

Answer to letter of F. Holsinger; description and habits of *Psenocerus super-notatus*.

1459. RILEY, C. V. Worms on cottonwood. <Colman's Rural World, 26 January, 1876. S.-b. No. 10, p. 1.

Answer to letter of J. H. Davidson; occurrence of larvæ of *Drasteria erechthea* on *Populus monilifera* and on *Trifolium*; description of the imago.

1460. RILEY, C. V. Ailanthus silk-worm in Missouri. <Colman's Rural World, 27 January, 1876. S.-b. No. 10, p. 2.

Answer to letter of "Subscriber;" extent and unprofitableness of the culture of *Samia* [= *Atacus*] *cynthia*; naturalization of the worm in the United States.

1461. RILEY, C. V. Cause of smut in wheat. <Colman's Rural World, 26 January, 1876. S.-b. No. 10, p. 2.

Critical review of a report by Pulaski Grange, Tenn., on the cause of smut in wheat; absurdity of the report; occurrence of *Brachytarsus variegatus* in the smut, and of larvæ of *Cecidomyia*, *Meromyza*, and *Chlorops* in the lower joints of wheat; smut caused by *Ustilago segetum*.

1462. RILEY, C. V. Colorado potato-beetle's native home. <N. Y. Tribune, 9 February, 1876. S.-b. No. 10, pp. 12-13.

Geographical distribution of *Doryphora decemlineata* prior to 1859.

1463. RILEY, C. V. An entomological question. <Prairie Farmer, 26 February, 1876, v. 47, p. 68. S.-b. No. 10, pp. 4, 5; No. 42, pp. 76, 77. See: <Prairie Farmer, 4 March, 1876, v. 47, p. 76. S.-b. No. 10, p. 4.

Reply to Proximo's "An entomological question;" commendation of legislative efforts to effect the appointment of a national entomological commission; text of the two bills introduced into Congress; criticism of the same.

1464. RILEY, C. V. Insect ravages. An interesting letter from Prof. C. V. Riley. How to protect our agricultural interests; legislation, wise and otherwise; the duty of Congress. <St. Louis Daily Globe-Democrat, 4 March, 1876, v. 1, p. 3. S.-b. No. 10, pp. 5-8.

Importance and extent of injuries inflicted by insects in North America; notice of existing legislation upon means against injurious insects; statement of legislation needed for protection against locusts; criticism of bills introduced into Congress for the appointment of a national entomological commission.

1465. RILEY, C. V. Notes on the Yucca borer, *Megathymus yuccæ*, Walk. <Trans. Acad. Sci. St. Louis, 10 January-23 March, 1876, v. 3, pp. 323-344, figs. 25-31. Separate: <St. Louis, Mo., January, 1876, pp. 23, figs. 25-31. Reprint: <8th Ann. Rept. State Ent. Mo., May, 1876, pp. 169-182, figs. 40-55.

See No. 1482 for synopsis of contents; see No. 1602.

1466. RILEY, C. V. Entomology. An interesting lecture on the insect world. The subject considered both practically and scientifically. <St. Louis Daily Globe-Democrat, 25 March, 1876, v. 1, p. 3. S.-b. No. 10, pp. 161-164. Reprint, with omissions: <Ware's Valley Monthly, August, 1876, v. —, pp. 281-289. S.-b. No. 14, pp. 163-167.

Definition of entomology; claims of the science as a liberalizing study; its economic importance; metamorphoses, abundance, and almost omnipresence of insects.

1467. [RILEY, C. V.] The insect world. Lecture by Professor Riley at Washington University. A practical subject for fruit-growers. <St. Louis Republican, 26 March, 1876. S.-b. No. 10, pp. 178, 179.

Advantages and interest of the study of insects as compared with that of other animals; economic importance of the study; ravages of *Glossina morsitans*.

1468. RILEY, C. V. Legislation in regard to insects injurious to agriculture. <Nation, 30 March, 1876, v. 22, p. 208.

Amount of insect injuries in the United States; demand for an independent commission; duties and limits of such a commission.

1469. RILEY, C. V. Entomology. Another lecture by Professor Riley. How to counteract the ravages of insects; direct remedies; practical hints to farmers, etc. Some of the duties of the State entomologist. <St. Louis Daily Globe-Democrat, 1 April, 1876, v. 1, p. 3. S.-b. No. 10, pp. 135-138; 179-184. Reprint, with omissions: <Ware's Valley Monthly, September, 1876, v. —, pp. 369-380. S.-b. No. 14, pp. 168-173.

Classification of means against insects; cause of the destructive occurrence of insects; importation of foreign pests; history of the introduction and spread of *Pieris rapæ*, *Phylloxera vastatrix*, and *Doryphora decemlineata*; natural history of these insects; spread of insects by small degrees; advantageous means against certain insects; encouragement of enemies of and parasites on noxious insects; need of distinguishing friends from foes; need of co-operation and of legislation for the destruction of insects; duties of a State entomologist.

1470. [RILEY, C. V.] Scarlet mite. <Colman's Rural World, 12 April, 1876, fig. S.-b. No. 10, p. 160.

Answer to letter of G. W. Barnes; occurrence, habits, and figure of *Trombidium sericeum*; habits of *T. holosericeum*; use of *T. tinctorium* as a dye.

1471. RILEY, C. V. Hibernation of *Amphipyra* [= *Pyrophila*] *pyramoides*. <Psyche, March [13 April], 1876, v. 1, p. 152.

Extract from 3d Ann. Rept. State Ent. Mo., pp. 72-73, with additional note; this species sometimes hibernates as a pupa, and doubtless frequently as a moth.

1472. RILEY, C. V. Bag-worms and borers. How to protect our shade-trees and insure their growth. How to render shade-trees healthy. Letter from the State entomologist. <St. Louis Re-

1472. RILEY, C. V.—Continued.

publican, 14 April, 1876, No. 16843, p. 3, 3 figs. S.-b. No. 10, pp. 173-175; 175-178.

Causes of the death of shade-trees in the city of St. Louis; description, figures, and natural history of and means against *Thyridopteryx ephemeraeformis* and *Chrysobothris femorata*.

1473. RILEY, C. V. The locust plague; how to avert it. <Proc. Amer. Assoc. Adv. Sci. for 1875, 1876, v. 24, pp. 215-222. Separate: <Salem, April, 1876, pp. 215-222.

Extent of the ravages of *Caloptenus spretus* in 1873, 1874, and 1875; classification of and special remarks on the several means to be employed against the same; need of more extensive investigation of the insect in its native haunts and breeding places.

1474. R[ILEY], C. V. Honey locust weevil. <Colman's Rural World, 26 April, 1876.

Answer to inquiry of E. H. B.; larva of *Spermophagus robiniae* has legs and spins a cocoon.

1475. RILEY, C. V. Apple and peach borers. <Colman's Rural World, 9 May, 1876. S.-b. No. 16, p. 11.

Answer to inquiry of F. H.; habits, natural history, and means against *Chrysobothris femorata* and *Ageria* [= *Sannina*] *exitiosa*.

1476. RILEY, C. V. Notes on the codling-moth. <Colman's Rural World, 17 May, 1876. S.-b. No. 13, p. 153.

Natural history of *Carpocapsa pomonella*.

1477. RILEY, C. V. Plums and cotton. <N. Y. Weekly Tribune, 17 May, 1876. S.-b. No. 10, p. 167.

Answer to letter of J. C.; a belt of cotton-batting around the trunk of the tree is no protection against the injury to plums by *Conotrachelus nenuphar*.

1478. RILEY, C. V. Rose-bug remedy. <N. Y. Weekly Tribune, 17 May, 1876, fig. S.-b. No. 10, p. 167.

Answer to letter of Mrs. S. P. Smith; description, figure, habits, and preferred food-plants of and means against *Macrodactylus subspinosus*.

1479. RILEY, C. V. Smut in wheat. <N. Y. Weekly Tribune, 17 May, 1876. S.-b. No. 10, pp. 167-168. Reprint: <Colman's Rural World, 14 June, 1876. S.-b. No. 10, p. 169.

Critical review of two quoted communications by A. S. and by L. Heskett, on the cause of smut in wheat; smut caused by the growth of *Ustilago segetum*; *Brachytarsus variegatus* breeds in various smuts; description of the beetle.

1480. [RILEY, C. V.] Potato-beetle; progress. <N. Y. Weekly Tribune, 17 May, 1876. S.-b. No. 10, p. 168.

Arrival of *Doryphora decemlineata* at the Atlantic coast; its ravages there and means against them.

1481. RILEY, C. V. Locusts as food for man. <Proc. Amer. Assoc. Adv. Sci. for 1875, 1876, v. 24, pp. 208-214. Separate: <Salem, May, 1876, pp. 208-214.

Reference to previous writings on the use of locusts as food for man; historical evidence of the extensive use of locusts as food; methods of preparing locusts for food; species used hitherto; use of *Caloptenus spretus*; peculiarities of individual taste or national custom.

1482. RILEY, C. V. Eighth annual report on the noxious, beneficial, and other insects of the State of Missouri, made to the State Board of Agriculture, pursuant to an appropriation for this purpose from the legislature of the State. <11th Ann. Rept. State Board of Agric. for 1875, May, 1876, pp. 185+4, 55 figs. Separate: <Jefferson City, Mo., May, 1876, pp. 185+4, 55 figs.

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1484. [RILEY, C. V.] The eggs of the army-worm. <Colman's Rural World, 7 June, 1876. S.-b. No. 10, p. 170. Reprint: <Trans. Acad. Sci. St. Louis, June, 1876, v. 3, p. 211 Proc. <Amer. Nat., August, 1876, v. 10, pp. 508–509.

Reasons why eggs of *Leucania unipuncta* have not been observed heretofore; verification of author's conclusions as to the probable method of oviposition of this species; description of eggs and young larvæ.

1485. R[ILEY], C. V. Persian insect powder. <N. Y. Tribune, 7 June, 1876. S.-b. No. 10, p. 168.

Answer to letter of G. W. Holmes; impossibility of prescribing means against unknown insects; Paris green unsuitable for protection of bearing fruit trees; pyrethrum recommended.

1486. R[ILEY], C. V. Cocoons of silkworms. <N. Y. Tribune, 7 June, 1876. S.-b. No. 10, p. 168.

Answer to letter of A. R. Sprout; description of larva and cocoon of *Callosamia* [= *Attacus*] *promethea*; colors of imago; food-plants of larvæ; deposition of eggs; silk of little value.

1487. [RILEY, C. V.] Is Paris green absorbed? <N. Y. Tribune, 7 June, 1876. S.-b. No. 10, pp. 168-169.

Answer to letter of M. F.; plants colored by certain tinctures placed at their roots; Paris green not absorbed into the tissues of plants in perceptible quantities, but neutralized in the soil.

1488. RILEY, C. V. Ditching for young locusts. <Colman's Rural World, 14 June, 1876. S.-b. No. 10, pp. 171-172; 203-204; 204-205.

Critical review of J. Stayman's article on same subject; proper width and depth of ditches to check the march of unfledged *Caloptenus spretus* and other locusts.

1489. RILEY, C. V. Periodical Cicada, "17-year locust." <N. Y. Semi-weekly Tribune, 23 June, 1876, 3 figs. S.-b. No. 10, pp. 166-167.

Occurrence of *Cicada* [= *Tibicen*] *septendecim* at Lexington, Va., in 1876; list of localities at which these insects will appear this year; chronological history of a brood; figures of larva, pupæ, and imago.

1490. RILEY, C. V. Specific for Colorado potato-beetle. <Colman's Rural World, 28 June, 1876. S.-b. No. 10, p. 160. Reprint, with omissions: <N. Y. Tribune. S.-b. No. 14, p. 7.

Answer to letter of R. Barbour; directions for the use of Paris green as a means against *Doryphora decemlineata*.

1491. RILEY, C. V. [Inquiries concerning the Colorado potato-beetle, and Mayor Brown's answer thereto.] <Trans. Acad. Sci. St. Louis, June, 1876, v. 3, pp. 170-172 Proc.

Verbal communication; critical review of answer of Mayor Brown to inquiries of A. C. Hardy de Boislieu as to the means of preventing the introduction of *Doryphora decemlineata* into Belgium; quotes the 6th Ann. Rept. State Ent. Mo., p. 16, showing that the fear of such introduction is not unfounded; inaccuracy of Mayor Brown's opinions; manner in which *Doryphora decemlineata* will probably reach Europe if at all.

1492. RILEY, C. V. [On the ravages of young locusts in western Missouri.] <Trans. Acad. Sci. St. Louis, June, 1876, v. 3, pp. 179-180 Proc.

Verbal communication; alarming nature of the ravages of unfledged *Caloptenus spretus* in western counties of Missouri at the present time; probable future departure of the winged locusts: means to be adopted against the locusts now.

1493. RILEY, C. V. [Lecture on the Rocky Mountain locust.] <Trans. Acad. Sci. St. Louis, June, 1876, v. 3, p. 180 Proc.
Brief abstract of lecture; prediction of the speedily approaching end of the ravages of *Caloptenus spretus* in Missouri for 1875; plentiful crops to be expected subsequently.
1494. RILEY, C. V. [Predictions verified.] <Trans. Acad. Sci. St. Louis, June, 1876, v. 3, p. 185 Proc.
Verbal communication; accuracy of author's conclusions as to the probable doings of *Caloptenus spretus* in Missouri later in the season.
1495. RILEY, C. V. [On changes in vegetation caused by locusts.] <Trans. Acad. Sci. St. Louis, June, 1876, v. 3, pp. 188-189 Proc.
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1496. RILEY, C. V. Jumping seeds and galls. <Trans. Acad. Sci. St. Louis, June, 1876, v. 3, pp. 190-192 Proc. Reprint: <Gardener's Mo. and Hortic., July, 1878, v. 20, pp. 213-214. See: <Amer. Nat., February, 1876, v. 10, p. 125. Pacific Rural Press, 6 April, 1878.
Description of the seeds (of an unknown plant) which are inhabited by the larvæ of *Carpocapsa saltitans*; manner in which these larvæ cause the seeds to roll and jump; habits of larva within the seed; description of the plant bearing the seeds; the seed of *Tamariscus* moved by the larva of *Nanodes tamarisci*, which feeds within it; description of the gall of *Cynips* [= *Neuroterus*] *quercus-saltatorius* and of the jumping of these galls.
1497. RILEY, C. V. [On the use of Paris green as an insecticide.] <Trans. Acad. Sci. St. Louis, June, 1876, v. 3, p. 193. See: <Amer. Nat., February, 1876, v. 10, p. 126.
Verbal communication; confirmation, by experiments of R. C. Kedzie, of author's conclusions in regard to the safety of Paris green as an insecticide; this substance metamorphosed into a less soluble form in the ground and held in the ground if not used to excess; when applied in small but sufficient quantities not injurious to plants; objections to the use of the "Potato-pest poison" made at the Lodi [N. J.] Chemical Works.
1498. RILEY, C. V. New use for the American Agave. <Trans. Acad. Sci. St. Louis, June, 1876, v. 3, pp. 195-196 Proc. See: <Amer. Nat., February, 1876, v. 10, p. 126.
Verbal communication; use of the dried flower-stalk of *Agave americanus* for lining insect-boxes.
1499. RILEY, C. V. [Food of insectivorous plants.] <Trans. Acad. Sci. St. Louis, June, 1876, v. 3, pp. 201-202 Proc.
Drosera, *Dionæa* and other plants digest, absorb, and appropriate nitrogenous matters; glands for the appropriation of animal food not yet found in the Sarracenias.
1500. RILEY, C. V. Parasites on bees. <Trans. Acad. Sci. St. Louis, June, 1876, v. 3, p. 212 Proc.
Bees in California infested with triungulins of a *Meloë* sp. which sometimes kill the bees; usual habits of such triungulins.

1501. RILEY, C. V. The locust pest. <Sci. Amer., 1 July, 1876 [v. 49], n. s., v. 35, p. 9.
Effects of water and cold on the eggs of *Caloptenus spretus*.
1502. RILEY, C. V. Swallows; bed bugs. <Colman's Rural World, 5 July, 1876. S.-b. No. 10, p. 166.
Answer to letter of R. R. Pierce; nests of *Hirundo fulva* generally infested by *Acanthia lectularia*; those of *Hirundo americana* rarely so; while this habit might cause annoyance about a dwelling, it is of little consequence when the bird nests under the eaves of a church.
1503. [RILEY, C. V.] Berry and cherry twigs. <N. Y. Tribune, 5 July, 1876. S. b. No. 10, p. 169.
Answer to letter of W. Keyser; eggs of *Acanthus niveus* laid in twigs of *Rubus* and *Prunus*; description, habits of, and means against *Oberea tripunctata*.
1504. R[ILEY], C. V. Three worms and their work. <N. Y. Weekly Tribune, 12 July, 1876, 2 figs. S.-b. No. 14, p. 132.
Answer to letter of "Subscriber;" means against larvæ of *Agrotididæ*, of *Elateridæ*, and earth worms, *Lumbricus*-sp.; eggs of *Agrotis ypsilon* laid in the spring; breeding-habits and economic importance of *Lumbricus*; figures of an elatrid larva and imago.
1505. [RILEY, C. V.] Mite parasites of the Colorado potato-beetle. <Mirror and Farmer, 15 July, 1876, v. 28, No. 29, p. 2. S.-b. No. 14, p. 221. Reprint: <Gardener's Mo. and Hortic., September, 1876, v. 18, p. 279. <Trans. Acad. Sci. St. Louis, December, 1877, v. 3, p. 219 Proc. Note: <Amer. Nat., October, 1876, v. 10, p. 636.
Ectoparasitism of a gamasid mite [*Uropoda americana*] on *Doryphora decemlineata*; list of vertebrate enemies of *D. decemlineata*.
The reprints note the occurrence of *D. decemlineata* in New Hampshire and its ravages along the Atlantic coast. See No. 1610.
1506. [RILEY, C. V.] [Wheat insects.] <Blair [Nebr.] Times, 20 July, 1876. S.-b. No. 10, pp. 200-201.
Quotes from 1st Ann. Rept. State Ent. Mo., pp. 159-161; wheat injured in Nebraska in 1876 by *Cecidomyia destructor* and *Meromyza americana*; ravages of larva, description of imago and means against the latter; occurrence of *Disonychia flaviventris* in Nebraska.
1507. RILEY, C. V. A new enemy of wheat. <N. Y. Tribune, 21 July, 1876. S.-b. No. 14, pp. 129-130; 130-131.
Answer to letter of W. Robson; occurrence, habits, and ravages of *Leucania albilinca* in Maryland, Pennsylvania, and Kansas; history and description of larva, pupa, and imago of the insect; evolution of new habits and forms among insects.
1508. [RILEY, C. V.] Chinch-bug; bee-moth. <Colman's Rural World, 26 July, 1876. S.-b. No. 10, pp. 201-205.
Answer to letter of G. R. Christian; means against *Blissus leucopterus* and *Galleria cercana*; food, seasons, habits, and description of the latter.
1509. RILEY, C. V. The grape-root borer, *Ægeria polistiformis*. <Colman's Rural World, 26 July, 1876, 2 figs. S.-b. No. 10, pp. 205-206.
Answer to letter of F. J. Kron; experiments on means against *Ægeria* [= *Sciapteron*] *polistiformis*; habits of larva; figures of imago; geographical distribution.

1510. RILEY, C. V. Sweet-potato beetles; "beautiful bugs." <N. Y. Weekly Tribune, 26 July, 1876, 3 figs. S.-b. No. 10, p. 213.
Answer to letter of W. Snowden; characters and habits of *Cassididae*; description and figures of larvæ and imagos of *Coptocycla* [= *Cassida*] *bivittata* and *C.* [= *C.*] *nigripes*; descriptions of *C. aurichalcea* and *C. guttata*; these species feed on leaves of *Ipomœa batatas* and *C. aurichalcea*, also on leaves of *Convolvulus* and of *Solanum dulcamara*; means against them.
1511. [RILEY, C. V.] Those centennial insects. <N. Y. Weekly Tribune, 26 July, 1876. S.-b. No. 10, p. 219.
Criticism of communication of L. A. M.; list of principal insects preying upon stored corn.
1512. RILEY, C. V. Wheatmidge; "rue-worms." <N. Y. Tribune, 2 August, 1876. S.-b. No. 10, p. 202.
Larvæ of *Papilio asterias* feeding on *Ruta graveolens*; description, habits, seasons, ravages of, and means against *Cecidomyia* [= *Diplosis*] *tritici*.
1513. RILEY, C. V. Apple and peach borers. <Colman's Rural World, 9 August, 1876. S.-b. No. 14, pp. 3-4; 55-56. Extract: <Cultivator and Country Gentleman, 7 September, 1876, v. 41, p. 566.
Answer to inquiries of F. H.; *Chrysobothris femorata* distinguished from *Saperda bivittata* [= *candida*] and *Egeria* [= *Sannina*] *exitiosa*; habits and description of the first; habits of the last and means against both.
1514. RILEY, C. V. Large saw-fly. <Colman's Rural World, 9 August, 1876. S.-b. No. 14, p. 4.
Answer to inquiry of J. B. J.; description of larva and imago of *Cimbex laportei* [= *americana*]; its food-plants and transformations.
1515. RILEY, C. V. Cottony scale-insect on maples. <Colman's Rural World, 9 August, 1876. S.-b. No. 14, pp. 4-5.
Answer to inquiry of C. F. Mills; *Lecanium acericola* [= *Pulvinaria innumerabilis*] injurious to *Acer dasycarpum* at Springfield, Ill.; habits, description of the scale, and manner of oviposition; no great injury ever done by insects of this genus.
1516. RILEY, C. V. Hickory vs. locust borer. <Colman's Rural World, 9 August, 1876. S.-b. No. 14, p. 5.
Answer to inquiry of F. M. D.; description of larva and imago and natural history of *Arhopalus* [= *Cyllene*] *pictus*; characters distinguishing this from *A.* [= *C.*] *robiniae*; food-plants and seasons of the latter.
1517. RILEY, C. V. Stag-beetle. <Colman's Rural World, 9 August, 1876. S.-b. No. 14, p. 5.
Answer to inquiry of S. Lee; occurrence and characters of *Lucanus elaphus*; food of larva.
1518. RILEY, C. V. Eggs of the angular-winged katydid. <Colman's Rural World, 9 August, 1876. S.-b. No. 14, p. 5.
Answer to inquiry of V. Kriegel; descriptions of eggs, imagos, and song of *Microcentrum retinerve*; habits and ravages and means against the same.
1519. RILEY, C. V. Experience with the Colorado potato-beetle. <Colman's Rural World, 9 August, 1876. S.-b. No. 14, p. 6.
Letter from N. Coleman; larvæ of *Doryphora decemlineata* in confinement pupated on the surface of the ground; imagos eat the tubers underground.

1520. [RILEY, C. V.] An elm enemy. <N. Y. Semi-weekly Tribune, 11 August, 1876. S.-b. No. 14, pp. 54-55.
Habits and ravages of and means against *Galcruca calmarieusis* [= *xanthomelena*].
1521. RILEY, C. V. The locust in 1876. <N. Y. Weekly Tribune, 16 August, 1876. S.-b. No. 14, p. 73.
The occurrence and ravages of *Caloptenus spretus* in Minnesota and Colorado in 1876; their absence from other portions of the country occasionally inhabited by them; their destruction by *Astoma gryllaria* [= *Trombidium locustarum*] and inability to maintain themselves in parts of the region they infest.
1522. [RILEY, C. V.] The war on "corn-worms." <N. Y. Semi-weekly Tribune, 18 August, 1876. S.-b. No. 14, p. 73.
Review of article by A. Brewster; ravages of and means against larvæ of *Elatridæ*, *Agrotididæ* and *Lachnosterna quercina* [= *fusca*] and the "grub-worm," injurious to growing maize.
1523. RILEY, C. V. Spined soldier-bug. <Ohio Farmer, 19 August, 1876, v. 50, p. 118.
1524. RILEY, C. V. "Potato-pest poison." <Sci. Amer., 19 August, 1876 [v. 49], n. s., v. 35, p. 116.
Condemning some of the patent poisons for *Doryphora decemlineata*.
1525. RILEY, C. F. Cottonwood borers. <N. Y. Weekly Tribune, 23 August, 1876. S.-b. No. 14, p. 55.
Answer to inquiry of J. R.; food-plants and ravages of and means against *Plectrodera scalator*.
1526. RILEY, C. V. Harmless insects. <N. Y. Weekly Tribune, 23 August, 1876. S.-b. No. 14, p. 55.
Answer to letter of a "Subscriber;" occurrence of *Psocus venosus* on apple-trees; habits and molting.
1527. RILEY, C. V. Locust prospects. <N. Y. Tribune, 6 September, 1876. S.-b. No. 10, pp. 213-215; No. 14, pp. 74-75. Reprint: <Prairie Farmer, 16 September, 1876, v. 47, p. 298. S.-b. No. 10, pp. 207-209.
Answer to letter of G. H. H.; movements and ravages of *Caloptenus spretus* in Aug., 1876, in Dakota, Minnesota, Iowa, Nebraska, and Colorado.
1528. RILEY, C. V. Some notes on potato-beetles. <Sci. Amer., 9 September, 1876 [v. 49], n. s., v. 35, p. 164. Reprint: <Ohio Farmer, 16 September, 1876, v. 50, p. 179. S.-b. No. 14, pp. 6, 7.
Critical review of S. R. M.'s "Facts about potato-beetles;" *Doryphora decemlineata* flies in the day-time, but not at night; feeds upon several species of plants; hibernates as an imago, which should be destroyed in early spring.
1529. RILEY, C. V. Entomological works wanted. <Colman's Rural World, 20 September, 1876. S.-b. No. 14, p. 2.
Answer to letter of J. W. Newman; notice of some works on entomology for the use of students.

1530. [RILEY, C. V.] Grape-leaf Phylloxera enemy. <Colman's Rural World, 20 September, 1876. S.-b. No. 14, p. 3.

Answer to letter of A. Engleman; *Leucopis* sp.? parasitic in galls of *Phylloxera vastatrix* and *P. rileyi*.

1531. [RILEY, C. V.] Grape-leaf gall. <Colman's Rural World, 20 September, 1876. S.-b. No. 14, p. 3.

Answer to letter of A. A. Briggs; *Phylloxera vastatrix* does comparatively little damage on the leaves of grape-vines; Clinton and Taylor vines peculiarly subject to the attacks of the leaf-inhabiting form; Concord vines seldom attacked by it and not seriously injured by the root-inhabiting form; means against the leaf-inhabiting form.

1532. RILEY, C. V. New locust theory wanted. <Colman's Rural World, 27 September, 1876. S.-b. No. 14, p. 62.

Answer to letter of W. T. D.; facts not theories wanted in regard to the flights of *Caloptenus spretus*.

1533. RILEY, C. V. Cecropia worm on elder. <Colman's Rural World, 27 September, 1876, 1 fig. S.-b. No. 14, p. 63.

Answer to letter of A. S. Van Winkle; description of larva, cocoon, and imago of *Samia* [= *Attacus*] *cecropia*; figure of larva; habits and seasons; availability of the cocoon for silk.

1534. RILEY, C. V. The harlequin cabbage-bug. <Colman's Rural World, 4 October, 1876. S.-b. No. 14, p. 56.

Answer to letter of R. J. Waters; habits, ravages, distribution, and means against *Strachia* [= *Murgantia*] *histrionica*; colors of early stages and of imagos.

1535. [RILEY, C. V.] Butterfly chrysalis. <N. Y. Tribune, 13 October, 1876. S.-b. No. 19, p. 224. Reprint: <N. Y. Tribune, 21 October, 1876. S.-b. No. 10, p. 223.

Answer to inquiry of E. B. S.; occurrence of *Danaus archippus* in swarms in central United States in autumn of 1876; colors of larva and pupa; larva feeds on *Asclepias*.

1536. [RILEY, C. V.] Domesticated katydid. <N. Y. Tribune, 18 October, 1876. S.-b. No. 19, p. 214. Reprint: <N. Y. Tribune, 21 October, 1876. S.-b. No. 10, p. 219.

Answer to letter of C. A. P.; longevity and food of *Microcentrum retinerve*.

1537. [RILEY, C. V.] Unjust accusation? <N. Y. Tribune, 21 October, 1876. S.-b. No. 10, p. 209; No. 19, p. 242.

Answer to inquiry of a "Correspondent;" *Harpalus erraticus* accused of destroying shrubbery; predaceous habits of *Carabidae*.

1538. RILEY, C. V. The Rocky Mountain locust. <Colman's Rural World, 1876, v. —, 30 October, 6 November, 13 November. S.-b. No. 10, pp. 185-188. See: <Kansas Farmer, November, 1876. S.-b. No. 10, pp. 225-235. <N. Y. Tribune, October, 1876. S.-b. No. 10, p. 215.

Verification of predictions in regard to the limitation of the ravages of *Caloptenus spretus* in western Missouri in 1876; gathering eggs, ditching, rolling, and burning recommended as means against them; recommends the employment of soldiers, of hogs, and of poultry, late planting, and the destruction of the locusts in their native country; *Blissus leucopterus* more

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1539. [RILEY, C. V.] Canker-worms at the West. <N. Y. Tribune, 31 October, 1876. S.-b. No. 17, p. 59.

Occurrence of *Paleacrita vernata* in Michigan in 1872 and in Ohio in 1874, 1875, and 1876; brief account of *P. vernata* and *Anisopteryx pometaria*; their habits, ravages, and means against them.

1540. RILEY, C. V. [The venation of *Anisopteryx* and variation in imagos.] <Ca. Ent., September [October], 1876, v. 8, pp. 178-179.

Variation in the venation of the wings of *Anisopteryx pometaria* and in the imagos of so-called species.

1541. RILEY, C. V. A new enemy of the grasshopper. <Lawrence [Kans.] Journal. Reprint: <Industrialist [Manhattan, Kans.], 2 November, 1876, v. 2, No. 30, p. 2. S.-b. No. 10, pp. 209-210.

Letter of F. H. Snow with comments; eggs of *Caloptenus spretus* destroyed by larvæ of *Anthomyia calopteni* [= *angustifrons*]; characters of the larvæ; eggs destroyed by larvæ of some *Ichneumon*? [= *Systoechus oreas*]; need of destroying eggs by artificial means.

1542. RILEY, C. V. Silk culture in Kansas. <Nationalist, 10 November, 1876. S.-b. No. 14, p. 1.

Importance of silk culture; practicability of the culture and prospects of its increase in the United States; measures for its promotion in Kansas; successful raising of silkworms on osage orange [*Maclura aurantiaca*].

1543. RILEY, C. V. Bee killers: *Asilus* flies. <N. Y. Weekly Sun, 15 November, 1876. S.-b. No. 10, p. 201.

Habits of *Asilidae*, especially of *Trupanea* [= *Promachus*] *apirora* and *Asilus missouriensis* [= *Proctacanthus milberti*]; description of *T.* [= *P.*] *apivora*; larva of *Asilus sericeus* feeds on roots of *Rheum rhaponticum*.

1544. RILEY, C. V. How to use Paris green for the cotton-worm. <Colman's Rural World, 15 November, 1876. S.-b. No. 10, pp. 210-211. See: <N. Y. Tribune, 15 December, 1876. S.-b. No. 14, p. 7.

Answer to letter of C. W. Niver; directions for the use of Paris green by the dry and wet method; description of sprinkling machines.

1545. [RILEY, C. V.] *Notodonta concinna*. <Colman's Rural World, 15 November, 1876. S.-b. No. 10, p. 219.

Answer to letter of J. Barritt; description of larva of *Notodonta* [= *Edemasia*] *concinna*; habits, food-plants, and means against the same.

1546. [RILEY, C. V.] The dog-day harvest fly. <Colman's Rural World, 15 November, 1876. S.-b. No. 10, p. 220.

Answer to inquiry of C. A. U.; description of *Cicada pruinosa* [= *tibicen*]; method of sonification; habits; notice of some manuals of entomology.

1547. [RILEY, C. V.] Snake-worms. <Colman's Rural World, 15 November, 1876. S.-b. No. p. 10, p. 220.

Answer to letter of J. Armstrong; description of larvæ of *Sciara* sp.; their habit of moving in congregations; their abode and enemies.

1548. RILEY, C. V. Locust eggs. <Colman's Rural World, 15 November, 1876. S.-b. No. 10, p. 223.

Answer to letter of C. T.; female *Acrididæ* lay more than one litter of eggs; the occurrence of egg-like parasites in males has led to the supposition that the males bore eggs.

1549. RILEY, C. V. Locust flights east of the Mississippi. <Colman's Rural World, 22 November, 1876. S.-b. No. 10, pp. 211-212; 221-222; 223-225. Reprint: <Sci. Amer., 16 December, 1876 [v. 49], n. s., v. 35, p. 392, 2 figs. S.-b. No. 10, pp. 216, 217. <Trans. Kans. Acad. Sci., 1877, v. 5, pp. 62-64.

Limitation of plants and animals to certain geographical regions; regions in which alone *Caloptenus spretus* survives; species confounded with *C. spretus*; occurrence of swarms of *Acridium americanum* in Ohio; description, geographical distribution, and ravages of the same; swarms of *Caloptenus differentialis*, *C. atlantis*, and *C. femur-rubrum* in Illinois; ravages of the same. The reprint in the Sci. Amer. contains figures of *Caloptenus spretus* and *Acridium americanum*.

1550. RILEY, C. V. Locusts again. <N. Y. Tribune, 22 November, 1876. S.-b. No. 10, p. 222.

Effects of winter on the vitality of the eggs of *Acrididæ*.

1551. RILEY, C. V. The army-worm; its natural history complete. <Sci. Amer., 9 December, 1876 [v. 49], n. s., v. 35, p. 372, 4 figs. S.-b. No. 10, pp. 217-219. Reprint, with slight changes: <Proc. Amer. Assoc. Adv. Sci. for 1876, 1877, v. 25, pp. 279-283, 2 figs.

Geographical distribution of *Leucania unipuncta*; figures of all stages and of ovipositor of female; place and manner of oviposition; description of eggs and young larvæ; number of annual broods; summary of the natural history of this species.

1552. RILEY, C. V. The apple-bark louse. <Ca. Farmer, 15 December, 1876. S.-b. No. 14, p. 50.

Seasons, habits, and ravages of *Mytilaspis pomicorticis* [= *pomorum*]; description of young larvæ; of males and females and formation of scales.

1553. RILEY, C. V. The apple maggot; a formidable enemy. <N. Y. Semi-weekly Tribune, 15 December, 1876. S.-b. No. 14, pp. 7-8.

Answer to letter of P. M. Augur; description of larva and imago of *Trypeta pomonella*; ravages, food-plants, habits, and means against the same; literature of the subject.

1554. RILEY, C. V. Entomological notes; confounding friend with foe. <Colman's Rural World, 20 December, 1876. S.-b. No. 14, p. 4.

Description of scales and eggs of *Diaspis harrisii* [= *Chionaspis furfurus*] and of colors of larva, pupa, and imago of *Chilocorus bivulnerus*; ravages of the *Diaspis*; habits and usefulness of the *Chilocorus*.

1555. RILEY, C. V. Locust injury next spring. The territory in Missouri that will probably suffer therefrom. <Colman's Rural World, 20 December, 1876. S.-b. No. 14, pp. 5-6. Reprint: <Industrialist [Manhattan, Kans.], 17 February, 1877, v. 2, No. 44, p. 4. S.-b. No. 14, p. 49.
Prediction of ravages of *Caloptenus spretus* to occur in spring of 1877 in Missouri.
1556. [RILEY, C. V.] Amputating insects. <N. Y. Semi-weekly Tribune, 29 December, 1876, 2 figs. S.-b. No. 14, pp. 8-9.
Description of the work of *Elaphidion putator* [= *villosum*] and *Oncideres cingulata*; habits of both; figures of larva, pupa, and imago of the latter; similarity in habits of *Oncideres amputator* and *E. putator* to those of *O. cingulata*.
1557. [RILEY, C. V., et al.] The Rocky Mountain locust or grasshopper, being the report of proceedings of a conference of the Governors of several Western States and Territories, together with several other gentlemen, held at Omaha, Nebr., on the 25th and 26th days of October, 1876, to consider the locust problem; also a summary of the best means now known for counteracting the evil. <St. Louis, 1876, 8°, pp. 3+58, 8 figs. See: <N. Y. Tribune, 1876. S.-b. No. 10, p. 223.
Preface, proceedings, pp. 1-36. Practical considerations and suggestions for the suppression of *Caloptenus spretus*; description, oviposition, transformations, and habits of the same; its enemies and parasites; means against it; description of *Anthomyia calopteni* n. sp. [= *angustifrons*]. Figures. Prepared by J. S. Pillsbury, P. Pusey, and C. V. Riley.
1558. RILEY, C. V. Potato pests. Being an illustrated account of the Colorado potato-beetle and the other insect foes of the potato in North America, with suggestions for their repression and methods for their destruction. <New York: Orange Judd Company [1876], pp. 108, 49 figs., map. Review: <Cultivator and Country Gentl., 11 January, 1877, v. 42, p. 25. Reply to review: <*ibid.*, 1 February, 1877, v. 42, p. 78. S.-b. No. 14, pp. 56-57.

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1559. RILEY, C. V. Gall-insects. <Johnson's New Universal Cyclopædia, 1876, v. 2, pp. 412-416, 16 figs. S.-b. No. 10, pp. 76-80.

Definition of the term "gall-insects"; classification and habits of the same; mention by name and figures of typical species and galls made by them; dimorphism and metagenesis of *Cynips*.

1560. RILEY, C. V. Gall-nuts. <Johnson's New Universal Cyclopædia, 1876, v. 2, p. 417, 1 fig. S.-b. No. 10, p. 81.

Definition of "gall-nuts" formed by *Cynips gallæ-tinctoriæ* on twigs of *Quercus infectoria*; local origin, chemical composition, use in the arts.

1561. RILEY, C. V. Galls. <Johnson's New Universal Cyclopædia, 1876, v. 2, pp. 418-419, 2 figs. S.-b. No. 10, pp. 82-83.

Definition of "galls;" their variety of form, texture, and location; their nature and source.

1562. RILEY, C. V. Locust prospects. <Colman's Rural World, 3 January, 1877. S.-b. No. 14, pp. 57-58; 58-59.

Explains means of prognosticating the advent of *Caloptenus spretus* in the spring of 1877; recommends measures of precaution and the procurement of information concerning means against these insects, and gives assurance that the invasion of the locusts will be but temporary.

1563. RILEY, C. V. Bots. <Sci. Amer., 6 January, 1877 [v. 50], n. s., v. 36, pp. 9-10. Reprint: —S.-b. No. 14, pp. 235-236. <Lancaster Farmer, 15 September, 1877, v. 9, p. 142. S.-b. No. 14, p. 129. <Colman's Rural World. S.-b. No. 14, p. 100.

Habits, ravages, and means against *Gastrophilus equi*, *Cephalomyia* [= *Æstrus*] *ovis*, and *Hypoderma bovis*.

1564. [RILEY, C. V.] Academy of Science. Brilliant and profound address of Prof. C. V. Riley. The splendid record of the Academy for the past year. Reports of officers and committees and election of managers for the ensuing year. <St. Louis Times, 16 January, 1877, v. —. S.-b. 14, pp. 91-96. Reprint: <Trans. Acad. Sci. St. Louis, December, 1877, v. 3, pp. 238-254 Proc. Separate: <St. Louis, 1877, 16 pp. Translation: <Anzeiger des Westerns, 16 January, 1877, v. 43, p. 3. S.-b. No. 14, pp. 50-54.

Review of progress made in science in North America, and especially by the Academy of Science of St. Louis in 1876; remarks on entomological observations and publications, and especially on *Doryphora decemlineata*, *Phyllorera vastatrix*, and *Caloptenus spretus*.

1565. RILEY, C. V. Is this a grasshopper year? Prof. Riley's opinion concerning the prospect for bugs. It all depends on the kind of weather we have during February. <St. Louis Daily Globe Democrat, 7 February, 1877, v. 2, No. 263, p. 3. S.-b. No. 14, pp. 69-70. Reprint: <Industrialist [Manhattan, Kans.] 17 February, 1877, v. 2, pp. 1, 4. S.-b. No. 14, p. 49. See: <Colman's Rural World, 1877. S.-b. No. 1, pp. 59-60.

Replies to questions as to the likelihood of the hatching of eggs of *Caloptenus spretus* in the spring of 1877; the degree of development attained before winter; possibility of the resumption of development after it has once been arrested.

1566. [RILEY, C. V.] Are the locusts hatching? Mistaken identity. <Colman's Rural World, 14 February, 1877, 2 figs. S.-b. No. 14, p. 62.

Modified extract from 8th Ann. Rept. State Ent. Mo., May, 1876, pp. 149-150, *Tragocephala* [= *Chortophaga*] *viridifasciata* and *Tettix granulatus* mistaken for *Caloptenus spretus*; geographical distribution of the first; hibernation and colors of the two former; figures of both.

1567. RILEY, C. V. Condition of locust eggs: Inquiries answered. <Colman's Rural World, 21 February, 1877. S.-b. No. 14, pp. 67-68; 68.

Replies to inquiries as to the degrees of development attained by eggs of *Caloptenus spretus* submitted for examination.

1568. RILEY, C. V. Tarred paper for fruit trees. <Colman's Rural World, 7 March, 1877. S.-b. No. 14, p. 61.

Critical review of article by E. Gaylord; the inclosure of trunks of fruit trees in tarred paper serviceable as a protection from the sun, rabbits, mice, and borers.

1569. RILEY, C. V. Insect on the grape. <Gardener's Mo. and Hortic., March, 1877, v. 19, p. 90.

Varieties of grape attacked by *Desmia maculalis*; means against the same.

1570. RILEY, C. V. Ninth annual report on the noxious, beneficial, and other insects of the State of Missouri, made to the State Board of Agriculture, pursuant to an appropriation for this purpose from the legislature of the State. <12th Ann. Rept. State Board of Agric. for 1876, March, 1877, pp. 7+129+3, 33 figs. Separate: <Jefferson City, Mo., March, 1877, pp. 7+129+3, 33 figs.

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1571. RILEY, C. V. Important observations on the Rocky Mountain locust or grasshopper pest of the West. <Sci. Amer., 28 April, 1877 [v. 50], n. s., v. 36, pp. 260-261, 5 figs.

Observations on the egg-laying habits of *Caloptenus spretus*; figures egg, egg-masses, method of oviposition, and female anal characters.

1572. RILEY, C. V. Experiments with locust eggs and conclusions therefrom. <Sci. Amer., 5 May, 1877 [v. 50], n. s., v. 36, pp. 276-277. S.-b. No. 14, p. 101.

Experiments upon the vitality of eggs of *Caloptenus spretus*; effects of alternately freezing and thawing, of exposure to great moisture or to the free air, and of burying them at different depths.

1573. RILEY, C. V. Prof. Riley's report to the Governor of Kansas: The grasshopper question: Interesting information. <Commonwealth [Topeka, Kans.], 12 May, 1877, No. 2500, p. 2. S.-b. No. 14, pp. 63-67. Reprint: <St. Louis Daily Globe-Democrat, 14 May, 1877, v. 2, No. 359, p. 3. S.-b. No. 14, pp. 70-72. Notice: <Ibid., p. 4. S.-b. No. 14, p. 70. See: <Kansas Farmer, 16 May, 1877. S.-b. No. 14, p. 59.

Reply to letter of Governor G. T. Anthony; area within Kansas in which eggs of *Caloptenus spretus* were laid in 1876; the degree to which the young from these eggs had perished or were likely to commit ravages in the summer of 1877; causes of the destruction of a great proportion of the young locusts; means of completing this destruction.

1574. RILEY, C. V. The strawberry leaf-roller, *Anchylopera fragariæ*. <Gardener's Mo. and Hortic., May, 1877, v. 19, pp. 143-144, fig. S.-b. No. 14, p. 45.

Reprint, with additional introduction and note, from 1st Ann. Rept. State Ent. Mo., March, 1869, pp. 142-143, fig. 80. See No. 1059 for synopsis of contents.

1575. [RILEY, C. V., *et al.*] U. S. Entomological Commission. Circular No. 1. [Riley, Packard, Thomas.] <Washington: 1877, 8°, 4 pp.
 Queries regarding the migrations, appearances, habits, and ravages of *Caloptenus spretus*; directions for making replies.
1576. RILEY, C. V. U. S. Entomological Commission. Circular No. 2. <Washington: 1877, 8°, 4 pp.
 Plans of work; request for information regarding the natural history, insect enemies, and parasites of *Caloptenus spretus* and other locusts; means against the same.
1577. [RILEY, C. V., *et al.*] Bulletin of the United States Entomological Commission. Destruction of the young or unfledged locusts. No. 1. [Riley, Packard, Thomas.] <Washington: 1877, 8°, 12 pp. See: <Sci. Amer., 2 June, 1877 [v. 50], n. s., v. 26, p. 344.
 Enumeration of means of destroying young or unfledged locusts; quotations of laws passed by States of Missouri, Kansas, and Minnesota to provide for the destruction of locusts and their eggs.
 Supplement to Bulletin No. 1, 2 pp. Summary of means for the destruction of young locusts.
1578. [RILEY, C. V., *et al.*] Bulletin of the United States Entomological Commission. On the natural history of the Rocky Mountain locust, and on the habits of the young or unfledged insects as they occur in the more fertile country in which they will hatch the present year. No. 2. [Riley, Packard, Thomas.] <Washington: May, 1877, 8°, 15 pp., figs. 1-11, map.
 Description, oviposition, hatching, transformations, and habits of *Caloptenus spretus*; map of the country that will suffer most severely, showing the eastern limit of injury the present year.
1579. RILEY, C. V. The grape leaf-folder. <Journ. and Farmer, 14 June, 1877. S.-b. No. 14, p. 133.
 Description of larva, imago, habits, ravages, distribution, seasons, and food-plants of *Desmia maculalis*.
1580. RILEY, C. V. The rascal leaf-crumpler. <Journ. and Farmer, 14 June, 1877. S.-b. No. 14, pp. 133-134.
 Description of larva, larva-case, imago, habits, ravages of, distribution, seasons, food-plants, and means against *Phycita nebulo* [= *Acrobasis indiginella*].
1581. RILEY, C. V. The Hessian-fly. <Journ. and Farmer, 14 June, 1877. S.-b. No. 14, p. 135.
 Description of eggs, larva, puparium, and imago of *Cecidomyia destructor*; civil history, seasons, habits, ravages of and means against it; habits of *Semiotellus* [= *Merisus*] *destructor*.
1582. RILEY, C. V. Locust prospects. <Sci. Amer., 16 June, 1877, [v. 50], n. s., v. 36, p. 369.
 Causes of the destruction of a great proportion of the young of *Caloptenus spretus*; a general and disastrous invasion improbable for some years.
1583. [RILEY, C. V.] Insect enemies. <N. Y. Tribune, 16 June, 1877. S.-b. No. 14, pp. 234-235.
 1. Apple-borers; answer to letter of V. B. P.; young apple-trees killed by *Xyleborus obesus*.

1583. RILEY, C. V.—Continued.

2. Rose-chaffer; answer to letter of I. M. H.; means against *Macrodactylus subspinosus*.
3. Bark-louse; answer to letter of J. L. K.; seasons and ravages of and means against *Mytilaspis pomicorticis* [= *pomorum*].
4. Flea-beetle; answer to letter of J. E. R.; habits, ravages, and means against *Graptodera* [= *Haltica*] *chalybea*.

1584. RILEY, C. V. The Hellgrammite. <Sci. Amer., 23 June, 1873 [v. 50], n. s., v. 36, pp. 392-393, 3 figs.

Structure and habits of *Corydalus cornutus*, description and figures of egg-masses, eggs, larvæ, pupa, and imagos; adaptations of sexual structure to conditions; figure and description of eggs of *Belostoma grande* [= *americanum*].

1585. RILEY, C. V. The 'hopper in Iowa. Report by Professor Riley, Chief of the U. S. Entomological Commission. <Chicago Daily Tribune, 4 July, 1877, v. 32, p. 3. S.-b. No. 14, pp. 112-114. Extract: <N. Y. Tribune, 4 July, 1877. S.-b. No. 14, p. 128.

Report to the governor of Iowa as to the observed and anticipated ravages of *Caloptenus spretus* in southwestern Iowa in 1877; the young locusts mostly destroyed by the weather; their natural enemies and the efforts of man; localities infested; recommends diversification of crops; summary of means against the young locusts; claims for the first recommendation of proper ditching; description of apparatus for catching and killing locusts.

1586. RILEY, C. V. Strawberry worm and remedy. <N. Y. Tribune, 18 July, 1877. S.-b. No. 14, p. 231.

Description of egg, larva, and imago, habits of and means against *Emphytus* [= *Harpiphorus*] *maculatus*.

1587. RILEY, C. V. Fighting the Hessian-fly. <N. Y. Tribune, 18 July, 1877. S.-b. No. 14, pp. 232-233. Reprint: <Colman's Rural World, 5 December, 1877. S.-b. No. 14, pp. 268-269.

Habits, seasons, parasites, introduction, spread, and ravages of and means against *Cecidomyia destructor*; description of eggs and larva.

1588. RILEY, C. V. The grasshopper. Considered practically and scientifically with a retrospective and prospective glance at his history. <Daily Rocky Mountain News [Denver, Colo.], 1 August, 1877, v. 18, p. 4. S.-b. No. 14, pp. 81-84; 110-112. Reprint: <Colorado Farmer, 2 August, 1877, v. 9, No. 31, p. 4. <Chicago [Ill.] Daily Tribune, 7 August, 1877, v. 32, p. 7. S.-b. No. 14, pp. 84-86.

Observations on the past and present conditions of *Caloptenus spretus* in 1877 in the regions invaded by it; work of its enemies and parasites; complication of the locust problem in Colorado owing to the climate of the State; prospects of future injury; means against the locusts in Colorado; work of the U. S. Entomological Commission.

1589. RILEY, C. V. In reference to wheat-worms. <Prairie Farmer, 11 August, 1877. S.-b. No. 14, p. 127; No. 20, p. 86.

Critical review of C. Thomas' "A wheat insect" (Prairie Farmer, 21 July, 1877), with correction of some obscurities in regard to *Meromyza americana* and *Gortyna nitela*.

1590. RILEY, C. V. Locust flights. An appeal from Prof. C. V. Riley. <Manitoba Daily Free Press, 8 September, 1877. S.-b. No. 14, p. 91.
Reprint of questions of Circular No. 1 of U. S. Entomological Commission, with request for answers and other information from observers in Manitoba.
1591. RILEY, C. V. The locusts in Kansas. <Sci. Amer., 8 September, 1877 [v. 51], n. s., v. 37, p. 164.
No danger of locust invasion in Kansas and adjacent States in the fall of 1877; diseased conditions of late swarms; seasons of drought and locust swarms generally followed by rainy seasons and a scarcity of locusts.
1592. RILEY, C. V. A satisfactory grasshopper-machine. <Sci. Amer., 8 September, 1877 [v. 51], n. s., v. 37, p. 169.
Description and figure of a machine for the killing of locusts.
1593. [RILEY, C. V.] Mistaken identity. <N. Y. Tribune, 12 September, 1877. S.-b. No. 14, p. 233.
Answer to letter of Subscriber; *Lema trilineata* mistaken for *Doryphora 10-lineata*; first occurrence of the latter in Vermont in 1876.
1594. RILEY, C. V. Injured orchard. <N. Y. Tribune, 12 September, 1877. S.-b. No. 14, p. 233.
Answer to letter of G. W. T.; occurrence of numerous nests of *Formicida* about the roots of orchard trees; probability that the ants are harmless; means against ants.
1595. [RILEY, C. V.] The stalk-borer. <N. Y. Tribune, 12 September, 1877. S.-b. No. 14, p. 233.
Answer to letter of Wisc.; food-plants of *Gortyna nitela*; description of larva.
1596. RILEY, C. V. Locust prospects in southwest Missouri this fall. <Journ. and Farmer, 27 September, 1877. S.-b. No. 14, pp. 236-237.
Ravages of *Caloptenus spretus* in Missouri in 1876 and prospects of same in 1877; history of locust flights in 1877.
1597. RILEY, C. V. The Colorado potato-beetle in Europe. German thoroughness. <Sci. Amer., 29 September, 1877 [v. 51], n. s., v. 37, p. 198. S.-b. No. 14, pp. 123-124.
Occurrence of *Doryphora 10-lineata* at Bremen and at Mülheim, in Germany; thorough measures taken to eradicate the pests; economic value of the measures.
1598. [RILEY, C. V.] The cussed red-leg. <Chicago [Ill.] Times, 29 September, 1877. S.-b. No. 14, pp. 119-123. Reprint: <Mo. Rept. Kansas State Board of Agric., 1877, pp. 32-41. S.-b. No. 14, pp. 146-161. Abstract: <Amer. Nat., November, 1877, v. 11, pp. 663-673. <Ca. Nat. and Quart. Jour. Sci., December, 1877, v. 8, pp. 363-374.
Distinction between the terms locust and grasshopper; nature of varieties and species; distribution of *Caloptenus spretus*; laws governing its migrations and distribution; exemplification of these laws by records of flights during 1877; means against locusts; distinctions between *Caloptenus spretus* and *C. femur-rubrum*; habits and transformations of *Astoma gryllaria* (= the young of *Trombidium sericeum* [= locustarum]); habits of the latter.

1599. RILEY, C. V. [White-grub-fungus.] <N. Y. Weekly Tribune, 4 October, 1877. Notice: <Amer. Ent., June, 1880, [v. 3], n. s., v. 1, p. 140.

1600. RILEY, C. V. On the larval characters and habits of the blister-beetles belonging to the genera *Macrobasis* Lec. and *Epicauta* Fabr.; with remarks on other species of the family *Meloidæ*. <Trans. Acad. Sci. St. Louis, 5-16 November, 1877, v. 3, pp. 544-562, figs. 35-39; figs. 1-12 of pl. 5 with 1 p. expl. of pl. Separate: <[St. Louis, Mo., 1877], pp. 1-19, figs. 35-39; figs. 1-12 of pl. 5 with 1 p. expl. of pl. Abstract: <Sci. Amer., 1877 [v. 51], n. s., v. 37; 1 December, p. 346; 15 December, p. 373; 404 il. S.-b. No. 14, pp. 272-275. <Ent. Mo. Mag., January, 1878, v. 14, pp. 169-175. Reprint, with changes and omissions: <Amer. Nat., 1878, v. 12; April [19 March], pp. 213-219, figs. 1-2; May [22 April], pp. 282-290, figs. 3-5, pl. 1 with 1 p. expl. of pl. Separate: <Boston: 1878, pp. 213-219; 282-290; pl. 1 with 1 p. expl. of pl.

Views of earlier authors as to the habits of meloid larvæ; nature of the newly hatched larva (triungulin); natural history of *Meloe* and *Sitaris*, with reference to the literature, descriptions of the triungulins, especially of *M. barbarus*?; figures of the several stages; nature of hypermetamorphosis; food-habits and breeding habits of *Macrobasis* and *Epicauta*, especially of *E. vittata*; summary of what is known of the larval habits of other genera of *Meloidæ*; descriptions and figures of all the earlier stages of *E. vittata*; descriptions of eggs and triungulins of *E. cinerea*, *E. pennsylvanica*, and *Henous confertus*.

1601. RILEY, C. V. On a remarkable new genus in *Meloidæ* infesting mason-bee cells in the United States. <Trans. Acad. Sci. St. Louis, 16 November, 1877, v. 3, pp. 563-565, fig. 40; fig. 13 of pl. 5, with 1 p. expl. of pl. Separate: <[St. Louis, Mo., 1877], pp. 20-22, fig. 40; fig. 13 of pl. 5, with 1 p. expl. of pl. Abstract: <Amer. Nat., April [19 March], 1878, v. 12, pp. 218-219.

Description of imagos, ultimate stage of second larva, and coarctate larva of *Hornia minutipennis*, n. g. et n. sp., parasitic in cells of *Anthophora sponso* [= *abrupta*]; figures ♂ imago and coarctate larva of the same; illustrates the stages of degradation in tarsal claws of several genera of *Meloidæ*; synoptic table of the North American genera of *Meloini*.

1602. RILEY, C. V. Additional notes on *Megathymus yuccæ*. <Trans. Acad. Sci. St. Louis, 16 November, 1877, v. 3, pp. 566-568. Separate: <[St. Louis, Mo., 1877], pp. 23-25.

Supplementary to No. 1465; habits, seasons, and number of molts of the larva; description of larva in second and third stage and of variations in the imago; description of *coloradensis* n. var.; *Ægiale cofaqui* a variety of *Megathymus yuccæ*; *Erynnis alceæ* bores in stems of *Malva sylvestris* in Europe; *Elaphidion tectum* and *Scyphophorus yuccæ* in stems of *Yucca*.

1603. RILEY, C. V. Further remarks on *Pronuba yuccasella* and on the pollination of *Yucca*. <Trans. Acad. Sci. St. Louis, 16 No-

1603. RILEY, C. V.—Continued.

vember, 1877, v. 3, pp. 568-573. Separate: <[St. Louis, Mo., 1877], pp. 25-30. Translation: <Stett. Ent. Zeit., 1878, Jahrg. 39, pp. 377-382.

Critical review of remarks on *Pronuba* by Chambers, Zeller, and Boll; *Hypnomenota quinquepunctella* mistaken for *Pronuba yuccasella*; variations in the former; uniformity in the latter; behavior of *Pronuba* in flowers of *Yucca*; question of the method of fertilization of *Yucca*.

1604. RILEY, C. V. On the differences between *Anisopteryx pometaria*, Harr. and *Anisopteryx æscularia* W.-V., with remarks on the genus *Paleacrita*. <Trans. Acad. Sci. St. Louis, 16 November-20 December, 1877, v. 3, pp. 573-577. Separate: <[St. Louis, Mo., 1877], pp. 30-34.

Characters of *Anisopteryx æscularia* show that it is congeneric with *A. pometaria*; criticism of Packard's Monograph of *Geometridæ*; structural characters separating *Anisopteryx* and *Paleacrita*.

1605. RILEY, C. V. Wheat rust and Hessian fly. <N. Y. Tribune, 19 December, 1877. S.-b. No. 14, p. 235.

Means against *Puccinia graminis*; *P. graminis* and *Æcidium berberidis* are alternate generations of one species.

1606. RILEY, C. V. A new oak-gall on acorn cups. <Trans. Acad. Sci. St. Louis, 20 December, 1877, v. 3, pp. 577-578.

Description of gall of *Cynips quercus-glandulus* n. sp. [p. 578] on cupules of all species of *prinus* group of *Quercus*; remarks on the allied structure of the galls of *C. fecundatrix* in Europe, and of *C. quercus-frondosa*; occurrence of galls of *C. [= Amphibolips] quercus-prunus* on cupules of acorns.

1607. [RILEY, C. V.] [Maggots in sauce.] <N. Y. Tribune, 26 December, 1877. S.-b. No. 14, p. 234.

Larvæ of *Drosophila* sp. in canned sauce; *D. nigricornis* common in similar substances.

1608. [RILEY, C. V.] [Round-headed apple-tree borer.] <N. Y. Tribune, 26 December, 1877. S.-b. No. 14, p. 234.

Ravages of and means against *Saperda bivittata [= candida]*.

1609. RILEY, C. V. Entomological notes. <Trans. Acad. Sci. St. Louis, December, 1877, v. 3, pp. 217-218 Proc. See: <Amer. Nat., October, 1876, v. 10, p. 635.

Generic resemblance of *Carpocapsa saltitans* to *C. pomonella*; correction of vernacular name of *Cicada [= Tibicen] septendecim*; occurrence of the same in Virginia in 1876; yearly development of *C. [= T.] tredecim*; *Sericaria mori* reared for five years on *Maclura aurantiaca* with increased vigor and healthfulness; *Salix nigra* stripped by larvæ of *Vanessa antiopa*; habits of the same.

1610. RILEY, C. V. Entomological notes. <Trans. Acad. Sci. St. Louis, December, 1877, v. 3, p. 219 Proc. See: <Colman's Rural World, 1876. S.-b. No. 10, p. 165. <N. Y. Tribune, 1876. S.-b. No. 9, p. 215. <Amer. Nat., October, 1876, v. 10, p. 635.

Occurrence and ravages of *Leucania albilinea* in Kansas; ectoparasitism of *Uropoda americana* on *Doryphora decemlineata*; list of vertebrate enemies of

1610. RILEY, C. V.—Continued.

D. decemlineata; occurrence of *D. decemlineata* in New Hampshire; its ravages along the Atlantic coast; see No. 1505.

1611. RILEY, C. V. Centennial insects. <Trans. Acad. Sci. St. Louis, December, 1877, v. 3, pp. 220-221 Proc.

List and characterization of insects observed injuring exhibits in the Centennial Exposition.

1612. RILEY, C. V. Parasites on eggs of *Caloptenus spretus*. <Trans. Acad. Sci. St. Louis, December, 1877, v. 3, p. 226 Proc.

A large proportion of locust eggs throughout the country are being destroyed by parasites, predaceous insects, and other causes; precautions against threatened injury; discovery of four new enemies of locust eggs.

1613. RILEY, C. V. Locust flights east of the Mississippi. <Trans. Acad. Sci. St. Louis, December, 1877, v. 3, pp. 226-228 Proc.

Locust swarms in Ohio, Illinois, Georgia, and South Carolina not composed of *Caloptenus spretus*; causes which limit the eastward flight of *C. spretus*.

1614. RILEY, C. V. Geographical range of species. <Trans. Acad. Sci. St. Louis, December, 1877, v. 3, pp. 230-233 Proc.

Range of species in our time affected only by the interposition of human influence; the limits of this range definitely established by classified knowledge, and impassable, except by man's assistance; *Caloptenus spretus* can not change its habits; the difference in the susceptibility of different species to change inexplicable.

1615. RILEY, C. V. [Anticipated locust injury next summer.] <Trans. Acad. Sci. St. Louis, December, 1877, v. 3, p. 236 Proc.

Abundance and advanced state of development of eggs of *Caloptenus spretus* in the States invaded in 1876; probable abundance and ravages in 1877.

1616. RILEY, C. V. [Japanese mode of packing silk-worm eggs.] <Trans. Acad. Sci. St. Louis, December, 1877, v. 3, p. 236 Proc.

Mode in which the eggs of *Serica mori* are packed in Japan for transportation.

1617. RILEY, C. V. Locust experience. <Trans. Acad. Sci. St. Louis, December, 1877, v. 3, p. 267 Proc. See: <Colman's Rural World, 1877. S.-b. No. 14, p. 265.

Northern limit of the permanent breeding-grounds of *Caloptenus spretus*; confirmation of views regarding laws governing locust invasions; discovery of a new law.

1618. RILEY, C. V. Mite transformations. <Trans. Acad. Sci. St. Louis, December, 1877, v. 3, pp. 267-268 Proc. See: <Colman's Rural World, 1877. S.-b. No. 14, p. 265.

Habits and transformations of *Trombidium sericeum* [= *T. locustarum*]; *Astoma gryllaria* an immature form of the same.

1619. RILEY, C. V. [*Mygale hentzii* and *Pepsis formosa*.] <Trans. Acad. Sci. St. Louis, December, 1877, v. 3, p. 269 Proc.

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1620. RILEY, C. V. [Ravages of *Termes flavipes*.] <Trans. Acad. Sci. St. Louis, December, 1877, v. 3, p. 269 Proc.
Note to communication of R. D. Grant on some ravages of *Termes flavipes*.
1621. RILEY, C. V. On the oviposition of *Saperda bivittata* Say. <Trans. Acad. Sci. St. Louis, December, 1877, v. 3, pp. 269-270 Proc.
See: <Colman's Rural World, 28 November, 1877. S.-b. No. 20, p. 6.
Description of egg and manner of oviposition of *Saperda bivittata* [= *candida*].
1622. RILEY, C. V. On migratory butterflies. <Trans. Acad. Sci. St. Louis, December, 1877, v. 3, pp. 273-274 Proc. See: <Valley Naturalist, January, 1878, v. 1, p. 2.
Phenomena and causes of the migrations of butterflies, especially of *Danaüs archippus*.
1623. RILEY, C. V. [Phylloxera and grape-rot.] <Trans. Acad. Sci. St. Louis, December, 1877, v. 3, p. 275 Proc. See: <Colman's Rural World, 28 November, 1877. S.-b. No. 14, p. 268.
Disagreement with views of A. J. Cook as to there being any connection between the work of *Phylloxera vastatrix* and the ordinary grape-rot.
1624. RILEY, C. V. The periodical Cicada. <Western Farmer's Almanac for 1878, 1877, p. 48. S.-b. No. 14, p. 138. Reprint: <Colman's Rural World, 28 November, 1877. S.-b. No. 14, pp. 265-266.
Regular periodicity of the appearance of *Cicada* [= *Tibicen*] *septendecim* and *C.* [= *T.*] *tredecim*; popular description and natural history of the same; chronology of twenty-two different broods, geographically classified.
1625. RILEY, C. V. The locust plague in the United States: being more particularly a treatise on the Rocky Mountain locust, or so-called grasshopper, as it occurs east of the Rocky Mountains, with practical recommendations for its destruction. <Chicago: Rand, McNally & Co., 1877, 236 pp., 3 pl., 42 figs. Extract: <Manitoba Standard, 1877. S.-b. No. 14, pp. 97-98. Notice: <Cultivator and Country Gentl., 30 August, 1877, v. 42, p. 557. <Gardener's Mo. and Hortie., October, 1877, v. 19, p. 317. <Ent. Mo. Mag., October, 1877, v. 14, p. 118.

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1626. RILEY, C. V. On an extensile penetrating organ in a gamasid mite. <Proc. Amer. Assoc. Adv. Sci. for 1876, 1877, v. 25, pp. 273-275, 1 fig. See: <Ca. Ent., September [October], 1876, v. 8, p. 180.

1626. RILEY, C. V.—Continued.

Habits and description of *Uropoda vegetans* and *U. americana* n. sp.; nature of the adhesive filament of these mites; structure of the supposed maxillary penetrating organ in *Uropoda*.

1627. RILEY, C. V. On the curious egg-mass of *Corydalus cornutus*, Linn., and on the eggs that have hitherto been referred to that species. <Proc. Amer. Assoc. Adv. Sci. for 1876, 1877, v. 25, pp. 275–279, 1 fig. Reprint: <9th Ann. Rept. State Ent. Mo., March, 1877, pp. 125–129, figs. 30–33. See: <Ca. Ent., October [November], 1876, v. 8, pp. 181–182.

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1628. RILEY, C. V. Phylloxera and grape-rot. <N. Y. Tribune, January, 1878. S.-b. No. 19, pp. 193; 224. Reprint: <Colman's Rural World, 1878. S.-b. No. 14, pp. 266–267. Extract: <Gardener's Mo. and Hortie., July, 1879, v. 21, pp. 213–214. S.-b. No. 23, pp. 118; 143–145. <Ann. Rept. [U. S.] Commissioner Agric. for 1878, 22 November, 1879, pp. 237–238. See: <Gardener's Chronicle, 9 August, 1879. S.-b. No. 26, p. 15.

See No. 1721 for synopsis of contents.

1629. RILEY, C. V. Address by Prof. C. V. Riley, retiring, before the St. Louis Academy of Science. <St. Louis Republican, 8 January, 1878. S.-b. No. 14, p. 269. Reprint: <Trans. Acad. Sci. St. Louis, 1880, v. 4, pp. 1–6 Proc.

Review of progress made in science in 1876; success of the investigation into the Rocky Mountain locust scourge.

1630. RILEY, C. V. New facts about the round-head apple-tree borer. <N. Y. Weekly Tribune, 20 February, 1878. S.-b. No. 19, pp. 193–194. Reprint: <Colman's Rural World, 20 March, 1878. S.-b. No. 14, pp. 267–268. Reprint, with slight omission: <*Ibid.*, 12 March, 1879. S.-b. No. 23, pp. 101–102. See: <Mirror and Farmer, 6 April, 1878. S.-b. No. 20, p. 3.

Description of egg and manner of oviposition of *Saperda bivittata* [= *candida*]; seasons of oviposition; means against the same.

1631. [RILEY, C. V.] Buggy beans. <N. Y. Tribune, 20 February, 1878. S.-b. No. 14, p. 234.

Habits and distribution of and means against *Bruchus fabæ*; edibility of the same.

1632. RILEY, C. V. On the transformations of the red mites. <Amer. Nat., March [23 February], 1878, v. 12, pp. 139–146, figs. 1–6.

Habits, description, and figures of *Trombidium locustarum* [p. 142], *T. giganteum* [p. 143], *T. muscarum* [p. 144], and *Hydrachna belostomæ* [p. 146], n. sp.; figures and description of most of the stages of the same; definition of *Trombidium*. [Advance extract from No. 1643.]

1633. RILEY, C. V.] Clothes moths. <Sci. Amer., 23 March, 1878 [v. 52], n. s., v. 38, p. 177. S.-b. No. 19, p. 238. Reprint: <Kansas Farmer, 17 April, 1878. S.-b. No. 19, p. 225. <Colman's Rural World, 3 April, 1878. S.-b. No. 19, pp. 198–199.

1633. RILEY, C. V.—Continued.

Indiscriminate use of names and habits of several species of *Tinea* injurious to woolen goods, fur, hair, and similar substances; means against the moths.

1634. RILEY, C. V. *Pieris vernalis* and *P. protodice*. <Ca. Ent., February [March], 1878, v. 10, p. 39.

Conformation of T. E. Bean's conclusion that *P. vernalis* is the spring form of *P. protodice*.

1635. RILEY, C. V. Migratory butterflies. <Sci. Amer., 6 April, 1878 [v. 52], n. s., v. 38, p. 215, fig. S.-b. No. 19, p. 250. Extract: <Amer. Ent., April, 1880 [v. 3], n. s., v. 1, p. 102, fig. 34.

Occurrence of migratory swarms of *Danaïs archippus* in central southern United States in the autumn of 1877, and of return migrations in spring; explanation of these migrations; mentions other migratory *Rhopalocera*; distribution of *Danaïs archippus* and *Cynthia* [= *Pyrameis*] *cardui*; figure of *Danaïs archippus*.

1636. RILEY, C. V. The horn-bug. <Sci. Amer., 20 April, 1878 [v. 52], n. s., v. 38, p. 249, 1 fig. S.-b. No. 19, p. 241.

Natural history, description of egg, larva and pupa, and figures of larva, pupa, and imago of *Passalus cornutus*.

1637. RILEY, C. V. Egg-feeding mites. <Ca. Ent., March [April], 1878, v. 10, pp. 58–59.

Citation of records of *Acari* feeding on eggs.

1638. [RILEY, C. V.] Bad work of the grain Aphis <N. Y. Tribune, 26 June, 1878. S.-b. No. 19, p. 224.

Habits and ravages of and means against *Aphis avenæ* [= *Nectarophora granaria*].

1639. [RILEY, C. V.] Of Doryphora. <N. Y. Tribune, 26 June, 1878. S.-b. No. 19, p. 243.

Natural history, enemies, and spread of *Doryphora decemlineata*; description of larva and imago; methods of using Paris green.

1640. RILEY, C. V. The apple-tree borer. <N. Y. Tribune, 24 July, 1878. S.-b. No. 19, p. 195.

Means against *Chrysobothris femorata*.

1641. [RILEY, C. V.] The raspberry saw-fly. <N. Y. Tribune, 24 July, 1878. S.-b. No. 19, pp. 197; 226.

Habits of and means against *Selandria* [= *Monophadnus*] *rubi*.

1642. [RILEY, C. V.] Inquiring friends. <N. Y. Tribune, 24 July, 1878. S.-b. No. 19, p. 198.

Means against *Aegeria tipuliformis*.

1643. [RILEY, C. V., et al.] First annual report of the United States Entomological Commission for the year 1877, relating to the Rocky Mountain locust and the best methods of preventing its injuries and of guarding against its invasions, in pursuance of an appropriation made by Congress for this purpose. With map and illustrations. <Washington, 29 July, 1878, pp. 16+

1643. RILEY, C. V.—Continued.

477+ 295, 111 figs., 5 pls., 2 maps. See: <Sci. Amer., 5 July, 1879 [v. 55], n. s., v. 41, p. 8. S. b. No. 23, p. 121.

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1644. RILEY, C. V. Attractive but untrue. <N. Y. Tribune, 31 July, 1878. S.-b. No. 19, p. 198.

Absurdity of statement that "a parasite of the strawberry plant has been found to wage a war of extermination against the *Phylloxera*."

1645. RILEY, C. V. Locusts eat the castor bean. <N. Y. Tribune, 14 August, 1878. S.-b. No. 19, pp. 198, 227–228.

Acrididae relish *Fagopyrum* and *Linum* but eat *Ricinus communis* with reluctance, though with impunity.

1646. [RILEY, C. V.] The stalk-borer. <N. Y. Weekly Tribune, 21 August, 1878, v. 37. S.-b. No. 19, pp. 227; 242–243; 244.

Description, food-plants, and habits of larva and description of imago of *Gortyna nitela*; *G. nebris* a variety of *G. nitela*.

1647. RILEY, C. V. That hundred and fifty million dollars. <Sci. Amer., 24 August, 1878 [v. 53], n. s., v. 39, p. 117. S.-b. No. 19, p. 245.

Critical review of sensational reports in current agricultural papers; an appropriation of \$5,000 made to the U. S. Department of Agriculture for cotton insect investigation.

1648. RILEY, C. V. Silk-worm breeding. <Sci. Amer., 24 August, 1878 [v. 53], n. s., v. 39, p. 119. S.-b. No. 19, p. 244.

Number of annual generations of *Sericaria mori*; inferiority of races breeding more than once annually.

1649. RILEY, C. V. Cotton-worm. <Daily Constitution [Atlanta, Ga.], 8 September, 1878, v. 11, No. 73, p. 1.

Aletia argillacea [= *xylina*] feeds from the extra-floral nectar-glands of the cotton-plant.

1650. RILEY, C. V. That "fatherless and motherless race." The basket-worm, alias drop-worm, alias bag-worm, *Thyridopteryx ephemeraeformis*. <Sci. Amer. Suppl., 28 September, 1878, fig. S.-b. No. 19, pp. 245–246.

Critical review of W. H. Gibson's article extracts from author's "The bag-worm," with additions; degradation and breeding habits of female *Psychidae*; method of imagination, fecundation, and oviposition of *Thyridop-*

1650. RILEY, C. V.—Continued.

teryx ephemeriformis; description of eggs and figures of all other stages; down in which the eggs are enveloped is extruded from the abdomen with the eggs; food-plants, parasites, and means against the species; its follicles available for silk production; this species proterogynous but most insects proterandrous.

1651. RILEY, C. V. Notes on the life-history of the blister-beetles, and on the structure and development of *Hornia*. <Kansas City Review of Science and Industry, September, 1878, vol. 2, No. 6, p. 353. S.-b. No. 19, p. 209. Reprint: <Proc. Amer. Assoc. Adv. Sci. for 1878 [14 July], 1879, v. 27, pp. 284–285. See: <Ca. Ent. September [October], 1878, v. 10, pp. 177–178.

Occurrence in *Epicauta* and *Macrobasis* of the hypermetamorphoses characteristic of *Meloidæ*; specification of the stages of the same; summary of the life-history of *Hornia minutipennis* parasitic on *Anthophora abrupta*.

1652. RILEY, C. V. On the larval characteristics of *Corydalis* and *Chauliodes*, and on the development of *Corydalis cornutus*. <Kansas City Review of Science and Industry, September, 1878, v. 2, No. 6, p. 354. S.-b. No. 19, pp. 210–211. Reprint: <Ca. Ent., May, 1879, v. 11, pp. 96–98. <Proc. Amer. Assoc. Adv. Sci. for 1878, [14 July], 1879, v. 27, pp. 285–287. See: <Ca. Ent., September [October], 1878, v. 10, p. 178.

Characters and economic value of larva of *Corydalis cornutus*; characters in brief of the imago; characters of larva of *Chauliodes*; description of eggs of both genera; situation of egg-masses of *Corydalis* and physical character of their covering; description of respiratory apparatus and method of respiration of larvæ of *Corydalis*.

1653. RILEY, C. V. Biological notes on the gall-making *Pemphiginæ*. <Kansas City Review of Science and Industry, September, 1878, v. 2, No. 6, p. 380. S.-b. No. 19, pp. 211–212: 212. Reprint: <Proc. Amer. Assoc. Adv. Sci. for 1878, [14 July], 1879, v. 27, pp. 288–289. Abstract: <Nature, 28 November, 1878, v. 19, p. 75. Extract: <Sci. Amer., 26 October, 1878 [v. 53], n. s., v. 39, p. 266. S.-b. No. 19, p. 244.

Method of hibernation of gall-making *Pemphiginæ* on *Ulmus*.

NOTE.—Nos. 1651–1653 and 1668–1669 were reprinted from Proc. Amer. Assoc. Adv. Sci., v. 27, under a separate cover. Salem, February, 1879.

1654. [RILEY, C. V.] The cottonwood killer. <N. Y. Weekly Tribune, 9 October, 1878. S.-b. No. 19, p. 242. Extract: <Amer. Ent., July, 1880 [v. 3], n. s., v. 1, pp. 159–160.

Habits, ravages, and food-plants of *Lina scripta*; description of and means against the same; *Trypeta pomonella* an example of the acquisition of new habits in insects.

1655. [RILEY, C. V.] A new insect foe to green corn. <N. Y. Tribune, 9 October, 1878. S.-b. No. 19, pp. 234; 244.

Ravages of *Cetonia* [= *Euphoria*] *inda*.

1656. [RILEY, C. V.] Inquiring friends. <N. Y. Tribune, 9 October, 1878. S.-b. No. 19, p. 245.

Ravages and food-plants of *Hylesinus opaculus*; impracticability of means against bark-borers in large trees.

1657. RILEY, C. V. Notes from the South. Facts about the cotton-worm. <Sci. Amer., 16 November, 1878 [v. 53], n. s., v. 39, pp. 312-313. S.-b. No. 19, pp. 213-214; 239-241. See: <Amer. Rural Home, 27 September, 1878. S.-b. No. 23, p. 128.
Note of a trip in the southern United States in 1878; commission to investigate insects injurious to the cotton-plant; food-plants and habits of the larva and imago of *Aletia argillacea* [= *xylina*]; use of poisonous baits and of Paris green; *Anomis exacta* injurious in certain regions.
1658. RILEY, C. V. Some further facts regarding that "fatherless race." <Sci. Amer. Suppl., 30 November, 1878. S.-b. No. 19, pp. 238-239.
Description and figures of male copulatory organs of *Thyridopteryx ephemerae-formis*; description of method of copulation; figures larva, pupa, imagos, and follicles of the same; "parthenogenesis, though not improbable, seldom takes place in this species;" nature of the down intermingled with the eggs; previous error concerning this down.
1659. [RILEY, C. V.] "The carpet bug." <N. Y. Tribune, 1 December, 1878. S.-b. No. 19, p. 236.
Ravages of and means against *Anthrenus scrophulariæ*; figures larva, pupa and imago.
1660. [RILEY, C. V.] A bug that eats bees. <N. Y. Tribune, 4 December, 1878. S.-b. No. 19, p. 237. Reprint: <Prairie Farmer, 4 January, 1879, v. 50, p. 3. S.-b. No. 23, p. 110.
Description and habits of *Phymata erosa*.
1661. [RILEY, C. V.] Tomato worm. <N. Y. Tribune, 4 December, 1878. S.-b. No. 19, p. 237.
Excessive abundance of larva of *Sphinx quinquemaculata* [= *Protoparce celeus*] near Port Hope, Ontario, in 1878.
1662. [RILEY, C. V.] Worm snake. <N. Y. Tribune, 4 December, 1878. S.-b. No. 19, p. 237.
Habits and abode of larvæ of *Sciara* sp. at Orange, Conn.
1663. [RILEY, C. V.] Carpet pests. <N. Y. Tribune, 4 December, 1878. S.-b. No. 19, p. 237.
Food habits, spread of, and means against *Anthrenus scrophulariæ*.
1664. RILEY, C. V. Corn worm. <N. Y. Tribune, 4 December, 1878. S.-b. No. 19, pp. 235; 237.
Food-plants and means against *Heliothis armigera*.
1665. [RILEY, C. V.] Hessian-fly. <N. Y. Tribune, 4 December, 1878. S.-b. No. 19, pp. 235; 237.
Indications of the ravages of and food-plants of *Cecidomyia destructor*.
1666. [RILEY, C. V.] Apple-worm. <N. Y. Tribune, 4 December, 1878. S.-b. No. 19, pp. 235; 237.
Baldwin apples more exempt than other varieties from the attacks of the second brood of *Carpocapsa pomonella*.
1667. RILEY, C. V. Anent the English sparrow. <Evening Star [Washington, D. C.], 28 December, 1878, v. 52, No. 8030, p. 1. S.-b. No. 19, pp. 214-215; No. 23, p. 151.
Value of *Passer domesticus* as a destroyer of insects and in other respects; objections to the special protection of the same.

1668. RILEY, C. V. Silk-culture; a new source of wealth to the United States. <Kansas City Review of Science and Industry, 1878, v. 2, pp. 419-423. S.-b. No. 19, pp. 216-218. Reprint: <Proc. Amer. Assoc. Adv. Sci. for 1878, [14 July], 1879, v. 27, pp. 277-283. Extract: <Kansas Farmer, 1879: 26 February, 12 November. S.-b. No. 23, pp. 105-106; No. 39, pp. 91-92. See: <Ca. Ent., September [October], 1878, v. 10, p. 178. <St. Louis Globe-Democrat, 28 August, 1878. S.-b. No. 19, p. 203.

Practicability and desirability of the extensive establishment of silk-culture in the United States; sketch of efforts made towards such establishment; requisites to its success.

1669. RILEY, C. V. The philosophy of the movements of the Rocky Mountain locust. <Kansas City Review of Science and Industry, 1878, v. 2, pp. 424-427. S.-b. No. 19, pp. 218-220. Reprint: <Proc. Amer. Assoc. Adv. Sci. for 1878, 14 July, 1879, v. 27, pp. 271-277. See: <St. Louis Daily Globe-Democrat, 24 August, 1878, v. 4, No. 95.

Limits of breeding-grounds of and region invaded by *Caloptenus spretus*; causes, periods, and directions of flights of the same; causes of the limitation of the flights; ravages; generalizations regarding locust invasions; work of the U. S. Entomological Commission.

1670. RILEY, C. V. A complete life-history of the army-worm, *Leucania unipuncta*, and its parasites. <25th Ann. Rept. Secr. Mass. Board Agric. for 1877, 1878, pp. 243-253, figs.

Early history, synonymy, distribution, seasons, enemies, and parasites of *Leucania unipuncta*; habits of larvæ and of female imagoes; descriptions of all stages; figures of all stages except the egg; figures of two unnamed parasitic Ichneumons. Parasitic habits of *Exorista* [= *Nemoræa*] *leucaniæ*, *E. flavicauda*, *Microgaster* [= *Apanteles*] *militaris*, *Pezomachus minimus*, and *Ophion purgatus*; descriptions of *Microgaster* [= *A.*] *militaris*, *Mesochorus vitreus*, and *Ophion purgatum*. *Ichneumon leucaniæ* also a parasite.

1671. RILEY, C. V. Phylloxera. <Johnson's New Universal Cyclopædia, 1878, v. 3, pp. 1241-1243, 8 figs. S.-b. No. 10, pp. 192-194.

Definition of the genus *Phylloxera*; list of the sixteen (16) described United States species; descriptions of their galls; distribution, history, description, and figures of various stages and ravages of and means against *Phylloxera vastatrix*.

1672. RILEY, C. V. Potato-bug. <Johnson's New Universal Cyclopædia, 1878, v. 3, pp. 1361-1364, 9 figs. S.-b. No. 10, pp. 195-198.

List of principal enemies of potato-plant; spread, natural history, food-plants, enemies of, and means against *Doryphora decemlineata*; figures of the same in its different stages, and of *Lydella* [= *Exorista*] *doryphoræ*, *Calosoma calidum*, *Hippodamia convergens*, *Mysia* [= *Anatis*] *15-punctata*, *Arma* [= *Podisus*] *spinosus*, *Harpactor* [= *Milyas*] *cinctus*, *Perillus circumcinctus*, and *Doryphora juncta*.

1673. RILEY, C. V. Weevil. <Johnson's New Universal Cyclopædia, 1878, v. 4, p. 1338, fig. S.-b. No. 14, p. 46.

Definition of "weevil;" mention of numerous species, with statement of their food-plants and manner of obtaining food; habits and means against *Sitophilus* [= *Calandra*] *granaria* and *S.* [= *C.*] *oryzæ*.

1674. RILEY, C. V. The locust swarms that devastate the trans-Mississippi country; their source, movements, and eastern limit. <Western Farmer's Almanac for 1879, 1878, pp. 48-50. S.-b. No. 19, pp. 247-248.

Limits of the breeding-grounds of and of regions invaded by *Caloptenus spretus*; causes, periods, and directions of their flights; causes of the limitations of the same physical and principally atmospheric; amount of ravages.

1675. [RILEY, C. V.] Prof. Riley in favor of the birds. <Evening Star [Washington, D. C.], 9 January, 1879, v. 53, No. 8039, p. 3. S.-b. No. 19, pp. 223-224; No. 23, p. 94.

From St. Louis [Mo.] Globe-Democrat. List of some birds which are beneficial to horticulture and some which are noxious.

1676. RILEY, C. V. Letter from Prof. C. V. Riley. <Colman's Rural World, 15 January, 1879. S.-b. No. 23, pp. 107-108.

Letter to N. J. Colman transmitting report as former treasurer of the Missouri State Horticultural Society; transmission of documents for distribution; proposal for a revised and condensed edition of author's reports as State entomologist of Missouri.

1677. [RILEY, C. V.] Michigan apples and codling-moth. <N. Y. Tribune, 15 January, 1879. S.-b. No. 23, p. 109.

Freedom of apples from *Carpocapsa pomonella* in 1878 in Michigan due to the smallness of the apple crop in 1877 and to the efforts made by the orchardists to exterminate the insects.

1678. RILEY, C. V. Notes on the *Aphididæ* of the United States, with descriptions of species occurring west of the Mississippi. <Bull. U. S. Geol. and Geog. Surv. Terr., 28 February, 1879, v. 5, pp. 1-32, pl. 1-2, with 2 pp. expl. of pl. Separate: <Washington, 22 January, 1879, 32 pp., 2 pl., with 2 pp. expl. of pl. Abstract: <Sci. News, 15 April, 1879, v. 1, pp. 184-186.

Part 1, pp. 1-17, by C. V. Riley, entitled "Biological notes on the *Pemphiginæ*, with descriptions of new species;" history and description of *Schizoneura americana* n. sp. [p. 4], *Colopha ulmicola*, *Pemphigus populi-monilis* n. sp. [p. 13], *P. populi-transversus* n. sp. [p. 15], *P. p.-ramulorum* n. sp. [p. 16], *P. acerifolii* n. sp. [p. 16], *P. fraxinifolii* n. sp. [p. 17], and *Hormaphis spinosus*.

Part 2, pp. 18-32, by J. Monell, entitled "Notes on *Aphidinaæ*, with descriptions of new species." Describes nine (9) new species of *Siphonophora*, five (5) of *Aphis*, two (2) of *Rhopalosiphum*, nine (9) of *Callipterus*, three (3) of *Chaitophorus*; description of other species of these genera and of *Drepanosiphum* and the genera above named; synoptic tables of some of the species.

1679. [RILEY, C. V.] . [Plant-lice on potatoes.] <N. Y. Tribune, 12 February, 1879. S.-b. No. 23, p. 109.

Aphididæ reputed injurious to potato plants, probably *Aphis solani*.

1680. RILEY, C. V. Missouri entomological reports. <Colman's Rural World, 19 February, 1879. S.-b. No. 23, p. 102.

Proposal for republication of the reports of the State entomologist of Missouri; reasons for the non-publication of a tenth report; sketch of what that report would have contained.

1681. RILEY, C. V. Entomological notes. The chinch-bug. <Farmer's Review. February, 1879, 2 figs. S.-b. No. 23, pp. 111-112.
Figures of all stages, ravages, natural history, and means against *Blissus leucopterus*; its method of hibernation, and the effect of weather upon it.
1682. RILEY, C. V. Notes on the apple-worm. <Colman's Rural World, 5 March, 1879. S.-b. No. 23, p. 102. Reprint with slight changes: <Amer. Nat., August [July], 1879, v. 13, pp. 523-524. <Ann. Rept. [U. S.] Commissioner Agric. for 1878, 22 November, 1879, pp. 238-239.
See No. 1721 for synopsis of contents.
1683. RILEY, C. V. The rice-weevil. Serious injury to stored and to cribbed corn. <Farmer's Review, March, 1879, fig. S.-b. No. 23, p. 99; 112.
Figures larva, pupa, and imago of *Calandra oryzae* and imago of *C. granaria*; habits, ravages, and means against the same; description of egg and method of oviposition of *C. oryzae*; use of carbon bisulphide against these insects; poisonous effects of eating the comminuted beetles.
1684. RILEY, C. V. [Letter to W. G. Le Duc.] <Boston Daily Herald, 4 April, 1879. <Psyche Advertiser, 11 April, 1879, v. 2, p. 9. <Ent. Nach., 1 July, 1879, jahrg. 5, p. 177.
The reason for which the author resigned as entomologist of the U. S. Department of Agriculture was not ill-health.
1685. RILEY, C. V. Preventing rot in plums. <N. Y. Tribune, 9 April, 1879. S.-b. No. 23, p. 110; 129.
Trapping and jarring recommended as a means against *Conotrachelus nenuphar*.
1686. [RILEY, C. V.] A new insect pest. <Colorado Farmer, 10 April, 1879, v. 12, No. 15, p. 6. S.-b. No. 23, p. 108.
Injury to orchards and ornamental trees in California by *Dorthesia* [*characias*?], introduced from Australia; ravages of *D. characias* in southern Africa; prospective ravages in California; means against it.
1687. RILEY, C. V. The nervous system and salivary glands of *Phylloxera*. <Psyche, 11 April, 1879, v. 2, pp. 225-226.
Correctness of E. L. Mark's conclusion that the author had mistaken nerve cords for tracheae; dissent from M. Cornu's view that the root swellings caused by *Phylloxera* are due to mechanical action of the puncture and the subsequent absorption of liquids; swelling considered to be caused by the introduction of a salivary secretion.
1688. RILEY, C. V. Mr. Henderson's experiments. <Gardener's Mo. and Hortic., April, 1879, v. 21, pp. 120-121. S.-b. No. 23, p. 107.
Review of P. Henderson's "Carnivorous plants;" believes that *Dionaea* and *Drosera* are nourished by the insects digested by their leaves.
1689. RILEY, C. V. The migrations and hibernation of *Aletia argillacea*. <Washington [D. C.] World, 10 May, 1879. <Science News, 1 June, 1879, v. 1, pp. 230-232. S.-b. No. 23, pp. 119-120. <Sci. Amer., 14 June, 1879 [v. 54], n. s., v. 40, p. 375. <Galveston [Tex.] Daily News, 24 October, 1879, v. 38, p. 2.

1689. RILEY, C. V.—Continued.

S.-b. No. 23, pp. 166-167, No. 42, pp. 38-39. Abstract: <Amer. Nat., November [25 October], 1879, v. 13, p. 726. <Farmer's Review, September, 1879. S.-b. No. 23, p. 108.

Ravages of insects, particularly of *Aletia argillacea* [= *xylina*] in the United States; hibernation theories; author's belief in the probable hibernation of the moth in the southern parts of the cotton belt; species mistaken for *Aletia*; description and food-plants of *Aspila virescens*.

1690. RILEY, C. V. Insects affecting clover. <N. Y. Tribune, 14 May, 1879. S.-b. No. 23, p. 90; 97; 129.

Habits, ravages of and means against *Hylesinus trifolii* and *Cecidomyia leguminicola*; prior observations upon the same; characters distinguishing *C. leguminicola* from *C.* [= *Diplosis*] *tritici* and *C. destructor*.

1691. RILEY, C. V. [*Æcanthus niveus*.] <N. Y. Tribune, 14 May, 1879. S.-b. No. 23, p. 95; 98.

Oecurrence of eggs of *Æcanthus niveus* in twigs of apple, raspberry, grape, and other plants; slight injuries to be expected from the same; means against them.

1692. [RILEY, C. V.] Insect powders and their use. <N. Y. Tribune, 14 May, 1879. S.-b. No. 23, p. 95; 96; 130-131.

Abstract of W. Saunders' "Insect powder," with additions; differences between Persian and Dalmatian insect powder; methods of using them against insects.

1693. [RILEY, C. V.] The grasshopper prospect. <N. Y. Tribune, 14 May, 1879. S.-b. No. 23, p. 98.

Prospect of injuries by *Caloptenus spretus* in 1879; a new species injurious in the Sierra Valley of California.

1694. RILEY, C. V. The westward progress of the imported cabbage-worm. <Amer. Nat., June [20 May], 1879, v. 13, p. 393. See: <Colorado Farmer, 10 April, 1879. S.-b. No. 23, p. 108. <Farmer's Review, April, 1879. S.-b. No. 22, p. 64. <Colman's Rural World, 1879. S.-b. No. 23, p. 108. <Ann. Rept. [U. S.] Commissioner Agric. for 1878, 22 November, 1879, p. 239. Spread of *Pieris rapæ* into Illinois and Missouri; means against the same.

1695. [RILEY, C. V.] Lures for moths. <N. Y. Tribune, 28 May, 1879. S.-b. No. 23, p. 95.

Trapping *Carpocapsa pomonella* in shallow dishes of sweetened liquid more harmful than beneficial, as many useful insects are destroyed; the method serviceable against *Heliothis armigera*.

1696. [RILEY, C. V.] The currant-worm. <N. Y. Tribune, 11 June, 1879. S.-b. No. 23, p. 106.

Description, habits, distribution, and spread of and means against *Nematus ventricosus* [= *ribesii*]; methods of using hellebore.

1697. [RILEY, C. V.] Sweet-potato beetle. <N. Y. Tribune, 11 June, 1879. S.-b. No. 23, pp. 106-107; 131.

Description of all stages, habits, food plants, and means against *Coptocycla* [= *Cassida*] *nigripes*.

1698. RILEY, C. V. [The seventeen-year Cicada.] <N. Y. Tribune, 1879. Reprint: <Colman's Rural World, 25 June, 1879. S.-b. No. 23, p. 152.
Boundaries of the areas in which *Cicada* [= *Tibicen*] *septendecim* is expected to occur in 1879; request for information of its appearance.
1699. RILEY, C. V. The imported carpet-beetle, *Anthrenus scrophulariæ*, L. <Farmer's Review, 1879, fig. S.-b. No. 23, pp. 96-98. Extract: <Amer. Ent., March, 1880 [v. 3], n. s., v. 1, p. 54. Letter of J. H. Parsons, with answer; description of larva and imago of *Anthrenus scrophulariæ*; its history, habits, ravages, and means against them; figures larva, pupa, and imago.
1700. [RILEY, C. V.] The cheese-skipper. <N. Y. Tribune, 2 July, 1879. S.-b. No. 23, p. 93. Notice: <Farmer's Review, 7 September, 1879. S.-b. No. 23, p. 103.
Description of larva, pupa, and imago, habits and means against *Piophilæ casei*.
1701. RILEY, C. V. The thick-thighed walking-stick. <Sci. Amer., 5 July, 1879 [v. 55], n. s., v. 41, pp. 7-8, fig. S.-b. No. 23, p. 121. Reprint, with slight changes: <Ann. Rept. [U. S.] Commissioner Agric. for 1878, 22 November, 1879, pp. 241-245, pl. 3. Treats of *Diapheromera femorata*. See No. 1721 for synopsis of contents.
1702. RILEY, C. V. The cotton-worm. <Mobile Register, 9 July, 1879. S.-b. No. 68, p. 204. See: <Colorado Citizen, 17 July, 1879. S.-b. No. 23, p. 91. <Galveston News, 19 July, 1879. S.-b. No. 23, p. 93.
Remarks at the Cotton Exchange about prospective injuries from *Aletia argillacea* [= *xylina*]; sudden appearance and means against the same; more injurious in wet than dry weather.
1703. RILEY, C. V. Other insects affecting cheese. <N. Y. Tribune, 9 July, 1879. S.-b. No. 23, p. 92. Reprint: <Amer. Dairyman. <Western Rural, 9 August, 1879, v. 17, No. 32, p. 250. S.-b. • No. 23, p. 92.
Habits and transformations of *Tyroglyphus siro*, *Corynetes* [= *Necrobia*] *rufipes*, and *Dermestes lardarius*; tenacity of life of the *Tyroglyphus* and assumption of *Hypopus* form by the same; anecdote of Latreille; injury done in cheese by *Musca corvina*.
1704. RILEY, C. V. Pupation of the *Nymphalidæ*. Abstract: <Psyche, 11 July, 1879, v. 2, pp. 249-251.
Notice of prevalent explanations of the manner in which suspended pupa of Lepidoptera support themselves while shedding the larval skin; explanation of the process in *Vanessa antiopa* and *Paphia glycerium*.
1705. RILEY, C. V. Fire-flies. <Sci. Amer., 26 July, 1879 [v. 55], n. s., v. 41, p. 49. S.-b. No. 23, p. 104.
Definition of "Fire-flies;" description of larva, pupa, and imago of *Photinus pyralis*; *Photuris pennsylvanicus*, the commonest species in the more northern states; absence or imperfect development of wings in certain female *Lampyridæ*.

1706. RILEY, C. V. Grape-scale insect, new species. <Pacific Rural Press, 16 August, 1879. S.-b. No. 32, p. 66.
Answer to inquiry of editor of Press; a new coccid, allied to *Pulvinaria vitis*.
1707. RILEY, C. V. Dragon-flies. <Sci. Amer., 23 August, 1879 [v. 55], n. s., v. 41, p. 113. S.-b. No. 23, p. 100.
Description and natural history of *Libellulidæ*.
1708. RILEY, C. V. Failure of tea roses. Habits of Fuller's rose beetle, *Aramigus fulleri* Horn. <Sci. Amer., 30 August, 1879 [v. 55], n. s., v. 41, p. 129, fig. S.-b. No. 23, pp. 114-116. Reprint: <Gardener's Mo. and Hortic., October, 1879, v. 21, pp. 310-311, fig. S.-b. No. 23, pp. 126-127. Reprint, with additions: <Ann. Rept. [U. S.] Commissioner Agric. for 1878, 22 November, 1879, pp. 255-257, pl. 17, f. 2.
See No. 1721 for synopsis of contents.
1709. RILEY, C. V. The "Devil's darning needle." <Sci. Amer., 6 September, 1879 [v. 55], n. s., v. 41, p. 148. S.-b. No. 23, p. 104. Review: <Sci. Amer., 27 September, 1879 [v. 55], n. s., v. 41, p. 194. S.-b. No. 23, p. 103½.
Diapheromera femorata winters in the egg-state; W. J. McGee confounds the above with a species of *Ranatra*; the term "Devil's darning needle" mostly associated in the popular mind with the dragon-flies (*Libellulidæ*).
1710. [RILEY, C. V.] The red-spider on roses. <Sci. Amer., 13 September, 1879 [v. 55], n. s., v. 41, p. 161. S.-b. No. 23, pp. 116-117.
Nature, ravages, and means against *Tetranychus telarius*; habits and transformations of *Acarina*.
1711. RILEY, C. V. Philosophy of the pupation of butterflies. <Sci. Amer. Suppl. No. 193, 13 September, 1879, p. 3069, 3 figs. S.-b. No. 23, p. 125. Reprint: <Science News, 15 September, 1879, v. 1, pp. 346-350. Reprint with changes: <Nature, 16 October, 1879, v. 20, pp. 594-595. <Kosmos, January, 1880, bd. 6, pp. 313-318. <Proc. Amer. Assoc. Adv. Sci. for 1879, 1880, v. 28, pp. 455-463, figs. <Separate: Salem, Mass., July, 1880, 9 pp., 6 figs. <Amer. Ent., July, 1880 [v. 3], n. s., v. 1, pp. 162-167, figs. 65-70. Abstract: <The Field Nat. and Sci. Student, January, 1883, pp. 179-180. S.-b. No. 42, p. 1. <Bull. Philos. Soc. Wash., 1879, v. 3, pp. 41-43.
Illustrates the prevalent explanation of the manner in which suspended chrysalids become attached to their supports; describes and illustrates the more correct process; structure of the terminal joint of the chrysalis especially in *Vanessa antiopa*, *Terias* sp., *Danaïd archippus*, and *Paphia glycerium*.
1712. RILEY, C. V. Parasites of the cotton-worm. <Ca. Ent., September, 1879, v. 11, pp. 161-162.
List of parasites of *Aletia argillacea* [= *xylina*]; descriptions of *Trichogramma pretiosa* n. sp. [p. 161], *Cirrospilus* [= *Tetrastichus*] *esurus* n. sp. [p. 162], and *Tachina aletiae* n. sp. [p. 162].

1713. RILEY, C. V. [Insect injurious to junipers.] <Ca. Ent., September, 1879, v. 11, p. 177.
Junipers on Long Island injured by *Dapsilia rutilana*.
1714. RILEY, C. V. The imported cabbage-worm in the South. <Farmer's Review, September, 1879. S.-b. No. 23, p. 106.
Spread of *Pieris rapæ* westward and southward; its present distribution; southern limit of distribution of *Doryphora 10-lineata*.
1715. RILEY, C. V. The shedding of the tracheæ and double cocoons. <Amer. Nat., October, 1879, v. 13, p. 652.
Review of two notes by E. Potts.
1716. RILEY, C. V. Leaf-galls on the grape-vine. <N. Y. Tribune, 1 October, 1879. S.-b. No. 23, pp. 117; 173. See: <Kansas Farmer, 26 November, 1879. S.-b. No. 26, p. 9. <West. Rural, 10 December, 1879.
Habits, ravages, reproduction, and distribution of *Phylloxera vastatrix*.
1717. RILEY, C. V. The Croton bug as a library pest. <Library Journal, September-October, 1879, v. 4, p. 376.
Letter to Weston Flint; ravages of and means against *Blatta* [= *Ectobia*] *germanica*.
1718. RILEY, C. V. The Ailanthus silk-worm, *Attacus* (*Samia*) *cynthia*. <Science News, 15 October, 1879, v. 1, pp. 377-383. Extract: <Amer. Ent., March, 1880 [v. 3], n. s., v. 1, pp. 56-58, fig. 16. <Farmer's Review, 8 January, 1880, v. 4. S.-b. No. 23, pp. 167-168.
Description of eggs, larvæ, and imagos of *Samia* [= *Attacus*] *cynthia*; history, food-plants, acclimation, and artificial rearing of the same, and of *Samia* [= *Attacus*] *ricini*; differences between the eggs, larvæ, and cocoons of the two species; availability of these and other species for silk-culture; superiority of *Sevicaria mori* for this purpose; occurrence of parthénogenesis and of retardation of development in *Bombycidae*.
1719. RILEY, C. V. The cotton-worm. Letter from Prof. C. V. Riley on some recent cotton-worm articles in the News. <Galveston [Tex.] Daily News, 24 October, 1879, v. 38, No. 185, p. 2. S.-b. No. 23, pp. 164-165. Reply: <*Ibid.*, 31 October, 1879, No. 191, p. 4.
Critical review of W. J. Jones's "The cotton caterpillar," and of Investigator's "The cotton-worm;" denies that *Aletia argillacca* [= *xylina*] hibernates in the pupa state; author not interested in entomological discoveries for mercenary ends.
1720. RILEY, C. V. [Spread of *Pieris rapæ* into Alabama.] <Ca. Ent., October, 1879, v. 11, p. 196.
Pieris rapæ now quite common in Alabama; it has reached Selma but not Mobile.
1721. RILEY, C. V. Report of the entomologist. <Ann. Rept. [U. S.] Commissioner Agric. for 1878, 22 November, 1879, pp. 207-257, + 1 p. expl. of pl., pls. 1-7. Separate: <Washington, Octo-

1721. RILEY, C. V.—Continued.

ber, 1879, pp. 52 + 1 p. expl. of pl., 7 pl. Notice: <Gardener's Mo. and Hortie., November, 1879, v. 21, pp. 349-350. S.-b. No. 23, p. 29.

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* Translation: <Acker- und Gartenbau-Zeitung, 1 June, 1880, v. 11, p. 87, fig. S.-b. No. 23, p. —.

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1722. RILEY, C. V. [Parasites bred from the cotton-worm.] <Ca. Ent., November, 1879, v. 11, p. 205.

Nine species of parasites have been bred from *Aletia argillacea* [= *xylina*].

1723. RILEY, C. V. The bee-moth. <N. Y. Tribune, 1879. Reprint: <Farmer's Review, 3 January, 1880. S.-b. No. 23, p. 158.

Description of larva and imago, habits, ravages, and means against *Galleria cereana*.

1724. RILEY, C. V. The silk-worm; being a brief manual of instructions for the production of silk. <Special Report No. 11 [U. S.], Dept. Agric., Washington, 1879, pp. 31, 8 figs. Second edition: <Washington, 1882, 37 pp., 8 figs. Third edition: <Washington, 1883, 37 pp., 8 figs. Fourth edition: Fifth edition: Sixth edition: <Bull. No. 9 Div. Ent. U. S. Dept. Agric., 11 July, 1886, 65 pp., 29 figs., 2 pl. Seventh edition: <*Ibid.*, April, 1888.

Treats of *Sericaria mori*. See No. 1721 for synopsis of contents.

1725. RILEY, C. V. London purple as an insecticide. <Farmer's Review, 29 January, 1880, v. 4, No. 5, p. —.

1726. [RILEY, C. V.] [The food-habits of thrushes.] <Amer. Ent., January, 1880 [v. 3], n. s., v. 1, pp. 2-3.

Notice of S. A. Forbes' "The food-habits of thrushes;" incompleteness of our knowledge of the food-habits of birds and of *Carabidae*; author's opinion favorable to the birds.

1727. [RILEY, C. V.] The grape Phylloxera in California. <Amer. Ent., January, 1880 [v. 3], n. s., v. 1, p. 3.

Phylloxera vastatrix as destructive to *Vitis vinifera* in California as in Europe; the winged female supposed not to have appeared yet in California; speculations upon this modification of habit, if true.

* Translation: <Acker- und Gartenbau-Zeitung, 1 August, 1880, v. 11, p. 119, 2 figs. S.-b. No. 23, p. —. Extract: <Prairie Farmer, 22 November, 1879, v. 50, p. 370. S.-b. No. 23, pp. 168-169. <Amer. Rural Farmer, 18 December, 1879. S.-b. No. 45, pp. 23-24.

† Translation: <Acker- und Gartenbau-Zeitung, 1 September, 1880, v. 11, p. 135, fig. S.-b. No. 23, p. 182.

1728. [RILEY, C. V.] On the hibernation of the cotton-worm, *Aletia argillacea* Hübn. <Amer. Ent., January, 1880 [v. 3], n. s., v. 1, pp. 6-11, figs. 3-5; p. 15.
Advance print from Bull. No. 3 U. S. Ent. Commission, pp. 24-31. See No. 1736 for synopsis of contents.
1729. [RILEY, C. V.] [Inquilines in galleries of the common white-ant.] <Amer. Ent., January, 1880, [v. 3], n. s., v. 1, p. 15.
Trichopsenius depressus and three undescribed *Alcocharini* found inquilinous in galleries of *Termes flavipes* in Texas by E. A. Schwarz; the *Trichopsenius* previously known by a single specimen from Georgia.
1730. [RILEY, C. V.] Large white scale on acacias, etc. <Amer. Ent. January, 1880 [v. 3], n. s., v. 1, p. 20.
Occurrence and ravages of *Dortheisia characias?* in California and southern Africa; characters of the insect.
1731. [RILEY, C. V.] [Ravages of moths in cushions.] <Amer. Ent., January, 1880 [v. 3], n. s., v. 1, p. 20.
Conclusions of discussion by German Society of Railway Companies as to the best method of preventing the ravages of moths in the cushions of railway carriages.
1732. [RILEY, C. V.] [Grape Phylloxera in Geelong, Victoria.] <Amer. Ent., January, 1880 [v. 3], n. s., v. 1, p. 20.
Occurrence of *Phylloxera vastatrix* in Geelong, Victoria.
1733. RILEY, C. V. Borers in black-ash: Fall web-worm: Apple-tree insects.. <Amer. Ent., January, 1880 [v. 3], n. s., v. 1, pp. 22-23.
Black-ash trees in New York killed by the borings of *Parandra brunnea*; ash trees bored also by *Trochilium* [= *Fatua*] *denudata*; the leaves of the same and other trees destroyed by *Hyphantria textor* [= *cunea*]; apples injured by the "gimlet-worm"; habits, ravages of, and means against *Bucculatrix pomifoliella*; figure of cocoons and imago of this moth.
1734. [RILEY, C. V.] Skippers injuring smoked hams. <Amer. Ent., January, 1880, [v. 3], n. s., v. 1, pp. 23-24.
Answer to communication from E. A. Smith; hams injured by larvæ of *Pio-phila casei*; means against these and other insects injuring hams.
1735. [RILEY, C. V.] *Tipula* eggs in the stomach of the cat-bird. <Amer. Ent., January, 1880 [v. 3], n. s., v. 1, p. 24.
Answer to communication from S. A. Forbes; description of eggs and method of oviposition of *Tipula trivittata?*
1736. RILEY, C. V. The cotton-worm. Summary of its natural history, with an account of its enemies and the best means of controlling it; being a report of progress of the work of the commission. <Bull. No. 3, U. S. Ent. Commission, 28 January, 1880, 144 pp., 1 pl., 84 figs. Extract: <Amer. Ent., March, 1880 [v. 3], n. s., v. 1, pp. 67-68, figs. 19-20. <Farmer's Review, January, 1880, 2 figs. S. b. No. 23, pp. 163-164.

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1737. [RILEY, C. V.] The 17-year Cicada in Iowa. < Amer. Ent., February, 1880 [v. 3], n. s., v. 1, pp. 25-26.

Review of C. E. Bessey on the 17-year Cicada in Iowa; limits of the broods of 1854-1871, 1861-1878, and 1862-1879 of *Cicada* [= *Tibicen*] *septendecem* in Iowa; occurrence of the last brood in Missouri; comparison of the distribution of these broods with the distribution of timber trees.

1738. [RILEY, C. V.] .Vegetal-feeding ground-beetles. <Amer. Ent., February, 1880 [v. 3], n. s., v. 1, p. 26.
Notes from various sources upon the phytophagous habits of *Carabidæ*.
1739. [RILEY, C. V.] The pear-leaf blister. <Amer. Ent., February, 1880 [v. 3], n. s., v. 1, p. 26. Notice: <*Ibid.*, March, 1880 [v. 3], n. s., v. 1, p. 74.
Review of T. J. Burrill's "The pear-leaf blister"; ravages of *Typhlodromus pyri* on leaves of pear-tree; characters of this mite; noxious habits of *Acarina*, especially of *Phytoptus*.
1740. [RILEY, C. V.] Fuller's rose-beetle in California. <Amer. Ent., February, 1880 [v. 3], n. s., v. 1, p. 26.
Occurrence and ravages of *Aramigus fulleri* in California.
1741. [RILEY, C. V.] *Lepidium* vs. bed-bugs. <Amer. Ent., February, 1880 [v. 3], n. s., v. 1, p. 26.
Notice of S. M.'s "Lepidium, the bed-bug destroyer;" *Acanthia lectularia* said to be attracted to and killed by *Lepidium* sp.
1742. [RILEY, C. V.] Aniseed and grain weevils. <Amer. Ent., February, 1880 [v. 3], n. s., v. 1, p. 26.
Notice of reports that *Calandra granaria* were attracted from grain to aniseed and killed by it.
1743. RILEY, C. V. Two valuable insecticides. <Amer. Ent., February, 1880 [v. 3], n. s., v. 1, pp. 41-45.
From Bull. No. 3, U. S. Ent. Commission, pp. 60-65. See No. 1736, for synopsis of contents.
1744. [RILEY, C. V.] Use of buckwheat to destroy insects. <Amer. Ent., February, 1880 [v. 3], n. s., v. 1, p. 48.
Extract from "The Farmer" with remarks on the planting and plowing in of buckwheat as a means against injurious insects.
1745. [RILEY, C. V.] *Tipula* eggs in stomach of eat-bird. <Amer. Ent., February, 1880 [v. 3], n. s., v. 1, p. 50.
Answer to communication from S. A. Forbes; two kinds of eggs found in stomach of eat-bird; these birds eat gravid females of *Tipula*.
1746. [RILEY, C. V.] Beetles supposed to be feeding on wheat. <Amer. Ent., February, 1880 [v. 3], n. s., v. 1, p. 50.
Answer to letter from P. H. M.; larva of *Cryptorhopalum* sp. supposed to have injured grains of wheat, was probably feeding on the remains of true grain insects; food-habits of larvæ of *Dermestidæ*.
1747. RILEY, C. V. The apple-twigg borer. <Amer. Ent., February, 1880 [v. 3], n. s., v. 1, pp. 50-51, figs. 11-12.
Answer to letter from H. G. Woleott; habits, food-plants, and means against *Amphicerus bicaudatus*; figure of male and female imago and of bored apple-twigs; habits and food-plants of *Sinoxylon basillare* and of *Bostrichus*.
1748. [RILEY, C. V.] Stinging caterpillars. <Amer. Ent., February, 1880 [v. 3], n. s., v. 1, p. 51.
Answer to letters from T. Pollard and G. W. S.; food-plants, general appearance, vernacular name, urticating properties and description of imago of *Lagoa opercularis*.

1749. RILEY, C. V. A new genus of *Proctotrupidae*. <Amer. Ent., February, 1880 [v. 3], n. s., v. 1, p. 52, figs. 13-14. Review: <*Ibid.*, December, 1880 [v. 3], n. s., v. 1, p. 293.
Description and figures of *Didictyum* [= *Hexaplasta*] *zigzag* n. g. et n. sp. reared from chrysalis of *Aletia argillacea* [= *xylina*].
1750. RILEY, C. V. Agricultural advancement in the United States. <Farmer's Review, 1880, v. 4: 4 March, p. 153; 11 March, p. 174. S.-b. No. 23, pp. 153-158. Notice: <*Ibid.*, 4 March, 1880, p.—. S.-b. No. 23, p. 150. Reprint: <Journ. Amer. Agric. Assoc., April, 1881, v. 1, pp. 47-54. Separate of reprint: <August, 1881, pp. 47-54.
Suggestions for the organization of an agricultural association; comparison of the relations of government to the advancement of agriculture in England, Germany, France, and the United States; necessary changes in the United States Department of Agriculture.
1751. RILEY, C. V. Parasites of the plum Curculio. <Farmer's Review, 4 March, 1880, v. 4, p. —, 2 figs. S.-b. No. 23, pp. 169-170.
Figures of larva, pupa, cocoon, and imagoes of *Sigalphus curculionis*; habits, variations, usefulness, and dissemination of the same; habits, colors, and seasons of *Porizon* [= *Thersilochus*] *conotracheli*.
1752. [RILEY, C. V.] Trapping the carpet-beetle. <Amer. Ent., March, 1880 [v. 3], n. s., v. 1, pp. 53-55, fig. 15.
Figures larva, pupa, and imago of *Anthrenus scrophulariæ*; food-plants and habits of imago and ravages of larva; importation, distribution, vernacular names of and means against the same.
1753. [RILEY, C. V.] Silk-worm eggs: Silk culture. <Amer. Ent., March, 1880 [v. 3], n. s., v. 1, p. 55.
Method of obtaining eggs of *Sericaria mori* and information on silk culture.
- 1754. [RILEY, C. V.] [Hickory *Scolytus*.] <Amer. Ent., March, 1880 [v. 3], n. s., v. 1, p. 58.
Occurrence of *Scolytus quadrispinosus* in Washington Territory.
1755. [RILEY, C. V.] [Tenacity of life.] <Amer. Ent., March, 1880 [v. 3], n. s., v. 1, p. 68.
Resistance of *Cleonus* sp. to the influence of various insecticides.
1756. [RILEY, C. V.] [*Danaïs archippus*.] <Amer. Ent., March, 1880 [v. 3], n. s., v. 1, p. 73.
Occurrence of a colorational variety on the island of Antigua.
1757. [RILEY, C. V.] Reports of the U. S. Entomological Commission. <Amer. Ent., March, 1880 [v. 3], n. s., v. 1, p. 73.
Method of obtaining the first report of the U. S. Entomological Commission.
1758. [RILEY, C. V.] [Habits of the cotton-moth.] <Amer. Ent., March, 1880 [v. 3], n. s., v. 1, p. 74.
Request for information on the habits of the imago and the food-plants of the larva of *Aletia argillacea* [= *xylina*] during March and April.
1759. [RILEY, C. V.] *Typhlodromus pyri*. <Amer. Ent., March, 1880 [v. 3], n. s., v. 1, p. 74.
Reference to early account of the pear-leaf blister-mite.

1760. [RILEY, C. V.] Food-habits of ground-beetles. <Amer. Ent., March, 1880 [v. 3], n. s., v. 1, p. 75.
Note on request of S. A. Forbes for *Carabidæ* found in situations suggesting herbivorous habits.
1761. [RILEY, C. V.] Moths and butterflies caught by the tongue. <Amer. Ent., March, 1880 [v. 3], n. s., v. 1, p. 75.
Notice of several articles on the capture of *Noctuidæ* and *Sphingidæ* by the flowers of *Physianthus albens*; capture of *Sphingidæ* by the flowers of *Nerium oleander* and *Oenothera grandiflora*, and of *Syrphus* sp. by the flowers of *Bidens chrysanthemoides*.
1762. [RILEY, C. V.] [Queen bees in the mails.] Amer. Ent., March, 1880 [v. 3], n. s., v. 1, p. 75.
Circumstances under which queen bees may be sent by mail; exclusion of pinned insects from the same.
1763. [RILEY, C. V.] Common tiger-beetle. <Amer. Ent., March, 1880 [v. 3], n. s., v. 1, pp. 77-78.
Answer to inquiry of J. L. Seney; habitat, distribution, and food-habits of *Cicindela repanda*.
1764. [RILEY, C. V.] Gall on *Pelargonium*. <Amer. Ent., March, 1880 [v. 3], n. s., v. 1, p. 78.
Answer to letter from Mary Treat; gall at base of *Pelargonium* probably made by a mite; the *Poduræ* found in it were undoubtedly feeding on diseased gall-tissue.
1765. [RILEY, C. V.] Catalogues and monographs of insects. <Amer. Ent., March, 1880 [v. 3], n. s., v. 1, p. 78.
Answer to letter of P. S. B.; mention of monographic works and catalogues of North American insects.
1766. [RILEY, C. V.] Leaf-hoppers injuring wheat fields. <Amer. Ent., March, 1880 [v. 3], n. s., v. 1, p. 78.
Answer to letter of R. L. B.; habits and ravages of *Cicadula exitiosa*, *Diedrocephala flaviceps*, and *Jassus* sp. in the southern United States, and of *Jassus sexnotatus* in Europe; means against the same.
1767. RILEY, C. V. A new leaf-hopper injurious to small grain. <Amer. Ent., March, 1880 [v. 3], n. s., v. 1, p. 78.
Description of *Diedrocephala flaviceps* n. sp. injurious to wheat and oats in Texas in 1876.
1768. RILEY, C. V. The bird question dispassionately considered. <Farmer's Review, 1 April, 1880, v. 4, p. 211. S.-b. No. 23, pp. 147-148.
Extract from E. Perris's "Birds vs. Insects," with introductory; conclusions as to the value of birds in agriculture as destroyers of noxious insects.
1769. RILEY, C. V. The cotton-worm in the United States. <Amer. Ent., April, 1880 [v. 3], n. s., v. 1, pp. 93-95. Reprint, with slight changes: <Proc. Amer. Assoc. Adv. Sci. for 1879, 23 February, 1881, v. 28, pp. 464-466. Separate of reprint: <Salem, Mass., August, 1880, 3 pp.
Date and manner of first appearance of larvæ of *Aletia argillacea* [= *xylina*]; number of annual generations and the existence of parasites upon it; his-

1769. RILEY, C. V.—Continued.

tory and refutation of the annual immigration theory; division of the cotton belt into regions wherein, respectively, *A. argillacea* [= *xylina*] is permanent and temporary; food-habits and enemies of the same.

1770. [RILEY, C. V.] The migrations of butterflies. <Amer. Ent., April, 1880 [v. 3], n. s., v. 1, pp. 100–102, figs. 34–35.

Migratory flights of Lepidoptera supposed to be due to excessive multiplication of individuals and to a true migratory instinct; directions, times, and extent of migrations of *Danaus archippus*; explanation of the migratory instinct; distribution of *D. archippus* and *Pyrameis cardui*; figures the former and its manner of clustering.

1771. [RILEY, C. V.] Gouty gall on blackberry and raspberry canes. <Amer. Ent., April, 1880 [v. 3], n. s., v. 1, p. 107.

Answer to letters of P. S., T. A. C., and J. W.; seasons, ravages of and means against *Agrilus ruficollis*.

1772. [RILEY, C. V.] Sowing cotton seeds in hot-beds and transplanting as a means of preventing injury from the cotton-worm. <Amer. Ent., April, 1883 [v. 3], n. s., v. 1, p. 107.

Impracticability of W. J. W.'s suggestion as indicated in title.

1773. [RILEY, C. V.] Not the cotton-moth. <Amer. Ent., April, 1880 [v. 3], n. s., v. 1, p. 107.

Answer to inquiry of D. B. Woodbury; food-plants of *Tolyte velleda*.

1774. [RILEY, C. V.] Moths caught in Alabama: Muscle-shaped bark-louse on apple-trees South <Amer. Ent., April, 1880 [v. 3], n. s., v. 1, pp. 107–108.

Mentions several insects received from J. F. Bailey, of Marion, Ala.; larva of *Papilio philenor* feeds on *Aristolochia*; *Bombus virginicus* ♀ robs hives of *Apis mellifica*; *Mytilaspis pomicorticis* [= *pomorum*] not before received from so far south; means against the same.

1775. [RILEY, C. V.] Chrysalides supposed to be those of *Aletia*. <Amer. Ent., April, 1880 [v. 3], n. s., v. 1, p. 108.

Answer to letter of W. J. Jones; pupæ of *Agrotis inermis* [= *saucia*] and *Prodenia lineatella* from cotton field.

1776. [RILEY, C. V.] Apple-twigg borer. <Amer. Ent., April, 1880 [v. 3], n. s., v. 1, p. 108.

Answer to inquiry of T. V. M.; occurrence and habits of *Amphicerus bicaudatus*.

1777. [RILEY, C. V.] Clover-weevil. <Amer. Ent., April, 1880 [v. 3], n. s., v. 1, p. 108.

Answer to inquiry of W. W. F.; several "weevils" infest clover-seeds; *Hy-lesinus trifolii* infests the roots and lower part of the stem.

1778. [RILEY, C. V.] Effects of cold applied to the chrysalides of butterflies. <Amer. Ent., May, 1880 [v. 3], n. s., v. 1, pp. 110–111.

Notice of the experiments of W. H. Edwards; effects of hibernation in the chrysalis and imago states.

1779. [RILEY, C. V.] Moth issuing from a larva. <Amer. Ent., May, 1880 [v. 3], n. s., v. 1, p. 114.

Notice of J. J. Weir on the issuance of *Orgyia* sp. from the larva without passing through the pupal stage.

1780. [RILEY, C. V.] The rose-slug. <Amer. Ent., May, 1880 [v. 3], n. s., v. 1, pp. 115-116, figs. 42-43.
Description of eggs, larvæ, and imago, history and means against *Selandria* [= *Monostegia*] *rosa*; figures, egg, larvæ, imago, with details of structure, and injured leaf.
1781. [RILEY, C. V.] Dr. Asa Fitch. <Amer. Ent., May, 1880 [v. 3], n. s., v. 1, pp. 121-123.
Biographical sketch of Asa Fitch, with notice of his collection of insects and his writings.
1782. [RILEY, C. V.] Flea-beetle on young tobacco plants. <Amer. Ent., May, 1880 [v. 3], n. s., v. 1, p. 123.
Leaves of *Nicotiana tabacum* eaten by *Epitrix hirtipennis* [= *Crepidodera parvula*] and probably by *E.* [= *C.*] *cucumeris*; leaves of *Solanum* eaten by the first named and by *E.* [= *C.*] *brevis*; distribution of these and other species of *Epitrix* [= *Crepidodera*].
1783. [RILEY, C. V.] The proboscis of the common house-fly. <Amer. Ent., May, 1880 [v. 3], n. s., v. 1, p. 125.
Review of paper by G. Macloskie.
1784. [RILEY, C. V.] Notes on South American Lepidoptera. <Amer. Ent., May, 1880 [v. 3], n. s., v. 1, pp. 125-126.
Report of meeting of the Entomological Society of London; length of proboscis of and presence of scent organ in *Sphingidæ*; perception of colors in *Rhopalocera*; secondary sexual character in *Callidryas* and other genera; according to R. Meldola the proboscis of *Macrosila eluentius* is 23.5^{cm} (9⁴ inches) long.
1785. [RILEY, C. V.] Floating apiaries. <Amer. Ent., May, 1880 [v. 3], n. s., v. 1, pp. 126-127.
Notice of an unsuccessful attempt to increase the product of an apiary by floating it southward late in the season and back to the north in the spring, on the Mississippi River.
1786. [RILEY, C. V.] American *Staphylinidæ* wanted. <Amer. Ent., May, 1880 [v. 3], n. s., v. 1, p. 127.
Notice of A. Fauvel's works on *Staphylinidæ* and his request for additional material.
1787. [RILEY, C. V.] Probable parthenogenesis in the Hessian fly. <Amer. Ent., May, 1880 [v. 3], n. s., v. 1, p. 127.
Review of paper by H. A. Hagen; *Cecidomyia destructor* less injurious than formerly in the older wheat-growing regions, its area of abundance having moved westward with the westward extension of wheat culture.
1788. [RILEY, C. V.] Raspberries destroyed by weevils. <Amer. Ent., May, 1880 [v. 3], n. s., v. 1, p. 127.
Ravages of *Otiorhynchus picipes* in England; warning against its introduction into the United States.
- 1788a. [RILEY, C. V.] Cotton culture and the insects affecting the plant at Bahia, Brazil. <Amer. Ent., May, 1880 [v. 3], n. s., v. 1, pp. 128-129.
Letter of R. A. Edes, with remarks on specimens sent.

1789. [RILEY, C. V.] Hemispherical larva at bottom of ant hill. <Amer. Ent., May, 1880 [v. 3], n. s., v. 1, p. 129.
Answer to inquiry of D. S. Sheldon; habitat of larva of *Microdon globosus*.
1790. [RILEY, C. V.] Chrysalides dug up in cotton field, mistaken for those of the cotton-worm. <Amer. Ent., May, 1880 [v. 3], n. s., v. 1, p. 129.
Answer to letter of R. Worrel.
1791. [RILEY, C. V.] *Aleurodes* on *Oxalis*. <Amer. Ent., May, 1880 [v. 3], n. s., v. 1, pp. 129-130.
Answer to letter of S. A. Conrad; description of all stages of *Aleurodes* sp. from leaves of *Oxalis* sp.
1792. [RILEY, C. V.] Larvæ in stomach of black-bass. <Amer. Ent., May, 1880 [v. 3], n. s., v. 1, p. 130.
Answer to inquiry of S. A. Forbes; two coleopterous larvæ from the stomach of *Micropterus salmoides*; one a dytiscid, the other perhaps a dascyllid.
1793. [RILEY, C. V.] Insects from stomach of rock-bass. <Amer. Ent., May, 1880 [v. 3], n. s., v. 1, p. 130.
Answer to letter of S. A. Forbes; coleopterous larva from the stomach of common sun-fish (*Lepiopomus pallidus*) and rock-bass (*Roccus lineatus*).
1794. [RILEY, C. V.] New enemy to sugar-cane. <Amer. Ent., May, 1880 [v. 3], n. s., v. 1, p. 130, fig. 48.
Answer to letter of D. Th.; ravages of *Ligyrys rugiceps* upon sugar-cane, maize, and grasses; recommends use of lamp and kerosene pan, and figures one form of such apparatus.
1795. [RILEY, C. V.] Parasites of the plum Curculio. <Amer. Ent., May, 1880 [v. 3], n. s., v. 1, pp. 131-132, figs. 49-50.
Answer to letter of W. S. Barnard; quotes from 3d Ann. Rept. State Ent. Mo., pp. 24-26; habits of *Sigalphus curculionis*; habits, varieties, and figures of all stages of the same; food-habits of *Semasia* [= *Grapholitha*] *prunivora* on which the *Sigalphus* is parasitic.
1796. [RILEY, C. V.] Blister-beetles from New Mexico. <Amer. Ent., May, 1880 [v. 3], n. s., v. 1, p. 132.
Answer to inquiry of J. M.; *Macrobasis albida* common in the Southwest and valuable as a vesicant; *Diplotaxis* not known to be a vesicant.
1797. [RILEY, C. V.] Abnormal cocoon. <Amer. Ent., May, 1880 [v. 3], n. s., v. 1, p. 132.
Answer to letter of W. S. Barnard; occurrence of *Callosamia* [= *Attacus*] *promethea* and *Orgyia antiqua* at Ithaca, N. Y.; description of abnormal cocoon of the latter found on sugar-maple.
1798. [RILEY, C. V.] Insects found about orange-trees. <Amer. Ent., May, 1880 [v. 3], n. s., v. 1, p. 132.
Answer to inquiry of J. S. Barnwell; list of insects from Darien, Ga.; most of them have no relation to orange trees; notes on *Aphis* sp., *Chilocorus birulnerus*, *Syrphus* sp., *Neoclytus erythrocephalus*, *Drasterius amabilis*, *Platynus punctiformis*, *Forficula* sp., *Gryllotalpa borealis*, and *Psocus venosus*.

1799. [RILEY, C. V.] *Luperus brunneus*, Crotch. <Amer. Ent., May, 1880, [v. 3], n. s., v. 1, p. 132.
Luperus noxius Riley MSS., is a pale form of *L. brunneus*; description of the typical and other forms of the same; distinctive characters of *L. brunneus* and *L. morulus* from other North American species and from each other; characters of the genus *Calomicrus*.
1800. [RILEY, C. V.] Professor Riley on army-worms. <N. Y. Weekly Sun, 20 June, 1880. S.-b. No. 26, p. 89.
 Interview with reporter; summary of present knowledge of *Leucania unipuncta*.
1801. RILEY, C. V. Cotton-caterpillars. <Selma [Ala.] Times, 25 June, 1880.
1802. RILEY, C. V. Notes on our commoner insects. <Amer. Ent., June, 1880 [v. 3], n. s., v. 1, pp. 133, 134, figs. 51-52.
 Description and figures of larva, pupa, cocoon, and imago of *Arctia* [= *Pyrrharcia*] *isabella*; habits, seasons, food-plants, parasites, vernacular names and variations of the same; figure of *Ophion macrurum*; descriptions of *Ichneumon cæruleus*, *I. signatipes*, and *Trogus obsidianator*; description of larva of *Epantheria scribonia*.
1803. RILEY, C. V. The white-grub fungus. <Amer. Ent., June, 1880 [v. 3], n. s., v. 1, pp. 137-140, figs. 53-55.
 Description and figures of *Torrubia ravenelii* and of its fructification; forms in which it occurs on larvæ of *Lachnosterna quercina* [= *fusca*]; list of some articles upon it; its synonymy and distribution; list of related species and their distribution; occurrence of related species on other insects.
1804. RILEY, C. V. The true and the bogus Yucca moth, with remarks on the pollination of Yucca. <Amer. Ent., June, 1880 [v. 3], n. s., v. 1, pp. 141-145.
 History of observations on *Prodoxus decipiens*; habits, parasite, and food-plants of the same; evolution of *Prodoxus* and *Pronuba*; criticism of errors resulting from mistaking *Prodoxus decipiens* for *Pronuba yuccasella*; failure of *Yucca angustifolia* to become fertilized in the absence of *Pronuba yuccasella*; *Hyponomeuta quinquepunctella* Chambers is the same as *Prodoxus decipiens*.
1805. [RILEY, C. V.] Intermittance of phosphorescence in fire-flies. <Amer. Ent., June, 1880 [v. 3], n. s., v. 1, p. 146.
 Criticism of a discussion before the London Entomological Society; the winged imagos of *Lampyridæ* can intermit their light; the larvæ and wingless imagos can suppress their light.
1806. [RILEY, C. V.] Grain Aphis vs. rust. <Amer. Ent., June, 1880 [v. 3], n. s., v. 1, p. 147.
 Ravages of *Aphis avenæ* [*Nectarophora granaria*] and of rust on wheat and oats in Georgia; the work of aphides promotes the growth of some kinds of rust.
1807. [RILEY, C. V.] Mold and Phylloxera. <Amer. Ent., June, 1880 [v. 3], n. s., v. 1, p. 147.
 Criticism of statements by Rommier; development of mycelium on phylloxerized roots does not result in the destruction of the *Phylloxera*.

1808. [RILEY, C. V.] Infecting Phylloxera with fungus disease. <Amer. Ent., June, 1880 [v. 3], n. s., v. 1, p. 148.
Abstract of discussion at meeting of Académie des Sciences de Paris on the infection of *Phylloxera vastatrix* by parasitic fungi; particular fungi infect only particular insects; method of experimentation to determine which fungi to use and how to apply them; improbability of success in these experiments.
1809. [RILEY, C. V.] Fungus in Cicada. <Amer. Ent., June, 1880 [v. 3], n. s., v. 1, p. 148.
Notice of C. H. Peck's description and J. Leidy's note on *Massospora cicadina*; *Cicada* [= *Tibicen*] *septendecim* and *C.* [= *T.*] *tredecim* subject to the attacks of the same.
1810. [RILEY, C. V.] On the nature of the phosphorescence of the glow-worm. <Amer. Ent., June, 1880 [v. 3], n. s., v. 1, p. 148.
Conclusions drawn by Jousset de Bellesme; probability that the phosphorescent substance is a gaseous product; nature of phosphorescence.
1811. [RILEY, C. V.] Death of mules caused by insects. <Amer. Ent., June, 1880 [v. 3], n. s., v. 1, p. 148.
About 6,000 mules reported killed in the Ouachita Valley, Louisiana, by the attacks of *Simulium* sp.
1812. [RILEY, C. V.] [May beetles swarming in Alabama.] <Amer. Ent., June, 1880 [v. 3], n. s., v. 1, p. 148.
Abundance and ravages of *Lachnosterna quercina* [= *fusca*] on oak-trees around Mobile, Ala., in May, 1880.
1813. [RILEY, C. V.] Fungus diseases of beneficial insects. <Amer. Ent., June, 1880 [v. 3], n. s., v. 1, p. 149.
Abstract of communication by C. Brongniart and Max Cornu on an epizootic among *Syrphus mellinus* caused by a species of *Entomophthora*; almost all insecticides liable to the objection that they kill useful as well as noxious insects.
1814. [RILEY, C. V.] Early appearance of cotton-worm. <Amer. Ent., June, 1880 [v. 3], n. s., v. 1, p. 149.
Extracts from letter of J. M. Bell and from the Goliad [Tex.] Guard and from G. Witting on the date of appearance of *Aletia argillacea* [= *xylina*] in Texas.
1815. [RILEY, C. V.] The butterfly tongue. <Amer. Ent., June, 1880 [v. 3], n. s., v. 1, p. 149.
Notice of and extract from paper by E. Burgess; conclusions as to the manner in which butterflies imbibe their liquid food.
1816. [RILEY, C. V.] Cottony maple scale. <Amer. Ent., June, 1880 [v. 3], n. s., v. 1, p. 149.
Notice of J. D. Putnam on *Pulvinaria innumerabilis*.
1817. [RILEY, C. V.] Necrological. <Amer. Ent., June, 1880 [v. 3], n. s., v. 1, p. 150.
Obituary notices of E. A. H. v. Kiesenwetter, S. C. Snellen van Vollenhoven, and F. L. de Laporte.
1818. [RILEY, C. V.] Effects of severe cold on insects. <Amer. Ent., June, 1880 [v. 3], n. s., v. 1, p. 150.
A steady even if severe winter not prejudicial to insect life.

1819. [RILEY, C. V.] Revision of the *Lampyridæ*. <Amer. Ent., June, 1880 [v. 3], n. s., v. 1, p. 150.
Notice of H. S. Gorham's work on the *Lampyridæ* and his request for additional material.
1820. [RILEY, C. V.] Apple-twigg borer. <Amer. Ent., June, 1880 [v. 3], n. s., v. 1, p. 151.
Answer to inquiry of A. S. H.; occurrence of *Amphicerus bicaudatus* on apple-trees in Virginia.
1821. [RILEY, C. V.] Grape-vine flea-beetle. <Amer. Ent., June, 1880 [v. 3], n. s., v. 1, pp. 152-153.
Answer to letter of J. Nilis; ravages of *Graptodera* [= *Haltica*] *chalybea* on grape-vines in Pennsylvania.
1822. [RILEY, C. V.] Cynipid gall on oak twigs. <Amer. Ent., June, 1880 [v. 3], n. s., v. 1, p. 153, fig. 56.
Answer to letter of J. A. Warder; figure of gall of *Cynips* (u. sp.?) from twig of *Quercus prinus* var. *acuminata*; comparison of this gall with that of *C.* [= *Andricus*] *q.-punctata*; the flies bred from these galls issue in spring and are all females, but probably have a bisexual form producing a different gall.
1823. [RILEY, C. V.] White-grub fungus. <Amer. Ent., June, 1880 [v. 3], n. s., v. 1, p. 153.
Answer to letter of H. S.; occurrence of *Torrubia ravenelii* at Iola, Kans.
1824. [RILEY, C. V.] *Galerita janus*. <Amer. Ent., June, 1880 [v. 3], n. s., v. 1, p. 153, fig. 57.
Answer to inquiry of H. D. M. Fair; distribution, habitat, transformations, and seasons of *Galerita janus*; figure of larva of *G. lecontei*.
1825. [RILEY, C. V.] Not Fuller's rose-beetle. <Amer. Ent., June, 1880 [v. 3], n. s., v. 1, pp. 153-154, fig. 58.
Answer to inquiry of J. Stewart; habits and synonymy of *Agonoderus comma* [= *pallipes*]; figure of the same.
1826. [RILEY, C. V.] Not *Aletia* chrysalides. <Amer. Ent., June, 1880 [v. 3], n. s., v. 1, p. 154.
Answer to letter of G. P. White; pupæ of *Agrotis saucia* from cotton fields; food-habits of larva; ravages of *Aletia argillacea* [= *xylina*] at Brown Station, Ala., in August, 1879.
1827. [RILEY, C. V.] Mud-wasp and parasite. <Amer. Ent., June, 1880 [v. 3], n. s., v. 1, p. 154, figs. 59-60.
Answer to inquiries of Mary Treat; nidification of several species of *Odynerus*; food-habits of *O. birenimaculatus*; figure of *O. flavipes* and of a nest of *Odynerus* sp.; figure of *Cryptus junceus*.
1828. [RILEY, C. V.] Monographs again. <Amer. Ent., June, 1880, [v. 3], n. s., v. 1, pp. 154-155.
Answer to letter of C. D. Marsh; references to works. *Elateridæ*, *Curculionidæ* and *Coccidæ*.
1829. [RILEY, C. V.] Rearing wood-borers. <Amer. Ent., June, 1880 [v. 3], n. s., v. 1, p. 155.
Answer to letter of W. H. Harrington; directions for rearing larvæ which bore in wood or under bark.

1830. RILEY, C. V. On a new tineid genus allied to *Pronuba*, Riley. <Amer. Ent., June, 1880, [v. 3], n. s., v. 1; pp. 155-156.
Description of *Prodoxus* n. g. [p. 155] of *Tineina* and of larva, pupa, and imago of *P. decipiens* n. sp. [p. 155].
1831. RILEY, C. V. A parasite on *Prodoxus decipiens*. <Amer. Ent., June, 1880, [v. 3], n. s., v. 1, p. 156.
Description of larva and imago of *Exothecus prodoxi* n. sp.; habits of larva.
1832. RILEY, C. V. How to manage the cotton-worm: Suggestions to cotton planters. <Farmer's Review, 8 July, 1880. S.-b. No. 24, p. 68.
Means against *Aletia xyliana*.
1833. [RILEY, C. V.] The cotton-worm investigation. <Selma [Ala.] Morning Times, 21 July, 1880, v. 55, No. 190, p. 3. Reprint: <Amer. Ent., August, 1880 [v. 3], n. s., v. 1, p. 197.
List of persons engaged in the cotton-worm investigation; statement of work to be done by each.
1834. [RILEY, C. V.] A foe to cottonwood. <Amer. Ent., July, 1880 [v. 3], n. s., v. 1, pp. 159-161, figs. 61-64. Extract: <Suppl. to Amer. Ent., July, 1880, p. 1.
Description of egg, larva, and imago and figures of all stages of *Melasoma* [= *Lina*] *scripta*; description and figures of variations of the imago; habits, ravages, seasons, food-plants, and means against the same; figure of *M.* [= *L.*] *lapponica* and of larva of *M.* [= *L.*] *populi*; description of these larvæ and of that of *M.* [= *L.*] *tremula*; food-plants and distribution of these species; acquisition of new habits by insects.
1835. [RILEY, C. V.] The northern army-worm. <Amer. Ent., July, 1880 [v. 3], n. s., v. 1, pp. 170-171, figs. 72-75.
Ravages of *Leucania unipuncta* in 1880; natural history, means against, description, and figures of all stages of the same.
1836. [RILEY, C. V.] The periodical Cicada. <Amer. Ent., July, 1880 [v. 3], n. s., v. 1, pp. 172-173, fig. 76.
Broods of *Cicada* [= *Tibicen*] *septendecim* and *C.* [= *T.*] *tredecim* which appear in 1880.
1837. [RILEY, C. V.] Use of guano for grape Phylloxera. <Amer. Ent., July, 1880 [v. 3], n. s., v. 1, p. 173. Reprint: <Suppl. to Amer. Ent., July, 1880, p. 2.
Application of sulphide of carbon with infusorial earth or guano.
1838. [RILEY, C. V.] Fertilizers of alpine flowers. <Amer. Ent., July, 1880 [v. 3], n. s., v. 1, p. 175. Reprint: <Suppl. to Amer. Ent., July, 1880, p. 2.
Relative frequency, according to H. Müller, of the visits of insects to flowers in high alpine regions as compared with such visits at lower levels.
1839. [RILEY, C. V.] Carnivorous habits of caddis-worms. <Amer. Ent., July, 1880 [v. 3], n. s., v. 1, p. 176.
Notice of paper by G. C. Goody.

1840. [RILEY, C. V.] Development of the eyes and luminosity in the fire-flies. <Amer. Ent., July, 1880 [v. 3], n. s., v. 1, p. 176.
Abstract of H. S. Gorham's observations.
1841. [RILEY, C. V.] Grape Phylloxera not at the Cape. <Amer. Ent., July, 1880 [v. 3], n. s., v. 1, p. 176. Reprint: <Suppl. to Amer. Ent., July, 1880, p. 1.
Examination of roots of unhealthy vines by R. McLachlan and R. Trimen show that the disease of the vines is not caused by *Phylloxera vastatrix*.
1842. [RILEY, C. V.] [Bill providing for the extermination of insects.] <Amer. Ent., July, 1880 [v. 3], n. s., v. 1, pp. 176-177.
Text of and comments on a bill introduced into the California Assembly, providing for the extermination of insects.
1843. [RILEY, C. V.] [Appropriation for the U. S. Entomological Commission.] <Amer. Ent., July, 1880 [v. 3], n. s., v. 1, p. 177.
Notice of the appropriation by Congress of \$25,000 for completing the work of the U. S. Entomological Commission.
1844. [RILEY, C. V.] Pronuba vs. Prodoxus. <Amer. Ent., July, 1880 [v. 3], n. s., v. 1, pp. 177-178.
Comments on letter of V. T. Chambers.
1845. [RILEY, C. V.] Interesting cotton-worm notes from Vera Cruz, Mexico. <Amer. Ent., July, 1880 [v. 3], n. s., v. 1, p. 179. Reprint with slight omission: <Suppl. to Amer. Ent., July, 1880, p. 3.
Letters from S. T. Trowbridge and R. de Zayas Enriquez, with notes on the irregular occurrence of *Aletia argillacea* [= *xylina*] in Vera Cruz.
1846. [RILEY, C. V.] Clover-root borer. <Amer. Ent., July, 1880 [v. 3], n. s., v. 1, pp. 179-180, fig. 81. Reprint: <Suppl. to Amer. Ent., July, 1880, p. 4. See: <Prairie Farmer, 31 July, 1880. S.-b. No. 45, p. 15.
Answer to letter of W. A. Henry; description and figures of larva, pupa, and imago of *Hylesinus trifolii*; ravages, habits, and means against the same.
1847. [RILEY, C. V.] Mud-wasp and spider egg-nest. <Amer. Ent., July, 1880 [v. 3], n. s., v. 1, p. 180, figs. 82-84.
Answer to letter of Mary Treat; figures of cells and of imago of *Eumenes fraternus*, which stores its cells with larvæ of *Paleacrita vernata*; figure and descriptions of egg-nests of *Epeira* sp.
1848. [RILEY, C. V.] Worm in joints of wheat. <Amer. Ent., July, 1880 [v. 3], n. s., v. 1, pp. 180-181, fig. 85. Reprint: <Suppl. to Amer. Ent., July, 1880, p. 4.
Answer to letter of J. K. P. Wallace; ravages of an unknown, apparently hymenopterous, larva in wheat stalks; figure of larva and pupa of *Meromyza americana* and of stalks injured by the same.
1849. [RILEY, C. V.] Linden and ash destroyers. <Amer. Ent., July, 1880 [v. 3], n. s., v. 1, p. 181. Reprint: <Suppl. to Amer. Ent., July, 1880, p. 4.

1849. RILEY, C. V.—Continued.

Answer to letter of Shelby Reed; season of appearance of *Odontota rubra* on *Tilia*; larvæ of *Hyphantria textor* [= *cunea*] feeding on the same; *Saperda calcarata* boring in poplar, and an unknown larva (*Neoclytus caprea*?) boring in black-ash.

1850. [RILEY, C. V.] Larva boring along the axis of apple-twigs. <Amer. Ent., July, 1880 [v. 3], n. s., v. 1, p. 181.

Answer to letter of T. V. Munson; twigs of apple-trees bored by larvæ of *Oberea* sp.?

1851. [RILEY, C. V.] Aquatic larvæ. <Amer. Ent., July, 1880 [v. 3], n. s., v. 1, p. 181.

Answer to letter of S. A. Forbes; larvæ of *Anax junius* and *Palingenia* [= *Hexagenia*] *bilineata* named; the latter common in the stomach of fishes.

1852. [RILEY, C. V.] First appearance of cotton-worm in prairie belt. Amer. Ent., July, 1880 [v. 3], n. s., v. 1, p. 181. Reprint: <Suppl. to Amer. Ent., July, 1880, pp. 3-4.

Answer to letter of J. F. Bailey; larvæ of *Aletia argillacea* [= *xylina*] appear first on lands where the cotton is luxuriant.

1853. [RILEY, C. V.] *Gyrinus* larva; terrestrial insects in stomach of shad. <Amer. Ent., July, 1880 [v. 3], n. s., v. 1, p. 182.

Answer to letter of S. A. Forbes; character of larva of *Gyrinus*; a mass of terrestrial insects including *Typhlocyba vitis*? a muscid, a Eurytomid, *Jassus* sp., *Triphleps insidiosus*, and other species from the stomach of Ohio shad.

1854. RILEY, C. V. Further remarks on the differences between *Pronuba* and *Prodoxus*. <Amer. Ent., July, 1880 [v. 3], n. s., v. 1, p. 182.

Differences between *Pronuba yuccasella* and *Prodoxus decipiens* in the form, sculpture, and color of the terminal joint, and of the ovipositor.

1855. [RILEY, C. V.] The grape-vine flea-beetle, *Graptodera chalybea* Illig. <Amer. Ent., August, 1880 [v. 3], n. s., v. 1, pp. 183-184, fig. 86.

Habits, seasons, ravages of, and means against *Graptodera* [= *Haltica*] *chalybea*; figures, injured leaf, and larvæ, cocoon, and imago of the same.

1856. RILEY, C. V. Further notes and observations on the army-worm. <Amer. Ent., 1880 [v. 3], n. s., v. 1: August, pp. 184, 185; September, pp. 214, 215. Reprint, with changes: <Sci. Amer., 4 September [v. 57], n. s., v. 43, p. 152. S.-b. No. 23, pp. 161-162.

Progress of knowledge upon the number of annual generations of *Leucania unipuncta*; stages of growth at which it hibernates; the destructive generation probably not the first of the season; explanation of the partial efficacy of the burning of fields in winter as a means against this insect; connection of wet and dry seasons with its increase; its natural habits; errors of A. Fitch.

1857. [RILEY, C. V.] Sprinklers and atomizers. <Amer. Ent., 1880 [v. 3], n. s., v. 1: August, pp. 185-189, figs. 87-98; September, pp. 211-214, figs. 111-117.

Extracts from pp. 56-57 and reprint of pp. 85-94 of Bull. No. 3, U. S. Entomological Commission. See No. 1736 for synopsis of contents.

1858. RILEY, C. V. The use of pyrethrum. <Amer. Ent., August, 1880 [v. 3], n. s., v. 1, pp. 193-195.
Record of experiments by W. A. Henry upon the effect of Pyrethrum powder on *Halticidæ*, *Meloidæ*, *Pieris rapæ*, *Coreus* [= *Anasa*] *tristis*, and *Blattidæ*; and of the fumes of burning pyrethrum on various insects.
1859. [RILEY, C. V.] [Colorado potato-beetle in New Hampshire.] <Amer. Ent., August, 1880 [v. 3], n. s., v. 1, p. 195.
Ravages of *Doryphora 10-lineata* in Coos County, N. H., in 1879.
1860. [RILEY, C. V.] Retarded development in a blister-beetle. <Amer. Ent., August, 1880 [v. 3], n. s., v. 1, p. 196.
Final transformations of individuals from a single batch of eggs of *Epicauta vittata* occurring at the first, second, and third year after hatching.
1861. [RILEY, C. V.] Ox-eye daisy as an insecticide. <Amer. Ent., August, 1880 [v. 3], n. s., v. 1, p. 196.
Experiments by W. S. Barnard upon the effect of alcoholic extracts of the flowers and stems of the ox-eye daisy on insects; "no evidence that they will prove of any practical value."
1862. [RILEY, C. V.] Directions for raising pyrethrum. <Amer. Ent., August, 1880 [v. 3], n. s., v. 1, p. 197.
Directions for sowing the seeds and cultivating the plants of pyrethrum.
1863. [RILEY, C. V.] State Entomologist for New York. <Amer. Ent., August, 1880 [v. 3], n. s., v. 1, pp. 197, 198.
Notice of the appointment of J. A. Lintner as State Entomologist of New York.
1864. [RILEY, C. V.] Economic investigations in the South and West. <Amer. Ent., August, 1880 [v. 3], n. s., v. 1, p. 198.
Meeting of the U. S. Entomological Commission; plan of work to be done in 1880-1881; partial list of persons engaged in the work.
1865. [RILEY, C. V.] [Number of entomologists in Europe.] <Amer. Ent., August, 1880 [v. 3], n. s., v. 1, p. 198.
Tabulation of the number of entomologists of the several countries of Europe.
1866. [RILEY, C. V.] [Catalogus coleopterorum by Gemminger and Harold.] <Amer. Ent., August, 1880 [v. 3], n. s., v. 1, p. 199.
Commendation of the above work and of the supplementary list of *Elatерidæ* by E. Candèze; need of co-operation for the completion of the whole catalogue.
1867. [RILEY, C. V.] Carnivorous propensity of plant-feeders. <Amer. Ent., August, 1880 [v. 3], n. s., v. 1, p. 200.
Larvæ of *Plusia brassicæ* devour those of *Pieris rapæ* and *Pionæa rimosalis* in default of more natural food.
1868. [RILEY, C. V.] Beetles injuring cabbages and fuchsias. <Amer. Ent., August, 1880 [v. 3], n. s., v. 1, p. 200, fig. 106.
Answer to letter of G. T.; ravages, distribution, and figures of *Epicærus imbricatus*; description of eggs, ravages, food-plants, and means against *Graptodera* [= *Haltica*] *carinata*.
1869. [RILEY, C. V.] Spider and nest. <Amer. Ent., August, 1880, [v. 3], n. s., v. 1, p. 200.
Answer to letter of Mrs. J. B. Harrison; distribution and distinctive characters of *Acrosoma stellatum*.

1870. [RILEY, C. V.] Damage to wheat: Worm boring in the stalk. <Amer. Ent., August, 1880 [v. 3], n. s., v. 1, p. 201.
Answer to letter of A. R. Frost; food-plants and ravages of larva and figure of larva and imago of *Gortyna nitela*.
1871. [RILEY, C. V.] Larvæ from stomach of blue-bird. <Amer. Ent., August, 1880 [v. 3], n. s., v. 1, p. 201.
Answer to letter of S. A. Forbes; larva of *Meracantha contracta* and of *Callimorpha* sp. from stomach of blue-bird; habits and characters of the same.
1872. [RILEY, C. V.] Butterfly larva injurious to cotton squares. <Amer. Ent., August, 1880 [v. 3], n. s., v. 1, p. 201.
Answer to letter of B. F. Cooke; larva of *Thecla (pæas?)* feeding on leaves and bolls of cotton-plant; a species of *Microgaster* parasitic in the larva.
1873. [RILEY, C. V.] Cut-worms from stomach of robin. <Amer. Ent., August, 1880 [v. 3], n. s., v. 1, p. 201.
Answer to letter of S. A. Forbes; larvæ of *Agrotis (messoria?)* from stomach of robin; *Agrotis cochrani* = *A. messoria*.
1874. [RILEY, C. V.] Large phosphorescent larva. <Amer. Ent., August, 1880 [v. 3], n. s., v. 1, pp. 201-202, fig. 108.
Answer to letter of S. F. Clarke; occurrence in Maryland and Missouri of a luminous larva (*Melanactes* sp. ?) [= *Phengodes* sp.]; figures of the larva, of its head and leg enlarged and of its probable parent; occurrence in the more northern States of a similar larva, probably that of *Asaphes memnonius*.
1875. RILEY, C. V. Worms injuring wheat. <Amer. Ent., August, 1880 [v. 3], n. s., v. 1, p. 202.
Answer to letter of J. Monaghan; ravages of larva of *Meromyza americana*.
1876. RILEY, C. V. Ash-root borer: Supposed eggs of *Odontota*. <Amer. Ent., August, 1880 [v. 3], n. s., v. 1, pp. 202-203.
Answer to letter of Shelby Reed; habits and ravages of *Parandra brunnea*; *Pimpla* sp. parasitic upon its larva; probable manner in which the eggs of *Odontota rubra* are laid.
1877. [RILEY, C. V.] Army-worm notes and inquiries: Its work on clover. <Amer. Ent., August, 1880 [v. 3], n. s., v. 1, p. 203.
Answer to letter of L. T. Derousse; *Leucania unipuncta* frequently leaves clover-plants untouched while eating the grasses growing with the clover, but under some circumstances destroys young clover-plants.
1878. [RILEY, C. V.] Ichneumon from stomach of bluebird. <Amer. Ent., August, 1880 [v. 3], n. s., v. 1, p. 203.
Answer to letter of S. A. Forbes; *Lampronota* sp. eaten in quantity by blue-birds.
1879. [RILEY, C. V.] Leaf-miner on white oak. <Amer. Ent., August, 1880 [v. 3], n. s., v. 1, p. 203.
Answer to letter of E. W. Claypole; description, habits, and ravages of *Lithocolletis cincinnatiella*.
1880. [RILEY, C. V.] Screw-worm: Its parentage in doubt. <Amer. Ent., August, 1880 [v. 3], n. s., v. 1, p. 203.
Answer to letter of A. R. Kilpatrick; *Lucilia macellaria* supposed to be the parent of the "screw-worm"; food-habits of certain *Muscidæ*.

1881. [RILEY, C. V.] Silk culture: How to dispose of cocoons. <Amer. Ent., August, 1880 [v. 3], n. s., v. 1, pp. 203-204.
Answer to letter of C. F. Durksen; need of silk-filatures in the United States; present means of selling cocoons.
1882. [RILEY, C. V.] Best cotton-worm destroyer. <Amer. Ent., August, 1880 [v. 3], n. s., v. 1, p. 204.
Answer to letter of J. G. Daunterive; reference to the most reliable poison and the best machines and methods for applying poison to kill *Aletia argillacea* [= *xylina*].
1883. [RILEY, C. V.] Twice-stabbed lady-bird. <Amer. Ent., August, 1880 [v. 3], n. s., v. 1, p. 204, fig. 109.
Answer to letter of H. N. Patterson; *Coccinellidæ* beneficial by feeding on *Aphididæ* and *Coccidæ*; figure of *Chilocorus bivulnerus*; significance of the presence of this beetle in large numbers on trees.
1884. [RILEY, C. V.] Pseudo-scorpion. <Amer. Ent., August, 1880 [v. 3], n. s., v. 1, p. 204.
Answer to inquiry of C. H. S. Davis; habitats and food-habits of *Chelifer can-croides* and other *Chernetidæ*.
1885. [RILEY, C. V.] Bluebirds feeding on parasitic and predaceous insects. <Amer. Ent., August, 1880 [v. 3], n. s., v. 1, pp. 204-205.
Answer to letter of S. A. Forbes; bluebirds more destructive to parasitic and predaceous insects than the thrushes; percentage of such food found in the stomachs of the bluebird; larvæ of *Leucania unipuncta*, *Telephorus bilineatus*, and *Nephelodes violans* eaten by the same; probable hibernation of the first named; habits, hibernation, distribution, and popular name of the *Nephelodes*.
1886. RILEY, C. V. The cotton destroyers. <New Orleans Democrat, 21 September, 1880, v. 5, No. 276, p. 8. S.-b. No. 23, pp. 170-173. Reprint: <Selma [Ala.] Times, 29 September, 1880. <Southern Enterprise [Atlanta, Ga.], December, 1880, v. 5, pp. 77-82. S.-b. No. 23, pp. 184-189; No. 61, pp. 3-5; No. 63, pp. 57-59; 60-62. Reprint, with slight changes: <Proc. Amer. Assoc. Adv. Sci. for 1880, 14 October, 1881, v. 29, pp. 642-649. Separate: <Salem, July, 1881, pp. 26-33. Extract: <Sci. Amer., 16 October, 1880 [v. 57], n. s., v. 43, p. 241. S.-b. No. 23, pp. 159-160. <Amer. Ent., October, 1880 [v. 3], n. s., v. 1, pp. 245-247. <Prairie Farmer, 30 October, 1880, v. 51, No. 44, p. 2. S.-b. No. 23, p. 153. Abstract: <Farmer's Review, 7 October, 1880. S.-b. No. 23, pp. 162-163. <Journ. Appl. Sci., November, 1880, v. 11, pp. 170-171.
Facts and principles established by the U. S. Entomological Commission, applicable to the whole cotton belt, regarding the times and manner of first appearance of *Aletia argillacea* [= *xylina*] and *Heliothis armigera* upon the cotton-plant; habits of the larvæ and imagos and the best means of destroying the same; relative efficacy of several insecticides; methods of preparing and applying the same; importance of early poisoning; main object of the cotton-worm inquiry accomplished.

1887. [RILEY, C. V.] The use of poisons to destroy insects. <Farmer's Review, 23 September, 1880, v. 5, p. 200. S.-b. No. 23, pp. 148-149; 165-166. Reprint: <Amer. Ent., October, 1880 [v. 3], n. s., v. 1, p. 244.
Advocacy of the use of Paris green and London purple as means against certain insects; danger of the use of the same against many insects; criticism of A. J. Cook's recommendation for their use against *Paria aterrima* and *Carpocapsa pomonella*; limitations within which they may be used.
1888. [RILEY, C. V.] Supplementary instructions to agents of the United States Entomological Commission. <Amer. Ent., September, 1880 [v. 3], n. s., v. 1, p. 218.
Call for experiments to ascertain the minimum quantity of poisons which can be used effectually against *Aletia argillacea* [= *xylina*]; effect of poisons on the several stages of this insect; food-plants, parasites, and enemies of the same; effect of yeast ferment upon it.
1889. RILEY, C. V. Dimorphism in locusts (*Acrididæ*). <Amer. Ent., September, 1880 [v. 3], n. s., v. 1, pp. 219-220.
Review of paper by S. H. Scudder; certain forms described as species of *Pezotettix* are dimorphic forms of *Caloptenus*; extract from 8th Ann. Rept. State Ent. Mo., 1876, p. 115.
1890. [RILEY, C. V.] A scale insect on maple hitherto unobserved by American entomologists. <Amer. Ent., September, 1880 [v. 3], n. s., v. 1, pp. 220-221.
Notice of paper by Miss E. A. Smith, with emended reprint of a portion of the same; habits, colors, and behavior of young larvæ and transformations of the male of *Pseudococcus aceris*.
1891. [RILEY, C. V.] How flight in insects is directed. <Amer. Ent., September, 1880 [v. 3], n. s., v. 1, p. 221.
Abstract of paper by Jousset de Bellesme; direction of flight not determined by the motion of the wings, but principally by the displacement of the center of gravity, resulting from the changes of position of other parts of the body.
1892. [RILEY, C. V.] Entomological work at the Department of Agriculture. <Amer. Ent., September, 1880 [v. 3], n. s., v. 1, p. 222.
Notice of the continuation of the appropriations by Congress for field-work and experiments in the entomological division of the U. S. Department of Agriculture.
1893. [RILEY, C. V.] Entomological papers read before the A. A. A. S. <Amer. Ent., September, 1880 [v. 3], n. s., v. 1, p. 223.
Titles of twenty-eight [28] papers read at the Boston meeting.
1894. [RILEY, C. V.] Entomologists at Boston. <Amer. Ent., September, 1880 [v. 3], n. s., v. 1, p. 223.
Notice of the 29th meeting of the A. A. A. S. at Boston, August-September, 1880.
1895. RILEY, C. V. Winged Phylloxera in California. <Amer. Ent., September, 1880 [v. 3], n. s., v. 1, pp. 224-225.
Letter from J. S. Hyde, with remarks; extracts from papers by E. W. Hilgard; winged fertile females of *Phylloxera vastatrix* found in California; local evidence of the spread of this insect; means of eradicating the same.

1896. [RILEY, C. V.] Worm infesting meal sacks. <Amer. Ent., September, 1880 [v. 3], n. s., v. 1, p. 229.
Answer to letter of J. Greenwood, jr.; description of larva and imago of *Ephestia zea* [= *interpunctella*]; food-habits of the larva.
1897. [RILEY, C. V.] Hesperid larva feeding on *Canna*. <Amer. Ent., September, 1880 [v. 3], n. s., v. 1, p. 229.
Answer to letter of N. S. Reed; occurrence of *Pamphila ethlius* in Illinois and South Carolina; its larva injurious to *Canna flaccida*.
1898. [RILEY, C. V.] Grape-vine apple-gall. <Amer. Ent., September, 1880 [v. 3], n. s., v. 1, p. 229, fig. 119.
Answer to letter of A. R. McCutchen; occurrence of *Cecidomyia* ? *vitis-pomum* and of *Calosoma scrutator* in Georgia; figures gall of the first named; food-habits of the *Calosoma*.
1899. [RILEY, C. V.] Apple-tree plant-lice in Oregon. <Amer. Ent., September, 1880 [v. 3], n. s., v. 1, pp. 229-230.
Answer to letter of H. B. May; occurrence and ravages of *Aphis mali* ? in Oregon; means against the same.
1900. [RILEY, C. V.] Phylloxera work. Wood-lice on grape-vine roots. <Amer. Ent., September, 1880 [v. 3], n. s., v. 1, p. 230.
Answer to letter of H. B. Trimble; occurrence of *Phylloxera vastatrix* at West Chester, Pa.; roots of grape-vines destroyed from unknown cause, perhaps by young of *Phyloscia* or *Porcellio*.
1901. RILEY, C. V. New hickory galls made by Phylloxera. <Amer. Ent., September, 1880 [v. 3], n. s., v. 1, p. 230.
Description of *Phylloxera caryæ-scissa* n. sp. and *P. caryæ-avellana* n. sp. from Florida; larva of *Diplosis* found in the galls.
1902. RILEY, C. V. Food-habits of the longicorn beetles or wood-borers. <Amer. Ent., 1880 [v. 3], n. s., v. 1; October, pp. 237-239; November, pp. 270-271.
Food-plants and food-habits of the *Prionidæ* and *Cerambycidæ* of the United States.
1903. [RILEY, C. V.] Additional experiments with Pyrethrum. <Amer. Ent., October, 1880 [v. 3], n. s., v. 1, p. 242.
Details of experiments made by H. G. Hubbard on the effect of very minute quantities of Pyrethrum powder on very young larvæ of *Aletia argillacea* [= *xylina*].
1904. [RILEY, C. V.] A new enemy to the strawberry. <Amer. Ent., October, 1880 [v. 3], n. s., v. 1, pp. 242-243, fig. 121.
Review of paper by A. J. Cook; extracts from the same; description and habits of larva and imago of *Paria aterrima*; means against the imago; habits of larva of *Colaspis flavida*; figure of the same; number of segments and spiracles in larvæ of Coleoptera.
1905. [RILEY, C. V.] A new enemy to corn: The long-horned *Diabrotica*. <Amer. Ent., October, 1880 [v. 3], n. s., v. 1, p. 247.
Notice of recent articles on the ravages of the larva of *Diabrotica longicornis*; food-habits and means against the same; food-habits of *Drasterius amabilis*.
1906. [RILEY, C. V.] Phylloxera congress in Spain. <Amer. Ent., October, 1880 [v. 3], n. s., v. 1, p. 247.
Notice of a congress to be held in Spain to consider all topics connected with the ravages of *Phylloxera vastatrix*.

1907. [RILEY, C. V.] The grape *Phylloxera* not permanently destructive. <Amer. Ent., October, 1880 [v. 3], n. s., v. 1, p. 248.
Recovery of grape-vines formerly injured by *Phylloxera vastatrix* in California and Missouri; belief that in Europe grape-vines will be grown again on the lands of late years ravaged.
1908. [RILEY, C. V.] Sale of silk-worm eggs. <Amer. Ent., October, 1880 [v. 3], n. s., v. 1, p. 248.
\$6,000,000 worth of silk-worm eggs sent from Japan to France via San Francisco in each of the four years 1874-1877.
1909. [RILEY, C. V.] [Death of S. S. Haldeman.] <Amer. Ent., October, 1880 [v. 3], n. s., v. 1, p. 248.
Obituary notice.
1910. [RILEY, C. V.] [Retirement of Mr. Fuller.] <Amer. Ent., October, 1880 [v. 3], n. s., v. 1, p. 248.
Announcement of the retirement of A. S. Fuller as assistant editor of the American Entomologist.
1911. [RILEY, C. V.] Insect enemies of growing rice. <Amer. Ent., October, 1880 [v. 3], n. s., v. 1, p. 253.
Answer to letters of J. L. Leconte and J. Screven; ravages of and means against the "grub" [= *Chalepus trachypygus*] and the "maggot" [= *Lissorhoptrus simplex*] in rice fields in Georgia.
1912. [RILEY, C. V.] Blind-eyed *Smerinthus*. <Amer. Ent., October 1880 [v. 3], n. s., v. 1, p. 254.
Answer to inquiry of Mrs. J. B. Harrison; occurrence at lamp-light in N. H. of *Smerinthus excrucatus*; food-plant of the larva of the same.
1913. [RILEY, C. V.] White waxy secretion on stems of bitter-sweet. <Amer. Ent., October, 1880 [v. 3], n. s., v. 1, p. 254.
Answer to inquiry of J. A. Lintner; method of oviposition and characters of egg-mass of *Enchophyllum* [= *Enchenopa*] *binotata*; seasons, habits, and food-plants and description of the eggs of the same.
1914. [RILEY, C. V.] Prickly-ash larva: Tachinid eggs. <Amer. Ent., October, 1880 [v. 3], n. s., v. 1, p. 254.
Answer to inquiry of R. W. Jones; larva of *Papilio cresphontes* on prickly ash; eggs of *Tachina* sp. on larva of *Aletia argillacea* [= *xyliua*].
1915. [RILEY, C. V.] Worms on cabbage: Boll-worm feeding on leaf. <Amer. Ent., October, 1880 [v. 3], n. s., v. 1, p. 254.
Answer to inquiry of R. W. Jones; food-habits of larvæ of *Heliothis armigera* and of *Pionea rimosalis*.
1916. [RILEY, C. V.] Buggy peas. <Amer. Ent., October, 1880 [v. 3], n. s., v. 1, p. 254.
Answer to letter of A. Berger; abundance of *Bruchus pisi* in Wisconsin; means against it.
1917. RILEY, C. V. Glow-worm. <Amer. Ent., October, 1880 [v. 3], n. s., v. 1, p. 254, fig. 123.
Answer to letter of J. J. Dean; occurrence of larva of *Photuris pennsylvanica* at Chatham, N. J.; figures larva and imago of the same: larva and imago of *Photinus pyralis*, also luminous; males and females of these species winged; female of *Lampyrus noctiluca* wingless and more luminous than the male.

1918. [RILEY, C. V.] The use of fungus growths to destroy insects. <Amer. Ent., November, 1880 [v. 3], n. s., v. 1, pp. 269-270.
Abstract of paper by A. N. Prentiss; the constant presence of spores of fungi in the air vitiates the value of most experiments on the application of the fungi to insects; insects rarely affected by the spores which are in the air while the plants are more so affected; yeast more injurious mechanically than infectiously.
1919. [RILEY, C. V.] New species of scale insects. <Amer. Ent., November, 1880 [v. 3], n. s., v. 1, pp. 275-276.
Review of paper by W. H. Ashmead on the red scale.
1920. [RILEY, C. V.] Remedy for cabbage worms. <Amer. Ent., November, 1880 [v. 3], n. s., v. 1, p. 276.
Pyrethrum powder the most satisfactory means against all larvæ affecting the leaves of cabbage.
1921. [RILEY, C. V.] Pyrethrum for the screw-worm. <Amer. Ent., November, 1880 [v. 3], n. s., v. 1, p. 276.
Notice of paper by A. R. Kirkpatrick; directions for the use of pyrethrum powder against the "screw-worm" [= *Lucilia macellaria*]; objections to the use of other remedies.
1922. [RILEY, C. V.] Oviposition in the *Tortricidæ*. <Amer. Ent. November, 1880 [v. 3], n. s., v. 1, p. 276.
Notice of and extract from paper by C. H. Fernald.
1923. [RILEY, C. V.] About *Phora* being merely a scavenger and not a true parasite. <Amer. Ent., November, 1880 [v. 3], n. s., v. 1, p. 277.
Letter from C. R. Osten Sacken, with remarks; *Phora aletia* not a parasite; oviposition and habits of larva of the same.
1924. [RILEY, C. V.] Gall on *Solidago* leaves. <Amer. Ent., November, 1880 [v. 3], n. s., v. 1, p. 278.
Answer to letter of H. Barnes; occurrence of galls of *Cecidomyia carbonifera* on leaves of *Solidago nemoralis*? at Mulberry Corners, Ohio.
1925. [RILEY, C. V.] Oak gall: *Cynips q. decidua* Bass. <Amer. Ent., November, 1880 [v. 3], n. s., v. 1, p. 278.
Answer to letter of J. Schenck; galls of *Cynips q. decidua*? found on leaves of *Quercus muhlenbergii* at Mount Carmel, Ill.
1926. [RILEY, C. V.] Insects from stomach of lark, robin, and sunfish. <Amer. Ent., November, 1880 [v. 3], n. s., v. 1, p. 278.
Answer to letter of S. A. Forbes; *Diplotaxis sordida* from stomach of meadow-lark; egg of a reduviid from that of a robin; larva of an ephemerid (*Poly-mitarcys alba*?) from the stomach of a sunfish.
1927. [RILEY, C. V.] Supposed hibernating *Aletia* chrysalis. <Amer. Ent., November, 1880 [v. 3], n. s., v. 1, p. 278.
Answer to letter of J. W. Davidson; pupa resembling that of *Achatodes zea* found in stalk of maize at Uniontown, Ala.
1928. RILEY, C. V. On the natural history of certain bee-flies (*Bombyliidæ*). <Amer. Ent., December, 1880 [v. 3], n. s., v. 1, pp.

1928. RILEY, C. V.—Continued.

279–283, figs. 147–151. Review: <Ent. Mo. Mag., February, 1881, v. 17, pp. 206–207.

Advance print of pp. 262–267 and a general abstract of pp. 267–269 of the section entitled “Bee-fly larvæ, family *Bombyliidæ*,” in 2d Rept. U. S. Entomological Commission. See No. 1959 for synopsis of contents.

1929. RILEY, C. V. On a new pyralid infesting the seed-pods of the trumpet-vine. <Amer. Ent., December, 1880 [v. 3], n. s., v. 1, pp. 286–288, figs. 152–153.

Description, with figures, of *Clydonopteron* n. g. [p. 287] and of larva, pupa, and imago of *C. tecomæ* n. sp. [p. 288], and of the abode of this insect in pods of the trumpet-vine; habits of the insect.

1930. [RILEY, C. V.] Experiments with yeast-ferment on various insects. <Amer. Ent., December, 1880 [v. 3], n. s., v. 1, pp. 289, 290.

Reports by J. E. Willet and A. J. Cook upon their experiments in the application of beer and yeast to various insects; no infection communicated to the insects by these applications.

1931. RILEY, C. V. Notes on the imported elm leaf-beetle. <Amer. Ent., December, 1880 [v. 3], n. s., v. 1, pp. 291–292.

Answer to letter of J. L. Leconte; seasons, transformations, enemies, and ravages of and means against *Galeruca xanthomelæna*; hibernation of *Chrysomeliæ*.

1932. [RILEY, C. V.] Synonyms of parasites' mistakes corrected. <Amer. Ent., December, 1880 [v. 3], n. s., v. 1, p. 293. Review: <Ca. Ent., February, 1881, v. 13, pp. 31–33, fig. 3.

Review of paper by L. O. Howard; comparison of the alleged characters of *Antigaster* and *Eupelmus* to show grounds for the founding of the former; *Didictyum* synonymous with *Hexaplasta*; *H. zigzag* not a parasite of *Aletia argillacea* [= *xylina*], but of *Phora aletia*; habits of *H. zigzag*.

1933. [RILEY, C. V.] “A mystery in reference to *Pronuba yuccasella*.” <Amer. Ent., December, 1880 [v. 3], n. s., v. 1, p. 293.

Critical review of paper by H. A. Hagen, who confounded *Prodoxus decipiens* with *Pronuba yuccasella*.

1934. [RILEY, C. V.] Mandible of *Lithocolletis guttifinitella*. <Amer. Ent., December, 1880 [v. 3], n. s., v. 1, p. 294, fig. 138.

Figure, with explanation, of the mandible of *Lithocolletis guttifinitella*.

1935. [RILEY, C. V.] Excessive injury by a beetle in Russia. <Amer. Ent., December, 1880 [v. 3], n. s., v. 1, p. 294.

Ravages of *Anisoplia austriaca* in southern Russia; description of the same; its habits and vernacular name.

1936. [RILEY, C. V.] Chemical change in the color of butterfly-wings. <Amer. Ent., December, 1880 [v. 3], n. s., v. 1, p. 294.

Note on paper by W. H. Edwards and J. M. Wilson.

1937. [RILEY, C. V.] Fungus foes. <Amer. Ent., December, 1880 [v. 3], n. s., v. 1, p. 297.

Answer to inquiry of J. J. Brown; *Cis fuscipes* and all *Cioidæ* infest fungi growing on old trees and logs.

1938. [RILEY, C. V.] The twig-girdler. <Amer. Ent., December, 1880 [v. 3], n. s., v. 1, p. 297, figs. 155-156.
Answer to letter of W. R. Maxwell; figures of larva, pupa, and imago of *Oncideres cingulata* and of twig injured by the imago; food-plants, habits, and transformations of this insect.
1939. [RILEY, C. V.] The bedeguar of the rose. <Amer. Ent., December, 1880 [v. 3], n. s., v. 1, p. 298, fig. 154.
Answer to letter of L. C. Bryan; account of the gall of *Rhodites rosæ*; figure of the same.
1940. [RILEY, C. V.] Minute borers in cherry, peach, and plum-trees. <Amer. Ent., December, 1880 [v. 3], n. s., v. 1, p. 298.
Answer to letters of J. L. Bennett and M. H. Boye; ravages, food-plants, and distribution of *Scolytus rugulosus*; food-habits of the species of *Scolytus*.
1941. [RILEY, C. V.] Smilax injured by cut-worms. <Amer. Ent., December, 1880 [v. 3], n. s., v. 1, p. 298.
Answer to letter of G. Thommen; habits, ravages, and food-plants of *Agrotis saucia*.
1942. [RILEY, C. V.] Honey-producing oak-gall. <Amer. Ent., December, 1880 [v. 3], n. s., v. 1, p. 298.
Answer to letter of H. C. McCook; secretion of saccharine matter by galls growing on *Quercus undulata*; description of these galls, *Cynips quercus-mellaria* n. sp.; *Myrmecocystus hortus-deorum* [= *melliger*] collects the saccharine matter from these galls.
1943. [RILEY, C. V.] Dr. Hagen's mystery. <Ca. Ent., December, 1880, v. 12, pp. 263-264.
Review of paper by H. A. Hagen; *Prodoxus decipiens* confounded with *Prodoxus nuba yuccasella*.
1944. RILEY, C. V. Acorn-gall. <Trans. Acad. Sci. St. Louis, 1880, v. 4, p. 1 Proc.
Gall mistaken for abortive acorn, by G. B. Emerson, in his "Trees and shrubs of Massachusetts."
1945. RILEY, C. V. Silk-culture in the United States. Condensed account of the silk-worm and how to inaugurate a new source of wealth. <Western Farmer's Almanac for 1881, 1880, pp. 35-39, 4 figs. S.-b. No. 23, p. —.
Practicability and desirability of the culture of *Sericaria mori* in the United States; requisites to its success; superiority of *S. mori* over all other insects for silk-culture; brief illustrated natural history of the same; directions for silk-culture.
1946. RILEY, C. V. Legislation to control insects injurious to vegetation. <Farmer's Review, 20 January, 1881. S.-b. No. 23, p. 148. Reprint: <Amer. Nat., April [25 March], 1881, v. 15, pp. 322-323. <Indiana Farmer, 16 April, 1881. S.-b. No. 23, p. 149. Notice: <Farmer's Review, 20 January, 1881. S.-b. No. 23, p. 170.
Appointment of C. H. Dwinelle, by the California State Horticultural Society, on a committee to consider what legislation is desirable to check the spread of noxious insects and to force land-owners to destroy the same; notice of the previous passage of such laws and of anticipated objections to them.

1947. RILEY, C. V. Larval habits of bee-flies, *Bombyliidæ*. <Amer. Nat., February [25 January], 1881, v. 15, pp. 143-145, figs. 1-3. Notice: <Western Stock Journ. and Farm, March, 1881, v. 11, p. 58.

Habits of *Systæchus* and *Triodites* as parasites on eggs of *Acerididæ*; notice of paper by T. A. Chapman; figures larva, pupa, and imago of *Systæchus oreas* and compares its larvæ and pupæ with those of *Bombylius major*.

1948. RILEY, C. V. Experiments with pyrethrum: Safe remedies for cabbage-worms and potato-beetles. <Amer. Nat., February [25 January], 1881, v. 15, pp. 145-147.

Details of experiments made by A. J. Cook and W. R. Hubbert upon the effect of a dusting of pyrethrum powder upon larvæ of *Pieris rapæ*, larvæ and imagos of *Doryphora 10-lineata*, and upon *Eriosoma* [= *Pemphigus*] *tesellata*, *Coreus* [= *Anasa*] *tristis*, and flies and mosquitoes.

1949. RILEY, C. V. Insect enemies of the rice-plant. <Amer. Nat., February [25 January], 1881, v. 15, pp. 148-149.

Chalepus trachypygus feeds on roots of the rice-plant; conjectures as to other enemies of the rice-plant; *Cecidomyia oryzae* injurious to the same in India.

1950. [RILEY, C. V.] The "yellow-fever fly." <Amer. Nat., February [25 January], 1881, v. 15, p. 150.

Review of paper by H. A. Hagen; food-habits of larvæ of *Sciara* sp.; occurrence of swarms of imagos of the same.

1951. [RILEY, C. V.] An aquatic Sphinx larva. <Amer. Nat., February [25 January], 1881, v. 15, p. 151.

Abstract of paper by H. A. Hagen.

1952. RILEY, C. V. Notes on the grape Phylloxera and on laws to prevent its introduction. <Amer. Nat., March [24 February], 1881, v. 15, pp. 238-241. Notice with extracts: <Pacific Rural Press, 23 April, 1881. S.-b. No. 42, p. 17.

Remarks upon letter of I. Bush; precautions to be adopted against the introduction of *Phylloxera vastatrix*; summary of the life-history of the same.

1953. RILEY, C. V. Hibernation of the cotton-worm moth: Ease with which mistakes are made. <Amer. Nat., March [24 February], 1881, v. 15, pp. 244-245, figs. 1-3.

Extract from letter of I. A. Wimbish; *Leucania unipuncta* mistaken for *Aletia argillacea* [= *xylina*]; characters of *Aletia*; figures ovipositor and eggs of *L. unipuncta* and imagos of both species.

1954. [RILEY, C. V.] On some interaction of organisms. <Amer. Nat., April [25 March], 1881, v. 15, pp. 323-324.

Review of paper by S. A. Forbes, with extracts; relative unimportance of special parasites as compared with predaceous animals of varied tastes in the limitation of the numbers of any species of animals; need of conservative action and exhaustive inquiry in the attempt to interfere with the order of nature.

1955. [RILEY, C. V.] Insect locomotion. <Amer. Nat., April [25 March], 1881, v. 15, p. 325.

Results of G. Carlet's studies on the order in which the feet are moved in the walking of *Hexapoda* and *Arachnida*.

1956. [RILEY, C. V.] Plant-feeding habits of predaceous beetles. <Amer. Nat., April [25 March], 1881, v. 15, pp. 325-327.
Citation of evidence from numerous sources proving that certain *Carabidæ* and *Coccinellidæ* occasionally feed on plants, seeds, and spores.
1957. RILEY, C. V. Notes on *Papilio philenor*. <Amer. Nat., April, [25 March], 1881, v. 15, pp. 327-329, figs. 1-3.
Description of egg and newly-hatched larva of *Papilio philenor*; figure of larva, chrysalids, and imago of the same; food-plants, distribution, and its occurrence in swarms.
1958. [RILEY, C. V.] Entomological notes. <Amer. Nat., April [25 March], 1881, v. 15, pp. 330-331.
Notice of H. A. Hagen's paper on *Simulium pictipes*, with additional notes; abstracts and minor notices of other papers and items of news.
1959. [RILEY, C. V.] Second report of the United States Entomological Commission for the years 1878 and 1879, relating to the Rocky Mountain locust and the Western cricket, and treating of the best means of subduing the locust in its permanent breeding grounds, with a view of preventing its migrations into the more fertile portions of the trans-Mississippi country in pursuance of appropriations made by Congress for this purpose, with maps and illustrations. <Washington: 1880 [4 April, 1881], pp. 18+322+80, 10 figs., 17 pl., 9 maps.

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1960. RILEY, C. V. Notes on North American *Microgasters*, with descriptions of new species. <Trans. Acad. Sci. St. Louis, 16 April 1881, v. 4, pp. 295–315, 9 figs. Separate: <[St. Louis, Mo.], 6 April, 1881, 20 pp., 9 figs.

Characteristics and habits of the *Microgasters*; description of larva of *Apanoteles aletiae*; the cocoons and their construction; effect of the parasites upon the longevity of the host; secondary parasites; habits and descriptions of several new species and varieties, for a list of which see the *Systematic Index*; figures *A. aletiae*, healthy and parasitized larvæ of *Chærocampa pampinatrix* [= *Ampelophaga myron*]; also mass of *Microgaster* cocoons, and the formation of the cocoon by the larva.

1961. [RILEY, C. V.] Exuviation in flight. <Amer. Nat., May [16 April], 1881, v. 15, p. 395.

Criticism of R. McLachlan's observations; process of casting subimaginal skin in *Polymitaercys alba*.

1962. RILEY, C. V. The rascal leaf-crumpler in Georgia. <Amer. Nat., May [16 April], 1881, v. 15, p. 400.

Occurrence and ravages of *Acrobasis nebulo* [= *indiginella*] in Bryan County, Georgia.

1963. [RILEY, C. V.] Vertical vs. horizontal insect boxes. <Amer. Nat., May [16 April], 1881, v. 15, p. 401.

Review of pamphlet by A. Preudhomme de Borre; reply of G. H. Horn to Preudhomme de Borre.

1964. [RILEY, C. V.] Insects affecting the China tree. <Amer. Nat., May [16 April], 1881, v. 15, pp. 401–402.

General immunity of the China tree from the attacks of insects and its consequent value as a shade tree; occurrence of a *Lecanium* and *Ceroplastes* n. sp. upon it in Alabama; injuries to its leaves by *Atta fervens* in Texas.

1965. [RILEY, C. V.] Galls on *Eucalyptus*. <Amer. Nat., May [16 April], 1881, v. 15, p. 402.

Critical review of paper by R. McLachlan; the supposed dipterous galls probably cecidomyioidous; the supposed lepidopterous galls probably not lepidopterous, but inhabited by a lepidopterous inquiline.

1966. [RILEY, C. V.] North American *Anthomyidæ*. <Amer. Nat., May [16 April], 1881, v. 15, p. 402.
Notice and summary of paper by H. A. Hagen.
1967. [RILEY, C. V.] Galls and gall-insects. <Amer. Nat., May [16 April], 1881, v. 15, pp. 402-403.
Review of paper by H. F. Bassett, with additional notes on the gall of *Cynips* [= *Andricus*] *quercus-californica* found on *Quercus douglasii* and infested by *Ozognathus cornutus*; the *Cynips* produced from this gall all females; earlier accounts of the gall and of the habits of *O. cornutus*.
1968. RILEY, C. V. Scale insect on raspberry. <Farmer's Review, 21 April, 1881, v. 6, p. 243. S.-b. No. 23, p. 150. Reprint: <Amer. Nat., June [19 May], 1881, v. 15, p. 487.
Remarks on communication from R. B. Fulton; occurrence and ravages of a scale (*Diaspis harrisii*?) [= *Chionaspis furfurus*] on black-cap raspberry in Mississippi; mode of dissemination and means of extermination of *Coccidæ*.
1969. RILEY, C. V. Descriptions of some new *Tortricidæ*, leaf-rollers. <Trans. Acad. Sci. St. Louis, May, 1882, v. 4, pp. 316-324. Separate: <[St. Louis, Mo.], 28 April, 1881, 9 pp.
Description of two (2) new genera and thirteen (13) new species of *Tortricidæ*; see the *Systematic Index* for a list of the same; mention of the food-plants of some of the species.
1970. RILEY, C. V. Larval habits of bee-flies. <Amer. Nat., June [19 May], 1881, v. 15, pp. 438-447, pl. 6. Separate: <pp. 438-447.
Adapted from the 2d Rept. U. S. Ent. Commission, pp. 262-269; see No. 1959 for synopsis of contents.
1971. [RILEY, C. V.] The periodical Cicada alias "seventeen-year locust." <Amer. Nat., June [19 May], 1881, v. 15, pp. 479-482, fig. 1. Correction: <*Ibid.*, July [22 June], 1881, p. 578.
Extract from 1st Rept. State Ent. Mo., with additional notes; figures eggs, pupæ, and imago of *Cicada* [= *Tibicen*] *septendecim*, and of twig punctured by the imago for the deposition of her eggs.
1972. RILEY, C. V. A new species of oak coccid mistaken for a gall. <Amer. Nat., June [19 May], 1881, v. 15, p. 482.
Description of *Kermes galliformis* n. sp. [p. 482] occurring on *Quercus palustris* in the southern and central United States; the coccid infested by *Euclemensia bassettella*.
1973. [RILEY, C. V.] The "water-weevil" of the rice-plant. <Amer. Nat., June [19 May], 1881, v. 15, pp. 482-483. Extract: <Ann. Rept. [U. S.] Commissioner Agric. for 1881 and 1882, pp. 130-133.
Note on the injury done to rice plants by the larvæ of *Chalepus trachypygus* and by other larvæ, probably *Lissorhoptrus simplex*; letter from J. Screven; seasons, habits, and ravages of the last-mentioned species.
1974. [RILEY, C. V.] The impregnated egg of *Phylloxera vastatrix*. <Amer. Nat., June [19 May], 1881, v. 15, pp. 483, 484. Reprint: <Amer. Wine and Grape Grower, 1 July, 1881, v. 3, p. 104. S.-b. No. 42, pp. 12-13.
Verification by P. Graell of author's conclusion that the impregnated egg of *Phylloxera vastatrix* would generally be found to hatch in the same season in which it was laid,

1975. RILEY, C. V. Works on North American Microlepidoptera. <Amer. Nat., June [19 May], 1881, v. 15, pp. 484-486.
Review of works of T. de Grey [Lord Walsingham]; discussion of new genera; list of *Tortricidæ* of economic interest common to Europe and North America; additions to the synonymy of *Tortricidæ*.
1976. [RILEY, C. V.] Moths mistaken for *Aletia*. <Amer. Nat., June [19 May], 1881, v. 15, pp. 486-487.
Platyhyphen [= *Hyphen*] *scabra* and *Phoberia atomaris* mistaken for *Aletia argillacea* [= *xylina*]; hibernating habits of the first species.
1977. [RILEY, C. V.] Specific value of *Apatura alicia* Edw. <Amer. Nat., June [19 May], 1881, v. 15, p. 487.
Critical review of paper by W. H. Edwards.
1978. RILEY, C. V. *Antigaster* vs. *Eupelmus*. <Ca. Ent., May, 1881, v. 13, p. 114.
Validity of L. O. Howard's reasons for considering *Antigaster* a synonym of *Eupelmus*.
1979. RILEY, C. V. The periodical Cicada alias "seventeen-year locust." <Farmer's Review, 16 June, 1881, v. 6, p. 370. S.-b. No. 42, pp. 18-20.
Extract from 1st Rept. State Ent. Mo., with additional notes and request for further information in regard to the chronology and geographical distribution of the broods of *Cicada* [= *Tibicen*] *septendecim* and *C.* [= *T.*] *tredecim* which appear in 1881.
1980. [RILEY, C. V.] Dimorphism in *Cynipidæ*. <Amer. Nat., July [22 June], 1881, v. 15, p. 566.
Claim of author to have made the first record at least in North America of proof of dimorphism in *Cynipidæ*; notice of writings of B. D. Walsh, H. F. Bassett, and H. Adler on the subject; list of species of *Cynipidæ* in which the occurrence of dimorphic forms has been proven, and of closely allied species in which no alternate generation seems to occur.
1981. [RILEY, C. V.] *Blepharoceridæ*. <Amer. Nat., July [22 June], 1881, v. 15, pp. 567-568.
Account of various investigations into the natural history of *Blepharoceridæ*; description of larvæ and pupæ of these flies.
1982. [RILEY, C. V.] *Braula cæca* not particularly injurious to the honey-bee. <Amer. Nat., July [22 June], 1881, v. 15, p. 568.
Notice of paper of J. Fedarb; ravages of *Braula cæca* in hives generally over-estimated at present and formerly unknown.
1983. [RILEY, C. V.] Economic entomology in England. <Amer. Nat., July [22 June], 1881, v. 15, p. 568.
Notice of Miss E. A. Ormerod's report for 1880.
1984. [RILEY, C. V.] The cultivation of pyrethrum and manufacture of the powder. <Amer. Nat., 1881, v. 15, July [22 June], pp. 569-572; September [23 August], pp. 744-746; October [23 September], pp. 817-819. See: <Amer. Wine and Grape Grower, December, 1881, v. 4, p. 22. S.-b. No. 51, p. 149.
Partial history of the use of pyrethrum powder as an insecticide; directions for the cultivation of the plants and for the production and use of the powder

1985. [RILEY, C. V.] Hudson Bay Lepidoptera. <Amer. Nat., July [22 June], 1881, v. 15, pp. 572, 573.

Review of paper of J. J. Weir; reprint of the list of Lepidoptera and of the remarks on the explanation of the relations of the fauna of Hudson's Bay to that of Europe; probability that the species identical with those of Europe are recent immigrants.

1986. [RILEY, C. V.] Trade in insects. <Amer. Nat., July [22 June], 1881, v. 15, p. 573.

General decline in prices of insects within sixty years or more; statement of some prices obtained for Coleoptera recently.

1987. [RILEY, C. V.] Ants injurious in Arizona. <Amer. Nat., July [22 June], 1881, v. 15, pp. 573, 574.

Statement by H. H. Rusby of ravages of *Formicidae*, which occur in vast colonies.

1988. [RILEY, C. V.] Covering of egg-puncture mistaken for *Dorthesia*. <Amer. Nat., July [22 June], 1881, v. 15, p. 574.

Waxy material covering the egg-punctures of *Enchophyllum* [= *Enchenopa*] *binotata*, labeled *Dorthesia riburni* and *D. celastri* in collection of A. Fitch.

1989. [RILEY, C. V.] [*Dolerus unicolor*.] <Amer. Nat., July [22 June], 1881, v. 15, p. 574.

Doubts the statement of H. Keenan that the imagoes of *Dolerus unicolor* injure the fruit buds of pear-trees.

1990. [RILEY, C. V.] Supposed army-worm in New York and other Eastern States. <Amer. Nat., July [22 June], 1881, v. 15, pp. 574-577.

Ravages of *Nephelodes violans* and *Crambus vulgivagellus* in New Jersey, Long Island, and northern New York; natural history, vernacular names, and description of the larva of the former species; previous accounts of this larva.

1991. [RILEY, C. V.] Migration of butterflies. <Amer. Nat., July [22 June], 1881, v. 15, p. 577.

Report by J. H. Mellichamp of the eastward flight of thousands of *Pieris monuste* in small groups of two, three, or more individuals, on 1 and 2 June, 1881, over Bluffton, S. C.; description of larva and pupa; food-plants of larva.

1992. [RILEY, C. V.] Classification of the mites. • <Amer. Nat., July [22 June], 1881, v. 15, pp. 577-578.

Abstract of letter of G. Haller; observations on the appendages and systematic position of the *Acarina*.

1993. [RILEY, C. V.] Carrying out the law. <Amer. Nat., July [22 June], 1881, v. 15, p. 578.

A fine of £5 imposed upon a man in England for importing living *Doryphora decemlineata* into that country.

1994. RILEY, C. V. Locusts and locusts. <N. Y. Tribune, 22 June, 1881. S.-b. No. 32, pp. 55-56; No. 42, pp. 7-11.

Cicada [= *Tibicen*] *septendecim* and *C. [T.] tredecim* compared with *Caloptenus spretus* to explain and correct the confusion of the species by those who call them all "locusts"; differences in the habits and characters of these

1994. RILEY, C. V.—Continued.

insects, their periodicity and distribution; no fear that *C. spretus* will commit great ravages this year; recommendation of a system of observations and warnings by the United States Signal Service to guard against unexpected inroads of *C. spretus*.

1995. RILEY, C. V. The caterpillar nuisance. <Evening Star [Washington, D. C.], 24 June, 1881, v. 57, No. 8802, p. 3. S.-b. No. 23, p. 152; No. 42, p. 13. Reprint: <Amer. Nat., September [23 August], 1881, v. 15, pp. 747-748, 1 fig.

Natural history of *Hyphantria textor* [= *cunea*]; means against it; methods of applying poisoned liquids to trees.

1996. RILEY, C. V. Directions for cultivating pyrethrum for insect powder. <Gardener's Mo. and Hortic., June, 1881, v. 23, pp. 172-173. S.-b. No. 23, p. 153.

Directions for raising *Pyrethrum cinerariaefolium* from seed; climate not favorable to the growth of *P. roseum*; preparation of these plants for the destruction of insects.

1997. RILEY, C. V. Cotton-worms and Cicadas. Prof. Stelle's logic! <Selma [Ala.] Times, 19 July, 1881. S.-b. No. 24, pp. 44-45; No. 39, p. 123.

Criticism of statements of J. P. Stelle; impossibility of exterminating *Aletia xyliana*; waves of destructiveness; *Cicada* [= *Tibicen*] *tredecim* abundant in sections of Alabama, as predicted.

1998. RILEY, C. V. The Rocky Mountain locust alias Western grasshopper. <Amer. Agric., July, 1881, v. 40, pp. 283-284, 6 figs. S.-b. No. 23, p. 142.

Summary of facts concerning the egg-laying development, habits, food-plants, destructive powers, migration, flight, and enemies of and means against *Caloptenus spretus*; figures of the eggs of the insect in all stages, of the manner of oviposition, and of plans for the destruction of the locusts; prospects of future injury.

1999. RILEY, C. V. Lepidopterological notes. <Papilio, July, 1881, v. 1, pp. 106-110.

Advance print of extracts from Bull. No. 6, U. S. Entomological Commission, pp. 56-58, 78, 82-83. See No. 2026 for synopsis of contents.

2000. RILEY, C. V. Further notes on the pollination of Yucca and on *Pronuba* and *Prodoxus*. <Proc. Amer. Assoc. Adv. Sci. for 1880, 14 October, 1881, v. 23, pp. 617-639, 16 figs. Separate: <[Salem, Mass, July, 1881], 23 pp., 16 figs.

Recapitulation of published observations on *Pronuba yuccasella* and *Prodoxus decipiens*, with additional observations and references to literature; habits and functions of the two species; descriptions and figures of the generic characters of *Pronuba*, *Prodoxus*, and *Hyponomeuta*, and of the specific characters of *Pronuba yuccasella*, *P. maculata* n. sp., *Prodoxus decipiens*, *P. intermedius* n. sp., *P. marginatus* n. sp., *P. cinereus* n. sp., *P. aenescens* n. sp., *Hyponomeuta malinella*, and *H. multipunctella*, especially the structure of the ovipositor and the male characters, and the venation of the wings; discussion of the structure of the ovipositor in Lepidoptera characterization of the new family *Prodoxidae* to comprise *Pronuba* and *Prodoxus*; generic and specific synonymy; reply to criticism of T. Meehan; list of insects frequenting Yucca; synonymical list of the described *Prodoxidae*.

2001. RILEY, C. V. Additional notes on the army worm, *Leucania unipuncta*. <Proc. Amer. Assoc. Adv. Sci. for 1880 [14 October], 1881, v. 29, pp. 640-642. Separate: <Salem, Mass., July, 1881, pp. 24-26. Abstract: <Boston Daily Advertiser, 2 September, 1880, v. 136, p. 4.

Number of annual generations of *Leucania unipuncta*; stages at which hibernation takes place; occasional immigration of moths into uninfested districts; preferred breeding-places; connection of wet and dry seasons with the abundance of these insects.

2002. RILEY, C. V. The hitherto unknown life-habits of two genera of bee-flies, *Bombyliidæ*. <Proc. Amer. Assoc. Adv. Sci. for 1880 [14 October], 1881, v. 29, p. 649. Separate: <Salem, Mass., July, 1881, p. 33.

Food-animals and food-habits of *Systoechus oreas* and *Triodites mus*; parallelism in the life-history of *Bombyliidæ* and *Meloidæ*; connection of the abundance of insects of these families in the western United States with the prevalence of *Acrididæ* there; retardation of development in the early stages of these parasites explained as a beneficial characteristic.

2003. RILEY, C. V. A remarkable case of retarded development. <Sci. Amer., 20 August, 1881 [v. 59], n. s., v. 45, p. 116. S.-b. No. 23, p. —.

Report of a case in which eggs of *Caloptenus spretus* remained undeveloped for a period of four and one-half years after being laid; remarks upon the problems involved in the explanation of retarded development.

2004. [RILEY, C. V.] *Blepharoceridæ*. <Amer. Nat., September [23 August], 1881, v. 15, p. 748.

Discovery by J. Q. Adams of pupæ and imago of *Blepharoceridæ* at Watertown, N. Y.

2005. [RILEY, C. V.] Remarkable case of retarded development. <Amer. Nat., September [23 August], 1881, v. 15, pp. 748-749.

Eggs of *Caloptenus spretus*, buried about 25 cm. (10 inches) under ground, remained unhatched and alive for four and one-half years, and hatched upon being exhumed.

2006. [RILEY, C. V.] Promotion of silk-culture in California. <Amer. Nat., September [23 August], 1881, v. 15, p. 749.

Answer to letter of Mrs. T. H. Hittell; popularization of silk-culture in California; preparation of the fiber for the market.

2007. [RILEY, C. V.] Locust flights in Dakota. >Amer. Nat., September [23 August], 1881, v. 15, pp. 749-750.

Flights of *Caloptenus spretus* in Dakota on 7th and 16th July, 1881; large numbers of *Diplax rubicundula* accompanying the locusts.

2008. [RILEY, C. V.] The Hessian fly. <Amer. Nat., September [23 August], 1881, v. 15, p. 750.

Extensive damages done by *Cecidomyia destructor* in Illinois and Missouri; its abundance in the western prairie States in 1881.

2009. [RILEY, C. V.] The genuine army-worm in the West. <Amer. Nat., September [23 August], 1881, v. 15, p. 750.
Occurrence and ravages of *Leucania unipuncta* in Illinois and Indiana in 1881; these larvæ either from eggs of hibernated moths or of a second brood; other insects mistaken for this in other States; periods of the *Leucania* and influence of the seasons upon it.
2010. [RILEY, C. V.] A new imported enemy to clover. <Amer. Nat., September [23 August], 1881, v. 15, pp. 750-751.
Clover injured by *Phytonomus punctatus* at Barrington, N. Y., in July, 1881.
2011. [RILEY, C. V.] Another enemy of the rice-plant. <Amer. Nat., September [23 August], 1881, v. 15, p. 751.
Rice-plants injured by the larva of *Laphygma frugiperda* in Georgia in the summer of 1881.
2012. [RILEY, C. V.] Canker-worms. <Amer. Nat., September [23 August], 1881, v. 15, p. 751.
Excessive ravages of *Palcacrita vernata* in Tazewell County, Illinois, in 1881.
2013. [RILEY, C. V.] Lepidopterological notes. <Amer. Nat., September [23 August], 1881, v. 15, pp. 751-752.
Advance extract from Bull. No. 6, U. S. Entomological Commission, pp. 55-56. See No. 2026 for synopsis of contents.
2014. RILEY, C. V. The periodical Cicada. <Amer. Agric., August, 1881, v. 40, p. 132, 5 figs. S.-b. No. 23, p. 141.
Brief sketch of the natural history of *Cicada* [= *Tibicen*] *septendecim* and *C.* [= *T.*] *tredecim*, with figures of all stages and of punctured twigs; the reputed stinging by these insects probably done by *Stizus grandis* [= *Sphecius speciosus*]; figure of the *Stizus*; recommends the substitution of the name "periodical Cicada" in place of the name "locust."
2015. RILEY, C. V. Entomological notes. <Farmer's Review, 22 September, 1881. S.-b. No. 42, pp. 54-55. Reprint: <Amer. Nat., [3] December, 1881, v. 15, pp. 1012-1013. See: <Sci. Amer., 11 February, 1882. S.-b. No. 38, p. 1½.
Abstract and critical review of paper by M. Saint-André; attempted explanation of the immunity of grape-vines in sandy soil from the ravages of *Phylloxera vastatrix*.
2016. RILEY, C. V. Notes on *Hydrophilus triangularis*. <Amer. Nat., October [23 September], 1881, v. 15, pp. 814-817, figs. 1-2.
Description and figures of egg-case and figures of eggs and of male imago, with structural details of *Hydrophilus triangularis*; characters and life-history of the larva and pupa; figures of eggs, egg-case, larva, and pupa of *H. piceus* of Europe.
2017. [RILEY, C. V.] Migration of plant-lice from one plant to another. <Amer. Nat., October [23 September], 1881, v. 15, pp. 819-820.
Exposition of J. Lichtenstein's theory that most *Aphididae*, especially gall-making *Pemphigini*, live upon two different plants in passing through their cycle of development; cites instances in which the host-plants are of different families.
2018. [RILEY, C. V.] The chinch-bug. <Amer. Nat., October [23 September], 1881, v. 15, pp. 820-821.
The abundance of *Blissus leucopterus* is connected with the moisture of the season; extraordinary noxiousness of this insect in the dry season of 1881 in various parts of the United States.

2019. [RILEY, C. V.] Phylloxera laws. <Amer. Nat., October [23 September], 1881, v. 15, p. 821.

Summary of the existing laws regulating the traffic in plants, with a view of preventing the introduction of *Phylloxera vastatrix* into different countries.

2020. [RILEY, C. V.] One half the vine area of France affected by Phylloxera. <Amer. Nat., October [23 September], 1881, v. 15, p. 821.

Statement that nearly one-fourth of the area of vineyards in France is destroyed by *Phylloxera vastatrix* and as much more attacked; submersion the only sure remedy, and the use of American resisting stocks the only available preventive.

2021. [RILEY, C. V.] London purple and Paris green. <Amer. Nat., October [23 September], 1881, v. 15, p. 821.

London purple more than twice as efficacious and less expensive than Paris green as an insecticide; it needs to be well ground; composition of London purple.

2022. [RILEY, C. V.] Entomologist for the Pacific coast. <Amer. Nat., October [23 September], 1881, v. 15, pp. 821-822.

Notice of attempts made to have a State entomologist appointed in California.

2023. [RILEY, C. V.] *Dilar* in North America. <Amer. Nat., October [23 September], 1881, v. 15, p. 822.

Notice of paper by R. McLachlan.

2024. [RILEY, C. V.] Locusts in Nevada. <Amer. Nat., October [23 September], 1881, v. 15, p. 822.

Statement from Reno [Nev.] Journal that the countless locusts which hatched in western Nevada in the spring of 1881 flew toward the Sierra Nevada without doing any injury.

2025. [RILEY, C. V.] Odor in butterflies. <Amer. Nat., October [23 September], 1881, v. 15, p. 822.

Notice of paper by Miss M. E. Murtfeldt.

2026. RILEY, C. V. General index and supplement to the nine reports on the insects of Missouri. <Bull. No. 6, U. S. Ent. Commission [24 March], 1881, 178 pp.

Order of matter: (1) Introduction. (2) Table of contents. (3) Corrections. (4) Notes and additions. (5) Descriptions of new species and varieties. (6) List of descriptions of adolescent states. (7) List of descriptions, mostly amplified, of species not new. (8) List of illustrations by reports. (9) Classified list of illustrations. (10) General index. (11) Index to food-plants.

2027. [RILEY, C. V.] The permanent subsection of entomology at the recent meeting of the A. A. A. S. <Amer. Nat., 1881, v. 15, November [28 October], pp. 909-912; [3] December, pp. 1008-1011.

Notice of the meeting at Cincinnati, Ohio, August, 1881, with abstracts and notices of papers read.

2028. RILEY, C. V. The new imported clover enemy. <Amer. Nat., November [28 October], 1881, v. 15, pp. 912-914.

Occurrence and habits of *Phytonomus punctatus* in New York; description of the egg and larva of the same; food-plants of the European species of *Phytonomus*.

2029. RILEY, C. V. *Crambus vulgivagellus*. <Amer. Nat., November [28 October], 1881, v. 15, pp. 914-915.
Excessive abundance of this species in the eastern United States in 1881; description of the egg; method of oviposition.
2030. RILEY, C. V. Larval habits of *Sphenophori* that attack corn. <Amer. Nat., November [28 October], 1881, v. 15, pp. 915-916.
Several species of *Sphenophorus* injurious to maize-plants in different parts of the United States; habits and ravages of *S. robustus*.
2031. [RILEY, C. V.] Effect of drought on the Hessian fly. <Amer. Nat., November [28 October], 1881, v. 15, p. 916. See: <N. E. Farmer, 10 December, 1881. S.-b. No. 45, p. 39. <Farmer's Review, 15 December, 1881. S.-b. No. 45, p. 99.
Hot and dry weather dries up and kills *Cecidomyia destructor* and its parasites.
2032. [RILEY, C. V.] *Simulium* from Lake Superior. <Amer. Nat., November [28 October], 1881, v. 15, p. 916.
Notice of paper by H. A. Hagen; larvæ and pupæ from Lake Superior similar to those of *S. pictipes*, but the imagoes from the same locality are different.
2033. [RILEY, C. V.] Coleopterous cave fauna of Kentucky. <Amer. Nat., November [28 October], 1881, v. 15, pp. 916, 917.
Notice of H. G. Hubbard's investigations; *Adelops* contains but one species, which seems to be equally common in all caves in the State; *Ancphthalmus* contains several species, and more may be expected to be found.
2034. [RILEY, C. V.] Hemipterological studies. <Amer. Nat., November [28 October], 1881, v. 15, p. 917.
Notice of paper of V. Signoret.
2035. [RILEY, C. V.] Entomology in Buffalo, N. Y. <Amer. Nat., November [28 October], 1881, v. 15, p. 917.
Notice of Vol. 4, No. 1, of the Bulletin of the Buffalo Society of Natural Science; list of entomological papers therein.
2036. [RILEY, C. V.] *Lampyridæ*. <Amer. Nat., November [28 October], 1881, v. 15, p. 917.
Notice of paper by J. L. Leconte.
2037. [RILEY, C. V.] Severe cold and hibernating apple-worms. <Amer. Nat., November [28 October], 1881, v. 15, p. 917.
According to A. J. Cook larvæ of *Carpocapsa pomonella* were killed in their cocoons where exposed to the severe cold of the winter of 1880-1881.
2038. RILEY, C. V. [Address delivered 4 November, 1881, at the cotton convention held in Atlanta, Ga., 2-4 November, 1881.] <[U. S. Department of Agriculture.] Address of Hon. George B. Loring ... and other proceedings of the cotton convention, Washington, 1881, pp. 19-35. Reprint: <Atlanta Constitution, 5 November, 1881. S.-b. No. 24, p. 34.
Beneficial and injurious influence of insects; methods of counteracting the same; ravages and natural history of and search for means against *Aletia argillacea* [= *xylina*]; improved methods and contrivances for the application of poisons to plants.

2039. RILEY, C. V. The chinch-bug. <Amer. Agric., November, 1881, v. 40, p. 476, figs. 1-3. S.-b. No. 42, pp. 21-23.
Ravages, food-plants, and natural history of *Blissus leucopterus*; descriptions and figures of its several stages and of dimorphic form of the imago; effect of wet weather upon it.
2040. [RILEY, C. V.] Retarded development in insects. <Amer. Nat., [3] December, 1881, v. 15, pp. 1007-1008. Reprint: <Proc. Amer. Assoc. Adv. Sci. for 1881, [13 October], 1882, v. 30, pp. 270, 271. Notice: <Gardener's Chronicle, 27 May, 1882, v. 17, pp. 708-709. S.-b. No. 42, p. 31.
Eggs of *Caloptenus spretus* retained their vitality four and one-half years under abnormal environment and then hatched on exposure to normal conditions; speculations on the cause of the phenomena of retardation of development.
2041. [RILEY, C. V.] Preparation of Diptera. <Amer. Nat., [3] December, 1881, v. 15, p. 1008.
Notice of paper of J. Mik.
2042. [RILEY, C. V.] Another herbivorous ground-beetle. <Amer. Nat., [3] December, 1881, v. 15, p. 1011.
Anisodactylus confusus injuring strawberry-plants in California.
2043. [RILEY, C. V.] A disastrous sheep parasite. <Amer. Nat., [3] December, 1881, v. 15, p. 1011.
A parasite (*Trichodectes ovis?*) doing great injury to sheep in Illinois.
2044. [RILEY, C. V.] Locusts in the West. <Amer. Nat., [3] December, 1881, v. 15, p. 1013.
Caloptenus spretus scarce in Colorado and Kansas; *Camnula pellucida* abundant on the Pacific coast; destructiveness of locusts in many parts of South America and of *Pachytylus migratorius* in Turkey; means adopted against the latter.
2045. [RILEY, C. V.] Structure of the claw in *Psocina*. <Amer. Nat., [3] December, 1881, v. 15, pp. 1013-1014.
Notice of paper of H. A. Hagen.
2046. [RILEY, C. V.] Insect collection for sale. <Amer. Nat., [3] December, 1881, v. 15, p. 1014.
Notice of the collection of Coleoptera left by C. Trabrandt.
2047. RILEY, C. V. Peach-tree bark-borer. Important note from Prof. C. V. Riley. <Rural New Yorker, 24 December, 1881, v. 40, p. 866. S.-b. No. 42, p. 13.
Habits and ravages of *Phloeotribus liminaris*; means against bark-borers.
2048. RILEY, C. V. The chinch-bug. <Amer. Agric., December, 1881, v. 40, p. 515, figs. 1-4. S.-b. No. 42, pp. 23-25.
Figures *Anthracoris* [= *Triphleps*] *insidiosus* and *Harpactor* [= *Milyas*] *cinctus* as enemies of *Blissus leucopterus* and *Nysius destructor* [= *angustatus*] and *Piesma cinerea* as likely to be confounded with it; mentions other enemies of the chinch-bug; means against it; importance of irrigation.
2049. RILEY, C. V. On the oviposition of *Prodoxus decipiens*. <Amer. Nat., January, 1882 [30 December, 1881], v. 16, pp. 62-63. Reprint: <Proc. Amer. Assoc. Adv. Sci. for 1881 [13 October],

2049. RILEY, C. V.—Continued.

1882, v. 30, p. 272. Separate: <[Salem, Mass., February, 1882], p. 3.

Time and manner of oviposition of *Prodoxus decipiens* in stem of *Yucca filamentosa*.

2050. [RILEY, C. V.] Clover insects. <Amer. Nat., January, 1882 [30 December, 1881], v. 16, p. 63.

Notice of paper of J. A. Lintner.

2051. RILEY, C. V. Horn's classification of the *Carabidæ*. <Amer. Nat., January, 1882 [30 December, 1881], v. 16, pp. 63-64.

Notice of paper of G. H. Horn.

2052. [RILEY, C. V.] The butterfly-trees of Monterey again. <Amer. Nat., January, 1882 [30 December, 1881], v. 16, p. 64.

Swarming and migrating habits of *Danaï archippus*; hibernation of the same.

2053. [RILEY, C. V.] Interest felt in economic entomology in California. <Amer. Nat., January, 1882 [30 December, 1881], v. 16, p. 65.

Notice of a call issued by the Board of State Horticultural Commissioners of California for a State convention to consider horticultural subjects, including means against insects.

2054. [RILEY, C. V.] Obituary. <Amer. Nat., January, 1882 [30 December, 1881], v. 16, p. 65.

Biographical notice of J. D. Putnam; announcement of the death of G. V. Mniszech.

2055. RILEY, C. V. New insects injurious to agriculture. <Amer. Nat., February [25 January], 1882, v. 16, pp. 151-152. Reprint: <Proc. Amer. Assoc. Adv. Sci. for 1881, [13 October], 1882, v. 30, pp. 272-273.

The occurrence of previously unnoticed noxious insects due to, 1, the introduction of species from abroad; 2, previously existing unnoticed species; and 3, the acquisition of new habits by previously known innocuous species; in the last case the acquisition of new habits may be accompanied by the acquisition of new descriptive character, thus constituting a new species; new species thus become developed within brief periods of time.

2056. [RILEY, C. V.] New entomological periodicals. <Amer. Nat., February [25 January], 1882, v. 16, pp. 152-153.

Notice of several prospective periodicals.

2057. [RILEY, C. V.] Locust probabilities for 1882. <Amer. Nat., February [25 January], 1882, v. 16, p. 153.

Favorable prospects of immunity from ravages of *Caloptenus spretus* in 1882.

2058. [RILEY, C. V.] Entomological notes. <Amer. Nat., February [25 January], 1882, v. 16, p. 153.

Notice of J. J. Weir's paper on the "Lepidoptera of the Outer Hebrides," etc.

2059. [RILEY, C. V.] Bibliography of gall literature. <Amer. Nat., March [24 February], 1882, v. 16, pp. 246-247.

Notice of the record of F. Thomas,

2060. RILEY, C. V. A new depredator infesting wheat-stalks. <Amer. Nat., March [24 February], 1882, v. 16, pp. 247-248, fig. 1.
Isosoma allynii French is a species of *Eupelmus* probably parasitic on some of the wheat-stalk feeders and on some species of *Chlorops*; habits and figures of larva and description of female imago of *Isosoma tritici* [p. 247]; comparisons between *I. tritici* and *I. hordei*; alleged habits of *I. lineare* of Europe; relative conspicuousness of the "humeral spot" in European, American, and Australian species of *Isosoma*. See No. 2063.
2061. RILEY, C. V. Further notes on the imported clover-leaf weevil (*Phytonomus punctatus*). <Amer. Nat., March [24 February], 1882; v. 16, pp. 248, 249.
 Identity of *Phytonomus opimus* Lec. with *P. punctatus* Fab.; instances in which injurious insects have been overlooked for a long time; probability that plant-feeding Coleoptera imported from Europe will not spread far from the Atlantic coast; some species, injurious in Europe, are thus far innoxious in America; hibernation of and means against *P. punctatus*.
2062. [RILEY, C. V.] Silk-worm eggs; prices and where obtained. <Amer. Nat., March [24 February], 1882, v. 16, pp. 249-250.
 Sources from which eggs of *Sericaria mori* can be obtained in the United States for purposes of silk-culture; prices at which eggs are sold by Crozier & Co.
2063. RILEY, C. V. The wheat *Isosoma*. A new depredator infesting wheat-stalks. <Rural New Yorker, 4 March, 1882. S.-b. No. 42, pp. 55-56. See: <Sci. Amer. Suppl., 17 June, 1882. S.-b. No. 37, p. 57.
 Description of female imago of *Isosoma tritici*; habits, ravages, and distribution of and means against the same; comparison with related species; a probable parasite of it, described as *Isosoma allynii* by G. H. French, belongs to the genus *Eupelmus*. See No. 2060.
2064. RILEY, C. V. Possible food-plants for the cotton-worm. <Amer. Nat., April [22 March, 1882], v. 16, pp. 327-329. Reprint: <Rept. [U. S.] Com. Agric. for 1881 and 1882, 1882 [January, 1883], pp. 164-166. Separate: <pp. 164-166.
 Food-plants of *Aletia xylinia*. See No. 2119 for synopsis of contents.
2065. [RILEY, C. V.] Mode of feeding on the larva of *Dytiscus*. <Amer. Nat., April [22 March], 1882, v. 16, p. 330.
 Notice of paper of E. Burgess; structure of the mouth of the larva of *Dytiscus*; manner in which this larva feeds.
2066. [RILEY, C. V.] Entomological notes. <Amer. Nat., April [22 March], 1882, v. 16, p. 330.
 Brief notices of several articles recently published with items of news.
2067. [RILEY, C. V.] Riley's researches. Orange insects and the cotton-worm; how the orange insect operates and the cure for its ravages; the hibernation of the cotton-worm; settlement of a mooted question. <Florida Daily Times, 29 March, 1882. S.-b. No. 42, pp. 28-29.
 Report of interview with C. V. Riley; discovery by W. H. Ashmead that "orange rust" is caused by a mite; habits of and means against the same;

2067. RILEY, C. V.—Continued.

successful application by H. G. Hubbard of an emulsion of kerosene and milk as a means against this mite and against scale-insects; proof of the hibernation of *Aletia argillacea* [= *xylina*] in the extreme south of the United States; means against the *Aletia*.

2068. RILEY, C. V. Prof. C. V. Riley and the Yucca moth. <Gardener's Mo. and Hortie., March, 1882, v. 24, p. 92. S.-b. No. 23, pp. 198-199.

Critical review and reply to editorial of T. Meehan.

2069. RILEY, C. V. The *Noctuidæ* in the Missouri entomological reports. <Papilio, March, 1882, v. 2, pp. 41-44. Separate: <N. Y., 1882, 4 pp.

Critical review of paper of A. R. Grote; discussion of the synonymy of the *Noctuidæ* in the Missouri entomological reports.

2070. RILEY, C. V. Silk-culture in the United States. <Sci. Amer., 1 April, 1882 [v. 60], n. s., v. 46, p. 193. S.-b. No. 42, pp. 93-96.

Statement of the dangers to be avoided and the obstacles to be overcome for the successful establishment of silk-culture in the United States.

2071. RILEY, C. V. Little known facts about well known animals. A lecture delivered in the National Museum, Washington, D. C., April 8, 1882. <Washington, April, 1882, 32 pp., figs. See: <National Farmer, 13 July, 1882. S.-b. No. 42, p. 15. <Prairie Farmer, 22 July, 1882. S.-b. No. 46, p. 99.

The entomological subjects include brief and popular illustrated accounts of the life-histories and transformations of the house-fly (*Musca domestica*) and mosquito (*Culex pipiens*); the development of *Trombidium* from *Astoma*; parasitism; truth of the theory of evolution; reasons for the prevalent ignorance of natural history; interest and value of a knowledge of natural history.

2072. RILEY, C. V. Lichtenstein's theory as to dimorphic asexual females. <Amer. Nat., May [24 April], 1882, v. 16, p. 409.

Criticism of J. Lichtenstein's theory that winged female *Aphididæ* and asexual female *Cynipidæ* are larvæ, and their eggs pupæ; errors in the comparison of these forms with the hypermetamorphic stages of *Meloidæ*.

2073. [RILEY, C. V.] Naphthaline cones for the protection of insect collections. <Amer. Nat., May [24 April], 1882, v. 16, pp. 409-410.

Use of and objections to the use of naphthaline cones; formula of a preferable protective mixture.

2074. [RILEY, C. V.] Injurious insects in California. <Amer. Nat., May [24 April], 1882, v. 16, p. 410.

Notice of treatise of Matthew Cooke.

2075. [RILEY, C. V.] *Sarcophaga lineata* destructive to locusts in the Dardanelles. <Amer. Nat., May [24 April], 1882, v. 16, pp. 410-411.

Notice of communications, by F. Calvert, regarding the parasitic habits of *Sarcophaga lineata*, which preys upon *Ædipoda cruciata*; egg-pods of the same locust destroyed by larvæ of *Callostoma fascipennis*.

2076. [RILEY, C. V.] Parasitic Diptera. <Amer. Nat., May [24 April], 1882, v. 16, p. 411.
Dilophus parasitic in larvæ of *Chætoptria hypericana*; the *Bibionidæ* have hitherto been known only as vegetable feeders in the larval state.
2077. RILEY, C. V. The cotton-worm. <Times-Democrat [New Orleans], 7 May 1882, v. —, p. 4. S.-b. No. 42, pp. 29–31; 112–113; No. 63, pp. 47–48. Reprint: <Rept. [U. S.] Com. Agric. for 1881 and 1882, 1882 [January, 1883], pp. 157–159. Separate: <pp. 97–99.
 See No. 2119 for synopsis of contents.
2078. RILEY, C. V. The house-fly. <Prairie Farmer, 13 May, 1882. S.-b. No. 39, p. 122. See: <Colman's Rural World, 15 June, 1882. S.-b. No. 68, p. 194. <Times-Democrat [New Orleans], 24 June, 1882. S.-b. No. 42, p. 31. <N. E. Farmer, 5 August, 1882.
 Wide distribution of *Musca domestica*; identity of *M. harpyia* with the species; description of eggs; habits, transformations, and hibernation.
2079. RILEY, C. V. Habits of *Cybocephalus*. <Amer. Nat., June [20 May], 1882, v. 16, p. 514.
Cybocephalus nigrifolius feeds on scales of *Chionaspis pinifolii* on *Pinus elliottii* in South Carolina, and *C. californicus* on a scale on apple-trees in California.
2080. [RILEY, C. V.] One effect of the Mississippi floods. <Amer. Nat., June [20 May], 1882, v. 16, pp. 514, 515.
 Probability that *Ligyrrus rugiceps* will have been drowned out of the region submerged for months by the Mississippi River; liability of the importation of new foes with new seed-plants.
2081. [RILEY, C. V.] *Doryphora decemlineata* in England. <Amer. Nat., June [20 May], 1882, v. 16, p. 515.
 A living specimen carried from North America to London, England, in a barrel of potatoes.
2082. [RILEY, C. V.] Dr. Dimmock's inaugural dissertation. <Amer. Nat., June [20 May], 1882, v. 16, p. 515.
 Review of G. Dimmock's paper on "The anatomy of the mouth-parts and of the sucking apparatus of some Diptera."
2083. [RILEY, C. V.] The triungulin of *Meloidæ*. <Amer. Nat., June [20 May], 1882, v. 16, p. 515.
 The triungulin of *Meloe proscarabæus* was described by J. L. Frisch in 1727.
2084. [RILEY, C. V.] Fossil tineids. <Amer. Nat., June [20 May], 1882, v. 16, p. 515.
 Notice of paper of V. T. Chambers; occurrence of the supposed burrow of a tineid larva in a fossil leaf of *Acer* sp.
2085. [RILEY, C. V.] Classification of North American Coleoptera. <Amer. Nat., June [20 May], 1882, v. 16, pp. 515–516.
 Notice of the approaching completion of the classification of the Coleoptera of North America by J. L. Leconte and G. H. Horn.

2086. RILEY, C. V. Hibernation of the army-worm. <Amer. Nat., June [20 May], 1882, v. 16, p. 516.
Confirmation of views in regard to the hibernation of the larvæ of *Leucania unipuncta*; places of oviposition; prospects of extensive injury by these insects in the more northern States in 1882.
2087. RILEY, C. V. Chinch-bug and army-worm prospects. <Rural New Yorker, 27 May, 1882. S.-b. No. 61, p. 27.
Blissus leucopterus abundant in dry weather; *Leucania unipuncta* in wet weather; the latter hibernates principally as a larva; its eggs secreted in old grass and stubble; means against *L. unipuncta*.
2088. RILEY, C. V. Successful management of the insects most destructive to the orange. <Sci. Amer., 27 May, 1882 [v. 60], n. s., v. 46, pp. 335-336, 5 figs.
Treats of *Coccidæ* injurious to the orange; means against the same; use of kerosene emulsion; figures stages of *Mytilaspis pomicorticis* [= *pomorum*], *M. gloveri*, and *M. citricola*.
2089. RILEY, C. V. The utilization of ants in horticulture. <Nature, 8 June, 1882, v. 26, p. 126. Reprint: <Gardener's Chronicle, 17 June, 1882, v. 17, p. 805. S.-b. No. 42, p. 32.
Abstract of paper of C. J. Macgowan; capture and sale of two species of ants which build nests in trees; colonization of these ants in orange orchards to destroy injurious insects.
2090. RILEY, C. V. The army-worm *vs.* the clover hay-worm. Remedies for the army-worm. <Rural New Yorker, 10 June, 1882. S.-b. No. 47, pp. 158-159; No. 61, pp. 32-33. Reprint: <Nat. Farmer, 22 June, 1882. S.-b. No. 37, p. 123. <Lancaster Farmer, July, 1882. S.-b. No. 46, p. 104. <Home and Farm, 1 July, 1882. S.-b. No. 37, p. 122.
Abundance of *Leucania unipuncta* and *Asopia costalis* in Alabama and Tennessee; confusion of the army-worm with the clover hay-worm; prevalence of enemies of and means against the former.
2091. RILEY, C. V. Repelling insects by malodorants. <Amer. Nat., July [22 June], 1882, v. 16, p. 596.
Critical review of paper of J. A. Lintner; odorous substances repel insects more by their toxic properties than by their odor; failure of attempts by the use of strongly smelling substances to prevent oviposition; sight, touch, and taste generally more important in insect economy than smell.
2092. [RILEY, C. V.] Habits of *Bittacus apterus*. <Amer. Nat., July [22 June], 1882, v. 16, pp. 596-597.
Notice of paper of C. R. Osten Sacken; locomotion and food-habits of *Bittacus apterus* in California.
2093. RILEY, C. V. Habits of *Coscinoptera dominicana*. <Amer. Nat. July [22 June], 1882, v. 16, p. 598.
Discovery by F. H. King that *Coscinoptera dominicana* is inquilineous in ants' nests in its earlier stages; similar habits of related species.
2094. [RILEY, C. V.] Sun-spots and insect life. <Amer. Nat., July [22 June], 1882, v. 16, pp. 598-599.
Review of paper of A. H. Swinton; dependence of certain insect phenomena on the periods of sun-spots, through the determination by the latter of meteorological conditions.

2095. RILEY, C. V. The silk-worm. No. 1-3. <National Farmer, 13, 20, 27 July, 1882. S.-b. No. 35, p. 15; No. 48, pp. 32, 49.
Nature of the silk-worm; stages, enemies, diseases, races; wintering and hatching of eggs; feeding and rearing of larvæ; the cocoons; spinning and gathering, choking chrysalids; egg-laying, reproduction, reeling, food-plants.
2096. RILEY, C. V. Change of habit; two new enemies of the egg-plant. <Amer. Nat., August [28 July], 1882, v. 16, pp. 678-679.
Sudden acquisition by *Doryphora juncta* and by *Cassida texana* of the habits of feeding on *Solanum melongena*, these species having been found previously on *S. carolinense* and *S. elaeagnifolium* respectively; occurrence of *C. texana* on *S. carolinense*; distribution of the two insects.
2097. RILEY, C. V. Notes on *Microgasters*. <Amer. Nat., August [28 July], 1882, v. 16, pp. 679-680.
Critical review of paper of A. S. Packard; synonymical notes on Packard's species.
2098. [RILEY, C. V.] Are honey-bees carnivorous? <Amer. Nat., August [28 July], 1882, v. 16, p. 681.
Observations of Fritz Müller on the carnivorous habits of Brazilian *Apidæ*.
2099. [RILEY, C. V.] The "overflow bugs" in California. <Amer. Nat., August [28 July], 1882, v. 16, pp. 681-682.
Extract from letter of Mrs. A. E. Bush, with introductory remarks; occurrence of *Platynus maculicollis* in such abundance as to become a nuisance.
2100. [RILEY, C. V.] Insects and drouth. <Amer. Nat., September [24 August], 1882, v. 16, p. 745.
Occurrence of excessive drouth in the spring and early summer of 1880 in New England; statement by S. Lockwood of the exceptional abundance of several insects in New Jersey in that year.
2101. RILEY, C. V. Probable sound organs in sphingid pupæ. <Amer. Nat., September [24 August], 1882, v. 16, pp. 745-746.
Occurrence of a peculiar structure on the abdominal joints of the pupæ of certain *Sphingidæ*; genera in which this structure is observed; probable connection of this structure with the function of producing sound as observed in *Sphinx atropos*.
2102. RILEY, C. V. Is *Cyrtoneura* a parasite or a scavenger? <Amer. Nat., September [24 August], 1882, v. 16, pp. 746-747.
Cyrtoneura stabulans bred from pupæ of *Aletia argillacea* [= *xylina*] usual food of this species; doubt whether the species is a parasite or is only a scavenger in decayed pupæ; *Phora aletia* merely a scavenger; great liability of pupæ of *Aletia* to decay.
2103. [RILEY, C. V.] Habits of *Polycaon confertus* Lec. <Amer. Nat., September [24 August], 1882, v. 16, p. 747.
Polycaon confertus bores in twigs of apple- and pear-trees and grape-vines; the larvæ probably live in the dead and dry wood of forest-trees.
2104. RILEY, C. V. *Dinoderus pusillus* as a museum pest. <Amer. Nat., September [24 August], 1882, v. 16, p. 747.
Dinoderus pusillus feeds on cork and paper lining in an insect box; they occur usually in drugs and other stored and dry vegetal products.

2105. RILEY, C. V. Myrmecophilous Coleoptera. <Amer. Nat., September [24 August], 1882, v. 16, pp. 747-748.
Larvæ and imago of *Euphoria hirtipes* live in hills of *Formica rufa*; pupæ of *Hymenorus rufipes* in nests of *Formica fusca* and of *H. obscurus* in nests of another species of ant; known myrmecophilous habits of *Cetonia*, *Cremastochilus*, *Euparia castanea* (in nests of *Solenopsis xyloni* [= *geminata*]), *Tenebrionidæ*, and *Anthicus*.
2106. [RILEY, C. V.] Discontinuance of publication. <Amer. Nat., September [24 August], 1882, v. 16, p. 748.
Announcement of the discontinuance of publication of "Revue Coléoptérologique;" critical review of the same.
2107. RILEY, C. V. Buffalo tree-hopper injurious to potatoes. <Amer. Nat., October [28 September], 1882, v. 15, p. 823.
Habits, food-plants, and ravages of *Ceresa bubalus*.
2108. [RILEY, C. V.] Moths attracted by falling water. <Amer. Nat., October [28 September], 1882, v. 16, p. 826.
Notice of paper of J. S. Gardner; gleaming water-falls in Iceland as attractive to moths as artificial light would be.
2109. [RILEY, C. V.] A new museum pest. <Amer. Nat., October [28 September], 1882, v. 16, p. 826. Reprint: <Psyche, September-October, 1882 [1 March, 1884], v. 3, p. 408.
Perimegatomia variegatum as a pest in collections of insects.
2110. [RILEY, C. V.] Fleas feeding on lepidopterous larvæ. <Amer. Nat., October [28 September], 1882, v. 16, p. 826.
Notice of paper of C. J. Boden; abundance of fleas (*Pulex* sp.) where few or no warm-blooded animals occur may be explained by the feeding of the fleas on insects.
2111. [RILEY, C. V.] [*Gasteracantha cancer*.] <Gonzales [Tex.] Inquirer, 30 September, 1882. S.-b. No. 42, p. 15.
Habits of *Gasteracantha cancer*; the male unknown.
2112. RILEY, C. V. *Cicada septendecim*. <Gardener's Mo. and Hortic., September, 1882, v. 24, pp. 274-275. S.-b. No. 38, p. 42; No. 39, p. 6; No. 42, pp. 2-4.
Orthography of the names *C.* [= *Tibicen*] *septendecim* and *C.* [= *T.*] *tredecim*; natural relations of the same; indistinguishability of the species of certain genera; dimorphic forms more numerous than usually recognized; *Massospora cicadina* parasitic on *Cicada*.
2113. RILEY, C. V. Remarkable felting caused by a beetle. <Rural New-Yorker, 14 October, 1882, v. 41, pp. 699-700. S.-b. No. 42, p. 16. Reprint, with changes: <Amer. Nat. [2] December, 1882, v. 16, pp. 1018-1019.
Description of the felting of the interior of a pillow-ticking with fragments of feathers formed by the ravages of *Attagenus megatoma* within a feather pillow.
2114. RILEY, C. V. The buckeye-leaf stem-borer. <Amer. Nat., November [28 October], 1882, v. 16, pp. 913-914. See: <Sci. Amer. Suppl., 16 December, 1882. S.-b. No. 47, p. 145.
Sericoris instrutana †Claypole = *S.* [= *Steganoptycha*] *claypoleana* n. sp.; habits and food-plants of this species and of *Proteoteras asculana*; distinctions between these two species.

2115. [RILEY, C. V.] Efficacy of chalcid egg-parasites. <Amer. Nat., November [28 October], 1882, v. 16, pp. 914-915. See: <Prairie Farmer, 2 December, 1882. S.-b. No. 60, p. 123.

Beneficial influence and occasional vast abundance of egg-parasitic *Chalcididae* and especially of *Trichogramma pretiosa* and of *Telenomus* sp.

2116. [RILEY, C. V.] On the biology of *Gonatopus pilosus* Thoms. <Amer. Nat., November [28 October], 1882, v. 16, p. 915.

Notice of paper of J. Mik; parasitism of *Gonatopus pedestris* on *Athysanus maritima*, and of *G. pilosus* on *Deltocephalus xanthoneurus*; transformations and habits of *G. pilosus*; probable parasitism of a *Gonatopus* (*G. contortulus*?) on *Amphiscepa bivittata*.

2117. RILEY, C. V. Species of *Otiiorhynchidae* injurious to cultivated plants. <Amer. Nat., November [28 October], 1882, v. 16, pp. 915-916. See: <Sci. Amer. Suppl., 16 December, 1882. S.-b. No. 47, p. 145.

Aramigus fulleri the only species of North American *Otiiorhynchidae* whose development and earlier stages are known; food-plants of several species; discovery by G. P. Peffer of the injuries of *Anametis grisea* upon roots of apple- and pear-trees.

2118. [RILEY, C. V.] Bombyliid larvæ destroying locust eggs in Asia Minor. <Amer. Nat., November [28 October], 1882, v. 16, pp. 916-917.

Notice of and extract from communications of F. Calvert; parasitic habits of *Callostoma fascipennis*; similarity of habits of *Bombyliidae* in Asia and in North America; probability that the larvæ of *Cantharis vesicatoria* and of other *Meloidae* will be found to feed on eggs of *Acrididae*.

2119. RILEY, C. V. Report of the Entomologist. <Ann. Rept. [U. S.] Commissioner Agric. for 1881 and 1882, 1882 [January, 1883], pp. 61-214, 20 pl. Separate: <Washington, 1 December, 1882, pp. 8+167, 20 pl.

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2121. [RILEY, C.V.] A butterfly larva injurious to pine-trees. <Amer. Nat., [2] December, 1882, v. 16, pp. 1015-1016.
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2122. [RILEY, C. V.] The army-worm in 1882. <Amer. Nat., [2] December, 1882, v. 16, p. 1017.
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2123. [RILEY, C. V.] The wheat-stalk worm on the Pacific coast. <Amer. Nat., [2] December, 1882, v. 16, pp. 1017-1018.
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2126. RILEY, C. V. Emulsions of petroleum and their value as insecticides. <Rural New Yorker, 9 December, 1882, v. 41, pp. 833, 834. S.-b. No. 42, pp. 17-18.
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2127. RILEY, C. V. The bean-weevil. <Rural New Yorker, 9 December, 1882, v. 41, p. 835. S.-b. No. 42, p. 18.
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2128. RILEY, C. V. The "cluster-fly." <Prairie Farmer, 23 December, 1882, v. 54, p. 7. S.-b. No. 42, pp. 16-17. Reprint: <Amer. Nat., [5] January, 1883, v. 17, pp. 82-83.
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2129. RILEY, C. V. Darwin's work in entomology. <Proc. Biol. Soc. Wash., 1882, v. 1, pp. 70-80.
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2130. RILEY, C. V. The cotton-worm. <Western Farmer's Almanac for 1883, 1882, p. 40. S.-b. No. 42, p. 71.
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2131. RILEY, C. V. Pyrethrum, an important insecticide. <Western Farmer's Almanac for 1883, 1882, pp. 41-42. S.-b. No. 42, p. 49. See: <Prairie Farmer, 27 January, 1883. S.-b. No. 42, pp. 56-58.
Condensed account of the history of the use of pyrethrum flowers as an insecticide; cultivation of the plants and preparation of the powder; methods of its application; experiments in the cultivation of the plants.

2132. [RILEY, C. V.] New lists of North American Lepidoptera. <Amer. Nat., [5] January, 1883, v. 17, pp. 80-82.
Reviews of lists of Brooklyn Entomological Society, of C. H. Fernald and A. R. Grote.
2133. [RILEY, C. V.] Naphthaline cones. <Amer. Nat., [5] January, 1883, v. 17, pp. 83, 84.
The cones stain the paper lining of boxes; they seem to destroy mites and *Psoci* very soon, but have little effect on *Dermeestidae*.
2134. RILEY, C. V. Emulsions of petroleum as insecticides. <Sci. Amer., 6 January, 1883 [v. 62], n. s., v. 48, p. 3. S.-b., No. 42, pp. 4-7.
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2135. RILEY, C. V. Entomological notes. <Rural New Yorker, 13 January, 1883. S.-b. No. 42, p. 78. See: <Amer. Nat., 1883, v. 17, pp. 198-199.
1. A new enemy to wax-beans; extract from letter of G. H. Stone, on the food-plants, habits, and ravages of *Epilachna corrupta*; distribution of the same. 2. Spread of the 12-punctured asparagus beetle; increasing noxiousness of *Crioceris 12-punctata* recorded from near Baltimore, Md., by O. Luger; comparative description of this species with *C. asparagi*. 3. An internal mite in fowls; presence of *Cytolichus sarcopoides* in lungs and other parts of diseased chickens.
2136. [RILEY, C. V.] The "lignified snake of Brazil." <Evening Star [Washington, D. C.], 20 January, 1883, v. 61, p. 2. S.-b. No. 42, pp. 59-60. Reprint: <Sci. Amer. Suppl., 17 February, 1883. See: <Science, 23 February, 1883, v. 1, p. 84.
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2137. RILEY, C. V. Utilization of ants in horticulture. <Sci. Amer., 27 January, 1883 [v. 62], n. s., v. 48, p. 49. S.-b., No. 42, pp. 65-66.
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2138. RILEY, C. V. Natural sugaring. <Amer. Nat., February [31 January], 1883, v. 17, pp. 197-198. Reprint: <Country Gentl., 31 May, 1883, v. 48. S.-b. No. 42a, p. 297.
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2139. [RILEY, C. V.] *Trogoderma tarsale* as a museum pest. <Amer. Nat., February [31 January], 1883, v. 17, p. 199.
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2140. [RILEY, C. V.] *Phylloxera* in California. <Amer. Nat., February [31 January], 1883, v. 17, pp. 199-200.

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2141. RILEY, C. V. The hibernation of *Aletia xyliana* [Say] in the United States a settled fact. <Sci. Amer., 3 February, 1883, v. 48, p. 68. S.-b. No. 42, pp. 66-67. Reprint: <Proc. Amer. Assoc. Adv. Sci. for 1882, 1883, v. 31, pp. 468-469. Separate: <Salem, Mass., July, 1883, pp. 468-469. Abstract: <Amer. Nat., April [15 March], 1883, v. 17, pp. 420-421. <Nature, 28 December, 1882, v. 27, p. 214.

Proof of the hibernation of *Aletia xyliana* as a moth and of the perpetual existence of the species in Florida.

2142. [RILEY, C. V.] Fostering the study of economic entomology. <Rural New-Yorker, 12 February, 1883. S.-b. No. 42, p. 58. Reprint: <Amer. Nat., April [15 March], 1883, v. 17, p. 420. Efforts of the French for the promotion of economic entomology.

2143. [RILEY, C. V.] Diseases of the chinch-bug. <Rural New-Yorker, 17 February, 1883. S.-b. No. 42, p. 58.

Note concerning paper of S. A. Forbes on two fungus parasites of *Blissus leucopterus*.

2144. RILEY, C. V. [Instinct of *Cicada* [= *Tibicen*] *septendecim*.] <Amer. Nat., March [21 February], 1883, v. 17, p. 322.

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2145. [RILEY, C. V.] Food-habits of *Megilla maculata*. <Amer. Nat., March [21 February], 1883, v. 17, pp. 322-323.

Summary of S. A. Forbes' observations upon the food of *Megilla maculata*; results of other observations on this subject.

2146. [RILEY, C. V.] Clothes-moths observed in the United States. <Amer. Nat., March [21 February], 1883, v. 17, p. 323.

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2147. RILEY, C. V. Entomological notes. <Rural New Yorker, 27 February, 1883. S.-b. No. 42, p. 58. See: <Amer. Nat., April [15 March], 1883, v. 17, pp. 419-420.

Abstract of the rules of the international convention at Berne for the prevention of *Phylloxera* ravages; their adoption by Belgium.

2148. RILEY, C. V. Notice of an illustrated essay on the *Noctuidæ* of North America. <Bull. Brooklyn Ent. Soc., February, 1883, v. 5, pp. 77-79. Separate: <[Brooklyn, N. Y., 1883], 4 pp.

Critical review of A. R. Grote's essay.

2149. RILEY, C. V. Concerning canker-worms. <Indiana Farmer, 3 March, 1883. S.-b. No. 56, p. 69. <Prairie Farmer, 3 March, 1883. S.-b. No. 56, p. 69. <Pacific Rural Press, 10 March, 1883. S.-b. No. 54, p. 15. <Lancaster Farmer, March, 1883. S.-b. No. 56, p. 72. <Gardener's Mo. and Hortic., April, 1883, v. 25. S.-b. No. 42a, p. 631.

Description of *Paleacrita vernata* and *Anisopteryx pométaria*; ravages of the former; request for information; method of observation.

2150. RILEY, C. V. Dipterous enemies of the *Phylloxera vastatrix*. <Ca. Ent., February [9 March], 1883, v. 15, p. 39.
Critical review of paper of T. W. Fyles; the characters given of *Diplosis grassator* are insufficient to distinguish the species; galls of *Phylloxera vastatrix* inhabited by *Leucopis phylloxerae* Riley MS.; comparison of the early stages of these two Diptera.
2151. [RILEY, C. V.] The food relations of the *Carabidæ* and *Coccinellidæ*. <Amer. Nat., April [15 March], 1883, v. 17, pp. 417-419.
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2152. [RILEY, C. V.] Relations of the *Carabidæ* and *Coccinellidæ* to birds. <Amer. Nat., April [15 March], 1883, v. 17, p. 419.
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2153. [RILEY, C. V.] Viviparity in a moth. <Amer. Nat., April [15 March], 1883, v. 17, p. 420.
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2154. [RILEY, C. V.] Damage to silver-plate by insects. <Amer. Nat., April [15 March], 1883, v. 17, p. 420.
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2155. RILEY, C. V. Possible food-plants of the cotton-worm. <Amer. Nat., April [15 March], 1883, v. 17, pp. 421-422.
Notice of paper of J. S. Bailey; occurrence of newly issued imagos of *Aletia xyliina* at Karner, N. Y., 7 and 8 October, 1882, proving that the larva of this insect feeds upon some genus of plants other than *Gossypium*.
2156. [RILEY, C. V.] *Agrotis messoria* Harr. vs. *Agrotis scandens* Riley. <Amer. Nat., April [15 March], 1883, v. 17, p. 422, 2 figs.
Critical review of views of A. R. Grote; *Agrotis lycarum*, *A. repentis*, and *A. cochranii* = *A. messoria*; *A. scandens* is a distinct species; comparison of the imagos; figures larvæ and imagos of the two species.
2157. [RILEY, C. V.] An internal mite in fowls. <Amer. Nat., April [15 March], 1883, v. 17, pp. 422-423.
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2158. [RILEY, C. V.] Prevalence of the screw-worm in Central America. <Amer. Nat., April [15 March], 1883, v. 17, p. 423.
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2159. RILEY, C. V. Dried leaves as food for lepidopterous larvæ. <Amer. Nat., April [15 March], 1883, v. 17, pp. 423-424.
Review of paper of A. H. Mundt; larvæ successfully fed upon fresh leaves transported from a distance under pressure; chopping the leaves would possibly permit of more rapid curing and more convenient packing.
2160. [RILEY, C. V.] Lepidopterological notes. <Amer. Nat., April [15 March], 1883, v. 17, p. 424.
Duplication of descriptions of the early stages of Lepidoptera to be avoided; notice of Mrs. C. H. Fernald's list of *Noctuidæ* taken in Orono, Me.

2161. [RILEY, C. V.] Obituary. <Amer. Nat., April [15 March], 1883, v. 17, p. 424.

Obituary notices of G. W. Belfrage and F. W. Mæklin.

2162. R[ILEY], C. V. Mosquitoes *vs.* malaria. <Sci. Amer., 14 April, 1883, v. 48, pp. 224-225. S.-b. No. 42, pp. 63-64; No. 67, p. 8. Abstract: <Amer. Nat., May [18 April], 1883, v. 17, p. 549.

Criticism of the views of Dr. A. F. A. King in support of the thesis that malarial disease is the result of inoculation of the body with malarial poison by the bites of insects; citation of twenty correspondencies in the conditions affecting the prevalence of mosquitoes [*Culicidæ*] and malarial disease.

2163. RILEY, C. V. Jumping seeds and galls. <Sci. Amer., 14 April, 1883, v. 48, p. 228, fig. S.-b. No. 42, pp. 61-63; No. 67, p. 2.

Figures of larva, pupa, and imago of *Carpocapsa saltitans*, with figures and description of seeds inhabited by the larva of this moth, and description of the plant bearing these seeds; vernacular names of plant and insect; movements imparted to the seeds by the insects and by *Cynips q.-saltatorius* to the galls of the same.

2164. RILEY, C. V. Reports of experiments, chiefly with kerosene, upon the insects injuriously affecting the orange-tree and the cotton-plant, made under the direction of the entomologist. <Bull. No. 1, Div. Ent. U. S. Dept. Agric., [17 April], 1883, 62. pp.

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2165. RILEY, C. V. Reports of observations on the Rocky Mountain locust and the chinch-bug, together with extracts from the correspondence of the division on miscellaneous insects. <Bull. No. 2, Div. Ent. U. S. Dept. Agric., [17 April], 1883, 36. pp. Second edition, 16 September, 1883.

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2166. [RILEY, C. V.] Insects as food for man. <Amer. Nat., May [18 April], 1883, v. 17, pp. 546-547.

Summary of Max Buchner's observations on the insects used as food by the Bantus tribe of negroes.

2167. RILEY, C. V. Number of molts and length of larval life as influenced by food. <Amer. Nat., May [18 April], 1883, v. 17, pp. 547-548.

Variability in habits and characters of insects; periods and number of molts observed in larvæ of *Tenebrio molitor*, *T. obscurus* and *Trogoderma tarsale*; conclusion that insufficient food retards development and occasions frequent molting.

2168. [RILEY, C. V.] Entomological notes. <Amer. Nat., May [18 April], 1883, v. 17, pp. 549-550.

Brief notes on recent publications.

2169. RILEY, C. V. Larval stages and habits of the bee-fly *Hirmoneura*. <Science, 27 April, 1883, v. 1, pp. 332-334, figs. 1-3. S.-b. No. 42, p. 52.

Summary of the life-history of *Hirmoneura obscura* condensed from Handlirsch, and from Brauer; figures the several stages; correspondences of the structure and early history of the larva; predictions in reference to the larvæ of *Bombyliidæ*.

2170. RILEY, C. V. The capitalizing of specific names. <Papilio, March [April], 1883, v. 3, p. 62.

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2171. RILEY, C. V. Observations on the fertilization of *Yucca* and on structural and anatomical peculiarities in *Pronuba* and *Prodoxus*. <Gardener's Mo. and Hortie. April, 1883, v. 25, pp. 118-119. S.-b. No. 51, p. 122½. Reprint: <Proc. Amer. Assoc. Adv. Sci. for 1882, 1883, v. 31, pp. 467-468. Separate: <Salem. Mass., July, 1883, pp. 467-468. Abstract: <Amer. Nat., February [31 January], 1883, v. 17, p. 197.

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2172. RILEY, C. V. The potato-stalk borer. <Rural New Yorker, 12 May 1883. S.-b. No. 42a, p. 213.

Answer to inquiry; life-history and means against *Baridius* [= *Trichobaris*] *trinotata*.

2173. RILEY, C. V. Jumping seeds and galls. <Proc. U. S. Nat. Mus., 12 May, 1883, v. 5, pp. 632-635, fig. Separate: <[Washington, 1884], pp. 632-635, fig.

Description of seeds of "arrow-weed"; their motions caused by larvæ of *Carpocapsa saltitans*; figures of the seeds and of the larva, pupa, and imago of the *Carpocapsa*; habits and seasons of the same; description of the plant bearing these seeds; character and motions of the gall of *Cynips q.-saltatorius*.

2174. RILEY, C. V. Note on cluster-flies. <Proc. U. S. Nat. Mus., 12 May, 1883, v. 5, pp. 636-637.

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2175. [RILEY, C. V.] The new classification of the Coleoptera of North America. <Amer. Nat., June [17 May], 1883, v. 17, pp. 660-661.
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2176. RILEY, C. V. A pretty and unique gall-making tortricid. <Amer. Nat., June [17 May], 1883, v. 17, p. 661, fig. 1.
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2178. [RILEY, C. V.] Synopsis of the N. A. *Heliothinae*. <Amer. Nat., June [17 May], 1883, v. 17, pp. 662-663.
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2179. [RILEY, C. V.] Death of Professor Zeller. <Amer. Nat., June [17 May], 1883, v. 17, p. 663.
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2182. [RILEY, C. V.] The sucking organs of bees, wasps, and flies. <Amer. Nat., June [17 May], 1883, v. 17, pp. 664-665.
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2184. [RILEY, C. V.] Entomological notes. <Amer. Nat., June [17 May], 1883, v. 17, pp. 666-667.
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2185. RILEY, C. V. Elephantiasis or Filaria disease. <Science, 18 May, 1883, v. 1, pp. 419-421, fig. S.-b. No. 42, p. 51, fig. .
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2186. RILEY, C. V. *Nemestrinidae*. <Science, 8 June, 1883, v. 1, p. 513.
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2187. RILEY, C. V. The corn-root *Diabrotica*. <Rural New-Yorker, 9 June, 1883. S.-b. No. 54, p. 42.
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2188. RILEY, C. V. Elm-leaf beetle. <Sci. Amer., 16 June, 1883, v. 48. S.-b. No. 42a, p. 265.
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2189. RILEY, C. V. A unique and beautiful noctuid. <Amer. Nat., July [20 June], 1883, v. 17, pp. 788-790, fig.
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2190. [RILEY, C. V.] Insects affecting stored rice. <Amer. Nat., July [20 June], 1883, v. 17, p. 790.
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2191. RILEY, C. V. Hypermetamorphoses of the *Meloidæ*. <Amer. Nat., July [20 June], 1883, v. 17, pp. 790-791.
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2192. [RILEY, C. V.] Entomological notes. <Amer. Nat., July [20 June], 1883, v. 17, pp. 792-793.
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2193. RILEY, C. V. The grape Phylloxera in France. <Science, 22 June, 1883, v. 1, pp. 576-578.
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2194. RILEY, C. V. Fig insects. <Science, 29 June, 1883, v. 1, p. 599.
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2195. RILEY, C. V. Egg-punctures on raspberry- and grape-vines, etc. <Rural New-Yorker, 30 June, 1883, v. 42, p. —. S.-b. No. 42, p. 56.
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2196. RILEY, C. V. Silk culture in the United States. <Rural New-Yorker, 14 July, 1883, v. 42, p. —. S.-b. No. 42a, p. 531.
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2197. RILEY, C. V. Economic entomology of Iowa. <Sci. Amer., 14 July, 1883, v. 49, p. —. S.-b. No. 53, p. 147.
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2198. [RILEY, C. V.] Insect plagues. <Boston Herald, 22 July, 1883, p. —. S.-b. No. 42, pp. 53-54; No. 67, p. 11. Extract: <Mirror and Farmer, 26 July, 1883, v. 35. S.-b. No. 42, pp. 126-127.
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2199. RILEY, C. V. Report by C. V. Riley. <Proc. U. S. Nat. Mus., 27 July, 1883, v. 6, pp. 104-105. Reprint: <Sci. Amer. Suppl., 13 October, 1883, v. 16, p. 6486.
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2200. RILEY, C. V. Emulsions of petroleum and their value as insecticides. <Proc. Amer. Assoc. Adv. Sci. for 1882, 1883, v. 31, pp. 469-470. Separate: <Salem, Mass., July, 1883, pp. 469-470. Reprint: <Kansas City Rev. of Science and Industry, November, 1883, v. 7, pp. 447-448. S.-b. No. 42, p. 124. Extract: <Sci. Amer., 19 November, 1883, v. 49, p. 294. S.-b. No. 51, p. 153.
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2201. [RILEY, C. V.] The old, old question of species. <Amer. Nat., September [15 August], 1883, v. 17, p. 975.
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2202. [RILEY, C. V.] *Myrmecophila*. <Amer. Nat., September [15 August], 1883, v. 17, pp. 975-976.
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2203. [RILEY, C. V.] Salt-water insects used as food. <Amer. Nat., September [15 August], 1883, v. 17, pp. 976-977.
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2204. [RILEY, C. V.] Food-plants of *Samia cynthia*. <Amer. Nat., September [15 August], 1883, v. 17, p. 977.
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2206. RILEY, C. V. *Steganoptycha claypoleana*. <Amer. Nat., September [15 August], 1883, v. 17, p. 978. Reprint: <Papilio, September-December, 1883, v. 3, p. 191.
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2207. RILEY, C. V. Extermination and restriction of *Phylloxera* in Switzerland. <Rural New-Yorker, 25 August, 1883, v. 42. S.-b. No. 49, p. 74.
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2208. RILEY, C. V. Hackberry psyllid galls. <Ca. Ent., August [5 September], 1883, v. 15, pp. 157-159, figs. 6, 7.
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2209. RILEY, C.V. Some recent discoveries in reference to *Phylloxera*. <Science, 7 September, 1883, v. 2, p. 336. S.-b. No. 42, pp. 68, 69. Reprint: <Proc. Amer. Assoc. Adv. Sci. for 1883, 1884, v. 32, p. 320. Separate: <Salem, Mass., July, 1884, p. 320. <Amer. Nat., December [28 November], 1883, v. 17, p. 1288. Summary of the cycle of development of the genus *Phylloxera*; character of the gall of *P. spinosa* and location of the impregnated egg of the species.
2210. RILEY, C. V. The *Psyllidæ* of the United States. <Science, 7 September, 1883, v. 2, p. 337. S.-b. No. 42, pp. 67-68. Reprint: <Proc. Amer. Assoc. Adv. Sci. for 1883, 1884, v. 32, p. 319. Separate: <Salem, Mass., July, 1884, p. 319. Characteristics and economic importance of *Psyllidæ*; status of the present knowledge of this family in the United States; list of new genera and species; food-plants of the same; characteristics of the eggs and young of *Psyllidæ*.
2211. RILEY, C. V. Improved method of spraying trees for protection against insects. <Science, 14 September, 1883, v. 2, p. 378. S.-b. No. 42, p. 68. Reprint: <Proc. Amer. Assoc. Adv. Sci. for 1883, 1884, v. 32, pp. 466-467. Separate: <Salem, Mass., July, 1884, pp. 466, 467. Description of apparatus, especially of "cyclone nozzle" and adjustable hose; mention of insecticide substances. NOTE.—Nos. 2209-2211 were issued as a separate, Salem, 1884.
2212. [RILEY, C. V.] Entomology at Minneapolis. <Amer. Nat., 1883, v. 17: October [17 September], pp. 1068-1070; November [19 October], pp. 1169-1174. Minutes of the meetings of the entomologists at the session of the American Association for the Advancement of Science; reorganization of the entomological club; election of officers and change in the constitution; abstracts of papers read.
2213. RILEY, C. V. Notes on *Pædisca scudderiana*. <Amer. Nat., October [17 September], 1883, v. 17, pp. 1069-1070. Habits and variation of *Pædisca scudderiana*; difference between the gall of this insect and that of *Gelechia gallæsolidaginis*.
2214. RILEY, C. V. A myrmecophilous lepidopteron. <Amer. Nat., October [17 September], 1883, v. 17, p. 1070. Larva of *Helia americalis* found in nests of *Formica rufa*; this species the only one of the Lepidoptera known to develop in ants' nests.
2215. [RILEY, C. V.] Enemies of the egg-plant. <Amer. Nat., October [17 September], 1883, v. 17, p. 1070. Extract from a letter of A. C. Emmler, proving that the occurrence of *Cassida texana* and *Doryphora juncta* on *Solanum melongena* is not accidental or temporary.
2216. [RILEY, C. V.] The periodical Cicada in southeastern Massachusetts. <Amer. Nat., October [17 September], 1883, v. 17, p. 1071. Note to paper of C. E. Bessey; *Cicada* [= *Tibicen*] *septendecim* at Martha's Vineyard, Mass., in June, 1883, the precursor to *septendecim* Brood XXI which will appear in North Carolina and Virginia as well as Martha's Vineyard in 1884; accelerated specimens of the same brood received from Loudoun County, Va., recently.

2217. RILEY, C. V. Habits of *Murmidius*. <Amer. Nat., October [17 September], 1883, v. 17, p. 1071.
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2218. [RILEY, C. V.] Obituary. <Amer. Nat., October [17 September], 1883, v. 17, p. 1072.
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2219. [RILEY, C. V.] Entomological notes. <Amer. Nat., October [17 September], 1883, v. 17, pp. 1072-1073.
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2220. [RILEY, C. V.] Economic notes. <Amer. Nat., October [17 September], 1883, v. 17, pp. 1073-1074.
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2221. RILEY, C. V. A parasite of the cabbage-worm. <Rural New-Yorker, 6 October, 1883, v. 42. S.-b. No. 42, p. 58.
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2222. RILEY, C. V. The handmaid moth. <Rural New Yorker, 13 October, 1883, v. 42. S.-b. No. 42, p. 77.
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2223. RILEY, C. V. Remarks on *Arzama obliquata*. <Amer. Nat., November [19 October], 1883, v. 17, p. 1169.
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2224. [RILEY, C. V.] Rare monstrosities. <Amer. Nat., November [19 October], 1883, v. 17, p. 1175.
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2225. [RILEY, C. V.] The nervous system of insects. <Amer. Nat., November [19 October], 1883, v. 17, pp. 1175-1176.
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2226. [RILEY, C. V.] *Hymenorus rufipes* as a myrmecophilous species. <Amer. Nat., November [19 October], 1883, v. 17, p. 1176.
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2227. [RILEY, C. V.] Recent publications. <Amer. Nat., November [19 October], 1883, v. 17, p. 1177.
Notice of J. H. Comstock's work on *Diaspinæ* and of other recent publications.
2228. [RILEY, C. V.] Entomological notes. <Amer. Nat., November [19 October], 1883, v. 17, pp. 1177-1179.
Review of "General Index of the Entomological Reports of the Province of Ontario;" recent publications and items of news.

2229. RILEY, C. V. The potato-stalk borer. <Rural New-Yorker, 20 October, 1883. S.-b. No. 42, pp. 78-79.

Answer to letter of S. C. R.; description, habits of, and means against *Gortyna nitela*; means against *Paria aterrima*, *Graphops pubescens*, and other larvæ of *Chrysomelidæ* injurious to the roots of strawberry-plants.

2230. [RILEY, C. V.] Recent advances in horticultural entomology. <Rural New-Yorker, 20 October, 1883, v. 42. S.-b. No. 42, pp. 79-81. Reprint: <Proc. 19th Sess. Amer. Pomol. Soc., 1884, p. 45. <Trans. Wisc. State Hortic. Soc., 1886, v. 17, p. —.

Report of address delivered; discussion of measnres recommended for adoption to prevent the ravages of insects injnrions to horticulture, especially of *Carpocapsa pomonella* and *Conotrachelus nenuphar*; correction of statements in regard to the oviposition of *Saperda bivittata* [= *candida*] and ? *Bembex marginata*; advance in knowledge of the life-history of *Aphididæ* and in the development of machinery for the application of poison sprays to plants; relative value of the principal insecticides.

2231. RILEY, C. V. On a gall-making genus of *Apioninæ*. <Bull. Brooklyn Ent. Soc., October, 1883, v. 6, pp. 61-62. Separate: <Brooklyn, N. Y., 1883, 2 pp.

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2232. RILEY, C. V. Report of the Entomologist. <Ann. Rept. [U. S.] Commissioner Agric. for 1883, pp. 99-180, 13 pl. Separate: <Washington, 31 October, 1883, pp. 5+pp. 99-180+pp. 7, 13 pl.

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2233. RILEY, C. V. The imported orchard *Scolytus* (*Scolytus rugulosus* Ratz.). <Thomasville [Ga.] Times, 10 November, 1883. S.-b. No. 56, p. 182.

Answer to inquiry; *S. rugulosus* bores in twigs of pear; means against it.

2234. RILEY, C. V. Osage orange vs. mulberry for the silk-worm. <Sci. Amer., 17 November, 1883, v. 49, p. 305. S.-b. No. 42, p. 91. Reprint: <Amer. Nat., 5 January, 1884, v. 18, pp. 78–79. <Prairie Farmer, 22 March, 1884, v. 56, p. 187. S.-b. No. 42, p. 118.

Comparative value of leaves of *Maclura aurantiaca* and of *Morus* as food for *Sericaria mori*; critical review of V. des Lauriers's conclusions.

2235. RILEY, C. V. Entomological notes of the year. <Prairie Farmer, 24 November, 1883, v. 55. S.-b. No. 42, pp. 86-87.

Progress of experiments for the destruction of scale insects, *Coccidæ*; introduction of *Aspidiotus rapax* into California on apples from New Zealand; strawberries injured by *Capsus oblineatus* [= *Lygus pratensis*] and a myriapod in Illinois; occurrence of *Leucania unipuncta* in several places, and of *Cecidomyia destructor* in Illinois; extension of culture of *Pyrethrum cinerariaefolium* in California; occurrence of *Anarsia lineatella* on strawberry-plants in Illinois; of *Doryphora juncta* and *Cassida texana* on *Solanum melongena* in Georgia; of *Ceresa bubalus* on potato-plants in Pennsylvania; of *Epilachna corrupta* on wax-beans, etc.

2236. RILEY, C. V. A satisfactory remedy for melon bugs, flea-beetles, etc. <Rural New-Yorker, 3 November, 1883, v. 42. S.-b. No. 42, pp. 77-78.

Quinn's method of sprinkling the vines with a mixture of tobacco water and soft soap and then powdering with lime is probably the best general preventive against *Diabrotica vittata* and *Halticidæ*; description of J. M. Nicholson's siphon arrangement by which to keep the vines constantly moist with the liquid.

2237. RILEY, C. V. The chinch-bug in New York. <Science, 9 November, 1883, v. 2, p. 621. Extract: <Sci. Amer., 22 December, 1883, v. 49, p. 384. S.-b. No. 42, pp. 122-123.

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2238. R[ILEY], C. V. Insects in relation to agriculture. <Stoddart's Encyclopædia Americana, 1883, v. 1, pp. 135-142, figs. 1-29.

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Leucania unipuncta; references to the more important articles on this
insect; figures of larva and imago.

2240. RILEY, C. V. An epidemic disease of *Caloptenus differentialis*.
<Amer. Nat., December [28 November], 1883, v. 17, p. 1287.

Note to communication of H. Osborn; the *Entomophthora calopteni* a result
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2241. RILEY, C. V. The growth of insect eggs. <Amer. Nat., December
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2243. [RILEY, C. V.] Saw-fly larvæ on the quince. <Amer. Nat., December
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2244. [RILEY, C. V.] Entomology in New York. <Amer. Nat., December [28 November], 1883, v. 17, pp. 1289-1291.
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2245. [RILEY, C. V.] Fruit insects in California. <Amer. Nat., December [28 November], 1883, v. 17, p. 1291.
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2246. [RILEY, C. V.] Death of Dr. J. L. Leconte. <Amer. Nat., December [28 November], 1883, v. 17, p. 1291.
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2247. [RILEY, C. V.] Entomological notes. <Amer. Nat., December [28 November], 1883, v. 17, pp. 1291-1292.
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2248. [RILEY, C. V.] Economic notes. <Amer. Nat., December [28 November], 1883, v. 17, p. 1292.
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2249. RILEY, C. V. [Raspberry canes punctured by *Orchelimum glaberrimum*.] <Fruit Recorder, Purdy, 1 December, 1883, v. 15. S.-b. No. 42, p. 92.
Description of and means against *Orchelimum glaberrimum*.
2250. [RILEY, C. V.] The Phylloxera in sandy soil. <Rural New-Yorker, 1 December, 1883, v. 42. S.-b. No. 42, p. 97. Reprint: <Amer. Nat., January, 1884 [29 December, 1883], v. 18, p. 78.
Condition of the grape crop in France; favorable account of the use of American grape-stocks; *Phylloxera vastatrix* harmless in sandy soils.
2251. RILEY, C. V. Bacterial disease of the imported cabbage-worm. <Sci. Amer., 1 December, 1883, v. 49, p. 337. S.-b. No. 42, pp. 91-92. Reprint: <Amer. Nat., January, 1884 [29 December, 1883], v. 18, p. 80.
Notice of observations of S. A. Forbes on the death of larvæ of *Pieris rapæ* from infection by *Bacterium*; previous mention of this disease.
2252. RILEY, C. V. The chinch-bug in New York State. <Sci. Amer., 8 December, 1883, v. 49, p. 359. Reprint: <Amer. Nat., 5 January, 1884, v. 18, pp. 79-80.
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2253. RILEY, C. V. Reports of observations and experiments in the practical work of the division, made under the direction of the entomologist. <Bull. No. 3, Div. Ent. U. S. Dept. Agric., [8 December], 1883, 75 pp., 3 pl.

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2254. RILEY, C. V. Entomology in New York. <Rural New-Yorker, 15 December, 1883. S.-b. No. 42, pp. 85-86.

Review of J. A. Lintner's first report (for the year 1881) as State entomologist of New York.

2255. RILEY, C. V. *Lucilia macellaria*. <Sci. Amer., 15 December, 1883, v. 49, p. 373. S.-b. No. 42, p. 93.

Critical review of paper of F. Humbert.

2256. RILEY, C. V. Dipterous larvæ in the human body. <Sci. Amer., 22 December, 1883, v. 49, p. 385. S.-b. No. 42, p. 90.

References to and notices of several articles on the occurrence of larvæ of Diptera in the human body; synonymy and distribution of *Comptosia* [= *Lucilia*] *macellaria*; myasis caused solely by larvæ of *Sarcophagidæ* and *Muscidæ*; *Estridæ* occur rarely and exceptionally in the human body.

2257. RILEY, C. V. Capitalizing specific names. <Papilio, September-December, 1883, v. 3, pp. 164-166. Separate: <[N. Y.], 3 pp.

Comments on reasons given by W. H. Edwards and others for the uniform capitalizing of specific names. See No. 2172.

2258. RILEY, C. V. Townsend Glover. <Papilio, September-December, 1883, v. 3, pp. 167-168.

Obituary notice.

2259. [RILEY, C. V.] The genus *Colias*. <Amer. Nat., [5] January, 1884, v. 18, pp. 74-76.

Review of paper of H. A. Hagen; discussion of the species of *Colias* in North America; plastic nature and classificatory characters of the genus.

2260. [RILEY, C. V.] Larval habits of the dipterous family *Dexidæ*. <Amer. Nat., [5] January, 1884, v. 18, pp. 76-77.

Notice of paper of F. Brauer; parasitism of *Dexia rustica* and of *Phorostoma latum* on the larva of *Rhizotrogus* and of *Melanophora? diabrotica* on *Diabrotica vittata*.

2261. [RILEY, C. V.] Entomological notes. <Amer. Nat., [5] January, 1884, v. 18, pp. 80-81.

Carpocapsa pomonella has been introduced into Australia, New Zealand, and Tasmania; occurrence of *Myrmicocela ochraceella* in ants' nests.

2262. RILEY, C. V. Recent outbreaks of the army-worm. <Rural New-Yorker, 12 January, 1884, v. 43, p. 19. S.-b. No. 56, p. 145.

Rare occurrence of *Leucania unipuncta* in 1882 and 1883, following its last abundance in 1881; occurrence of its larvæ at East Windsor, Vt., in June, 1883.

2263. [RILEY, C. V.] The harlequin cabbage-bug, etc. <Rural New-Yorker, 2 February, 1884, v. 43, p. 70. S.-b., No. 63, p. 41.

Habits of and means against *Murgantia histrionica*; effect of chemicals applied to the soil upon the colors of flowers.

2264. RILEY, C. V. Tribute to the memory of John Lawrence Leconte. <Psyche, November-December, 1883 [11 February, 1884], v. 4, pp. 107-110. Separate: <[Cambridge, Mass., 11 February, 1884], pp. 107-110. Notice: <Psyche, *loc. cit.*, p. 119.

Biographical notice of J. L. Leconte; his work and writings; his personal character; disposition of his entomological collection.

2265. [RILEY, C. V.] Fruit culture in the South. <Washington Post, 26 February, 1884. S.-b. No. 42, pp. 119-120.

Interview with a reporter; means against insects infecting the orange.

2266. RILEY, C. V. Oviposition of the round-headed apple-tree borer. <Rural New-Yorker, 1 March, 1884, v. 43, p. 132, fig. 73. S.-b. No. 42, p. 85; No. 67, p. 3.

Notice of paper of C. G. Atkins; confirmation of the account of the method of oviposition of *Saperda candida*; description of this method; correction of several statements by W. Saunders in regard to the oviposition of different insects; description and figure of the egg of *S. candida*; figures of the burrows and hole of exit of this beetle; figures of the pupa and of the position of the egg when deposited.

2267. [RILEY, C. V., *et al.*] Third report of the United States Entomological Commission, relating to the Rocky Mountain locust, the Western cricket, the army-worm, canker-worms, and the Hessian fly; together with descriptions of larvæ of injurious forest insects, studies on the embryological development of the locust and of other insects, and on the systematic position of the Orthoptera in relation to other orders of insects; with maps and illustrations. <Washington: 1883 [6 March, 1884], pp. 14+347+12+92, 18 figs., 64 pls., 4 maps.

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2268. [RILEY, C. V.] The silk industry in the United States. <Science, 7 March, 1884, v. 3, pp. 290-292. S.-b. No. 42, pp. 82-84. Review of article of W. C. Wyckoff; early history and present status of silk culture in North America; criticism of the estimates of the amount of silk raised in early times; relations of silk-culture and silk-manufacture to free trade and protection in the United States.

2269. RILEY, C. V. The army-worm. <Washington, 1883 [20 March, 1884], pp. 89-152, pl. 1-2, with 1 p. expl. of pl. Advance reprint of principal portions: <Rept. [U. S.] Com. Agric. for 1881-1882, January, 1883, pp. 89-106.

Chapter 6 of the Third Report U. S. Entomological Commission. See No. 2267 for synopsis of contents.

2270. RILEY, C. V. Canker-worms. <Washington, 1883 [20 March, 1884], pp. 157-198, pl. 3, with 1 p. expl. of pl. Extract: <Amer.

2270. RILEY, C. V.—Continued.

Cult., 1884, v. 46: 29 March, p. 1; 5 April, p. 1. S.-b. No. 42, pp. 118–119; No. 57, pp. 86–87.

Chapter 7 of Third Report U. S. Entomological Commission. See No. 2267 for synopsis of contents.

2271. [RILEY, C. V.] The chinch-bug. Another entomologist expresses his views regarding the farmers' pest. <Watertown [N. Y.] Daily Times, 27 March, 1884, v. 24. S.-b. No. 57, pp. 42–43. Reprint: <Ogdensburg Journal, 1884.

Notice of articles of J. A. Lintner; the occurrence of *Blissus leucopterus* in New York State in unusual abundance in 1882 and 1883 not a cause for great alarm; means against this insect. See No. 2252.

2272. RILEY, C. V. Notes on North American *Psyllidæ*. <Proc. Biol. Soc. Wash., 1884, v. 2, pp. 67–79. Separate: <[Washington], 10 April, 1884, pp. 67–79.

Notice of earlier studies of European and North American *Psyllidæ*; list of 18 nominal species described from North America; systematic and synonymical list of the same; descriptions of *Pachypsylla* n. g. [p. 71], *P. venusta*, *P. celtidis-mamma*, and *P.* [*Blastophysa* n. s.-g., p. 75] *celtidis-gemma* n. sp. [p. 74]; dichotomic table of the three species of *Pachypsylla*; descriptions of *Ceropsylla* n. g. [p. 76] *sideroxyli* n. sp. [p. 76], *Rhinopsylla* n. g. [p. 77] *schwarzii* n. sp. [p. 78].

2273. RILEY, C. V. Remarks on the bag-worm, *Thyridopteryx ephemeraformis*. <Proc. Biol. Soc. Wash., 1882–1884, 1884, v. 2, pp. 80–83, figs. 1–3. Separate: <[Washington], 10 April, 1884, pp. 80–83, figs. 1–3.

Explanation of the more important and less known facts in relation to the life-history of *Thyridopteryx ephemeraformis*, especially in reference to the act of coition; figures of all stages and of the external male genitalia.

2274. RILEY, C. V. The use of naphthaline as an insecticide. <Science, 11 April, 1884, v. 3, pp. 455–456.

Review and summary of article of E. Fischer.

2275. RILEY, C. V. Entomography of *Hirmonneura*. <Science, 18 April, 1884, v. 3, p. 488.

Review of F. Brauer's observations on the life-history of *Hirmonneura obscura*.

2276. RILEY, C. V. Orthoptera. <Standard Natural History (The) . . . Boston, Cassino, 1 May–27 July, 1884, v. 2, pp. 167–203, 1 pl., figs. 243–285. Reprint: <Riverside Natural History (The) . . . Boston and New York, Houghton, Mifflin & Co., 1888, v. 2, pp. 167–203, 1 pl., figs. 243–285.

Systematic position, limitations, classificatory characters, transformations, molts, and geographical and geological distribution of the order; characters, habits, and distribution of the several families; mention of the principal North American and of some foreign species, with more particular accounts of many species, especially in regard to their stridulation and oviposition, with figures of a few species and of their eggs. *Ectobia germanica*, *Phasmomantis carolina*, *Diapheromera femorata*, *Ecanthus niveus*, *E. latipennis*, *Orocharis saltator*, *Camptonotus scudderi*, *Cyrtophyllus concavus*, *Microcentrum retinerve*, and *Caloptenus spretus* are particularly mentioned.

2277. RILEY, C. V. Reports of observations and experiments in the practical work of the division, made under the direction of the

2277. RILEY, C. V.—Continued.

entomologist, together with extracts from correspondence on miscellaneous insects. <Bull. No. 4, Div. Ent. U. S. Dept. Agric. [3 May], 1884, 102 pp., 4 figs.

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2278. RILEY, C. V. Silk-culture in the colonies. <Science, 9 May, 1884, v. 3, pp. 562-563.

Explanation of several technical terms used in silk-culture.

2279. RILEY, C. V. Maple-tree insects. <Sci. Amer., 24 May, 1884, v. 59, p. 325. S.-b. No. 63, p. 45.

Answer to inquiry of R. H. Cutler; food-plants of and means against *Pulvinaria innumerabilis*.

2280. RILEY, C. V. *Acronycta betulæ* n. sp. <Bull. Brooklyn Ent. Soc., May, 1884, v. 7, pp. 2-3, fig.

Description of *Acronycta betulæ* n. sp. [p. 2], reared from *Betula nigra*; seasons and habits of larva; comparison with related species.

2281. RILEY, C. V. Recent advances in economic entomology. <Proc. Philos. Soc. Washington, 1884, v. 7, pp. 10-12. Separate: <Washington, 1884, pp. 10-12. Reprint: <Kansas City Review of Science, May, 1884, pp. 13-15. S.-b. No. 63, pp. 43-44.

Characteristics of economic entomology as a science and difficulties of its prosecution; the chief insecticide substances and their applicability; recent progress in mechanical appliances.

2282. RILEY, C. V. Department of insects. <Ann. Rept. of Regents Smith. Inst. for 1882, 1884, pp. 215-216.

List of accessions to the U. S. National Museum, with comments; note on the Glover plates and manuscripts.

2283. RILEY, C. V. Quelques mots sur les insecticides aux États-Unis et proposition d'un nouveau remède contre le Phylloxera. Communication faite à la Société d'Agriculture de l'Hérault à la seance du 30 Juin, 1884. <Montpelier, 1884, t.p. cover+8 pp. Reprint: <Messager Agricole, 10 July, 1884, ser. 3, v. 5, pp. 255-265. <La Vigne Amer., July, 1884, v. 8, No. 7, p. 207.

Resistant vines better than the best insecticides as a means against *Phylloxera vastatrix*; principal insecticides in use, especially arsenical substances, petroleum and pyrethrum; method of action and mode of application of these insecticides, especially application by the cyclone nozzle, and the subterranean application of kerosene emulsion as a means against *Phylloxera vastatrix*; tobacco vapor, under favorable conditions, would probably kill this insect.

2284. [RILEY, C. V.] Remedies for various insects. <Prairie Farmer, 26 July, 1884, v. 56, p. 470. S.-b. No. 59, p. 36.
Comparative efficacy and other qualities of several insecticides, especially arsenical substances, tobacco vapor, petroleum emulsions, and pyrethrum.
2285. RILEY, C. V. Habits of *Grapholitha olivaceana*. <Ent. Mo. Mag., August, 1884, v. 21, p. 67.
Grapholitha olivaceana bred from curled tips of *Solidago*.
2286. RILEY, C. V. *Rhyssa* not lignivorous. <Science, 28 November, 1884, v. 4, p. 486.
Parasitic habits of *Rhyssa* [= *Thalessa*] upon *Tremex columba*.
2287. RILEY, C. V. The apple-root borer. <Rural New-Yorker, 13 December, 1884, v. 43, p. 831. S.-b. No. 63, p. 50.
Means against the larva of *Prionus laticollis*.
2288. RILEY, C. V. A new insect injurious to wheat. <Bull. Brooklyn Ent. Soc., December, 1884, v. 7, pp. 111-112. Separate: <[Brooklyn, N. Y., December, 1884], p. 111.
Description of larva, pupa, and female imago of *Isosoma grande* n. sp. [p. 111] reared from wheat stems in Indiana.
2289. RILEY, C. V. The insects of the year. <Science, 26 December, 1884, v. 4, pp. 565-568.
Entomological calendar for each month of the year.
2290. RILEY, C. V. On the care of entomological specimens. <Science, 9 January, 1885, v. 5, p. 25.
Reply to editorial comments on the care of entomological specimens in the National Museum.
2291. RILEY, C. V. Report of the entomologist. <Ann. Rept. [U. S.] Commissioner Agric. for 1884, 1885, pp. 285-418, 10 pl. Separate: <Washington: 31 January, 1885, pp. 9+pp. 285-418+pp. 9, 10 pl.

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2292. RILEY, C. V. General truths in applied entomology. Essay.

<Trans. Ga. State Agric. Soc., 1884, v. —, pp. 153–159. Separate: <Macon, Ga., 1884, t.p. cover, pp. 153–159. Reprint: <Rept. [U. S.] Commissioner Agric. for 1884, pp. 323–330. <Gardener's Chronicle, 1885, v. 23; 20 June, pp. 785–786; 27 June, p. 818. S.-b. No. 61, p. 6; 10–11. See: <Ga. Crop

2292. RILEY, C. V.—Continued.
 Rept., June, 1884, p. 33. <Sci. Amer. Suppl., 7 February, 1885, v. 19, p. 7588. S.-b. No. 61, p. 12.
 See No. 2291 for synopsis of contents.
2293. R[ILEY], C. V. Codlin moth. <Suppl. Encyclopædia Britannica, 9th ed., 1884, v. 2, p. 281, fig.
 Natural history, remedies, and figures of *Carpocapsa pomonella*.
2294. R[ILEY], C. V. Colorado potato-beetle. <Suppl. Encyclopædia Britannica, 9th ed., 1884, v. 2, p. 311, fig.
 Summary of the eastward spread of *Doryphora 10-lineata*; natural history, enemies, remedies, and figures of the same.
2295. R[ILEY], C. V. Cotton-worm. <Suppl. Encyclopædia Britannica, 9th ed., 1884, v. 2, pp. 432–433, figs.
 History, ravages, life-history, remedies, and figures of *Aletia xyliana*.
2296. R[ILEY], C. V. Curculio, plum. <Suppl. Encyclopædia Britannica, 9th ed., 1884, v. 2, p. 494.
 Natural history and means against *Conotrachelus nenuphar*.
2297. RILEY, C. V. Insect named. <Daily Gate City [Keokuk, Iowa], 18 February, 1885. S.-b. No. 63, p. 31.
 Brief notes of *Olfersia americana*.
2298. RILEY, C. V. A new remedy for the imported cabbage-worm. <Rural New-Yorker, 28 February, 1885, v. 44, p. 132. S.-b. No. 63, p. 50. See: <Colman's Rural World, 5 March, 1885, v. 38, p. 76. S.-b. No. 63, p. 8. <Prairie Farmer, 7 March, 1885, v. 57, p. 153. S.-b. No. 61, p. 26. <Amer. Farmer, 1 April, 1885, v. 4, p. 105. S.-b. No. 67, p. 60. <Sci. Amer., 23 May, 1885, v. 52, p. 322. S.-b. No. 61, p. 19. <Indiana Farmer, 30 May, 1885. S.-b. No. 61, p. 22.
 Ice-cold water applied during the heat of the day causes the death of the larva of *Pieris rapæ*.
2299. RILEY, C. V. The collection of insects in the National Museum. <Science, 6 March, 1885, v. 5, pp. 188–189. S.-b. No. 61, pp. 7–8.
 Answer to criticisms of C. H. Fernald; the insects in the National Museum cared for by the entomologist of the Department of Agriculture.
2300. RILEY, C. V. Ants and aphides. <Rural New-Yorker, 14 March, 1885, v. 44, p. 171. S.-b. No. 61, p. 19.
 Answer to inquiry of J. McFarland; habits of ants in relation to plant-lice; subterranean plant-lice attended by ants; ants in northern States beneficial rather than injurious; ground can be cleared of them by injection of bisulphide of carbon or a strong kerosene emulsion.
2301. RILEY, C. V. Parasites of the larva of *Lachnosterna fusca*. <Psyche, 1884 [16 March, 1885], v. 4, p. 224.
 Criticism of statements of O. Lügger; larval habits of *Tiphia inornata* and *Rhipiphorus* sp.
2302. RILEY, C. V. Jumping spiders. <Rural New-Yorker, 11 April, 1885, v. 44, p. 250. S.-b. No. 63, p. 33.
 Answer to inquiry of H. B. S.; habits of *Attus* sp.

2303. RILEY, C. V. Circular No. 9 [U. S. Department of Agriculture, Division of Entomology]. <[Washington:] 1 May, 1885, 1 p., fo., 1 fig. Reprint: <Pacific Rural Press, 16 May, 1885. S.-b. No. 63, p. 27. <Weekly Times-Democrat [New Orleans], 23 May, 1885. S.-b. No. 61, p. 23. <Rural Californian, June, 1885, v. 80, p. 122. <S.-b. No. 61, pp. 20-21. <Sci. Amer. Suppl., 6 June, 1885, v. 19, p. 7859. S.-b. No. 63, pp. 25-26. <Pacific Rural Press, 16 May, 1885, v. 29, p. 469. S.-b. No. 63, p. 27. See: <Farmer's Review, 21 May, 1885, v. 14, p. 362. S.-b. No. 63, p. 29. N. Y. Weekly Sun, 27 May, 1885. S.-b. No. 63, p. 29. N. Engl. Farmer, 16 May, 1885. S.-b. No. 63, p. 29.

Conditions under which the Government will buy silk-worm eggs; how to select moths to produce eggs.

2304. RILEY, C. V. The imported elm-leaf beetle. Its habits and natural history and means of counteracting its injuries. <Bull. No. 6, Div. Ent. U. S. Dept. Agric. [14 May], 1885, 20 pp., 1 pl., 1 fig.

Treats of *Galeruca xanthomelana*; its habits and natural history; description, figures, remedies, and methods of application of insecticides.

2305. RILEY, C. V. Destroying Cicadas: Scurfy apple bark-louse. <Rural New-Yorker, 23 May, 1885, v. 44, p. 353. S.-b. No. 61, p. 24.

Answer to inquiries of J. A. K.; means against *Cicada* [= *Tibicen*] *septendecim* and *Chionaspis furfurus*.

2306. RILEY, C. V. [Poisonous spider.] <Rural New-Yorker, 23 May, 1885, v. 44, p. 354. S.-b. No. 61, p. 23.

Reply to statements of Dr. W. H. G.; no spider known whose foot-tracks kill leaves or trees.

2307. [RILEY, C. V.] Expected advent of the locust. <Sci. Amer., 23 May, 1885, v. 52, p. 320. S.-b. No. 61, p. 9. <Farmer's Home Journ., 13 June, 1885. S.-b. No. 63, p. 18. <Orange Co. [N. Y.] Farmer, 28 May, 1885. S.-b. No. 63, p. 23. <See: <Sci. Amer., 20 June, 1885, v. 52, p. 389. S.-b. No. 63, p. 28.

Simultaneous appearance of a 17-year (*Cicada* [= *Tibicen*] *septendecim*) and a 13-year (*C.* [= *T.*] *tredecim*) brood; localities of the two broods; life-history and habits.

2308. RILEY, C. V. Rust of orange. <Rural New-Yorker, 16 May, 1885, v. 44, p. 355, figs. 196, 197. S.-b. No. 61, pp. 18-19, figs. 196-197. Reprint: <Colman's Rural World, 18 June, 1885, v. 38, p. 195, 2 figs. S.-b. No. 61, pp. 31-32, 2 figs.

Description, habits, and means against *Phytophtus gleivorus*; figures the same and its eggs; figure of a rusty orange.

2309. [RILEY, C. V.] Red-ants. <Sci. Amer., 21 May, 1885, v. 52, p. 183. S.-b. No. 66, p. 35.

Recommends pyrethrum, kerosene, hot water, and naphthaline as means against red-ants in houses.

2310. [RILEY, C. V.] Ridding the ground of cut-worms. <Rural New-Yorker, 30 May, 1885, v. 44, p. 368. S.-b. No. 63, p. 22.
Answer to inquiry of V. R. R.; means against the larvæ of *Agrotidæ*.
2311. [RILEY, C. V.] An entomological breakfast. <N. Y. Times, 2 June, 1885. S.-b. No. 63, p. 1. See: <Belvidere [Ill.] Standard, 23 June, 1885. S.-b. No. 63, p. 7.
Cicadas and *Acerididæ* as food.
2312. RILEY, C. V. The periodical or seventeen-year Cicada. <Harper's Weekly, 6 June, 1885, v. 29, p. 363, 4 figs. S.-b. No. 61, pp. 24-26, 4 figs.
Records and map showing distribution of brood XXII (*septendecim*) and of brood VII (*tredecim*); habits, enemies, and figures, with details of structure of *Cicada* [= *Tibicen*] *septendecim*; figure of twig punctured by the same and of twig healed after the puncture.
2313. [RILEY, C. V.] The winged pests of the West. <St. Louis Globe-Democrat, 9 June, 1885. S.-b. No. 61, p. 11.
Prediction that the northern States of the Mississippi Valley will escape serious damage from locusts this year; reasons for this opinion; ravages of *Camnula pellucida* in California.
2314. RILEY, C. V. The periodical or seventeen-year Cicada. <Amer. Grange Bulletin, 11 June, 1885. S.-b. No. 63, pp. 16-17.
Chronological record, natural history, and popular names of *Cicada* [= *Tibicen*] *septendecim*.
2315. RILEY, C. V. The periodical Cicada. An account of *Cicada septendecim* and its *tredecim* race, with a chronology of all broods known. <Bull. No. 8, Div. Ent. U. S. Dept. Agric., [17 June], 1885, 46 pp., 8 figs. Second edition, 13 July, 1885.
2316. RILEY, C. V. Notes on joint worms. <Rural New-Yorker, 20 June, 1885, v. 44, p. 418, figs. 215-218.
Habits, means against, and figure of *Isosoma hordei*; criticism of A. J. Cook's views on *Isosoma*; figures *I. tritici* and *I. grande*.
2317. RILEY, C. V. Beetles in the corn-fields. <Daily Gate City [Keokuk, Iowa], 23 June, 1885. S.-b. No. 61, p. 17.
Answer to letters of J. M. Evans and J. M. Schaffer; *Agonoderus pallipes* injurious to seed corn; recommends soaking the seed corn in Paris green or London purple.
2318. RILEY, C. V. Notes on the periodical Cicada. <Science, 26 June, 1885, v. 5, pp. 518-521. Reprint: <Sci. Amer. Suppl., 27 June, 1885, v. 19, pp. 7905-7906. S.-b. No. 61, pp. 47, 48; No. 63, p. 74.
Record showing distribution of brood XXII (*septendecim*) and of brood VII (*tredecim*) in 1885; the specific value of the different forms; long period of underground development; its life-history; food of the larva, methods of burrowing, and transformations; the Cicada versus civilization.
2319. RILEY, C. V. The Chester onion pest. <Orange County [N. Y.] Farmer, 2 July, 1885. S.-b. No. 61, pp. 1-2. See: <Rural New-Yorker, 5 December, 1885, v. 44, p. 829. S.-b. No. 61, p. 151.
Extract from Rept. U. S. Ent. for 1884; remedies against cabbage cut-worms; the poisoned ball system and kerosene emulsion effective against the onion cut-worm; formula for a soap-kerosene emulsion.

2320. RILEY, C. V. Premature appearance of the periodical Cicada. <Science, 3 July, 1885, v. 6, pp. 3-4.

Criticism of L. F. Ward's record of the occurrence and song of *Cicada* [= *Tibicen*] *septendecim*. See No. 2326.

2321. RILEY, C. V. Periodical Cicada in Massachusetts. <Science, 3 July, 1885, v. 6, p. 4.

The occurrence of *Cicada* [= *Tibicen*] *septendecim* in southeastern Massachusetts needs confirmation.

2322. RILEY, C. V. Destructive insects of the year. <Rural New Yorker, 11 July, 1885, v. 44, p. 464. S.-b. No. 61, p. 8.

Injuries and means against *Agrotis malefida*, *Anthonomus musculus* and *Eurycreon rantis*; localities and food-plants of the last.

2323. [RILEY, C. V.] [Grasshopper ravages in California.] <Rural New-Yorker, 11 July, 1885, v. 44, p. 470. S.-b. No. 61, p. 2.

Ravages committed by *Melanoplus* [= *Caloptenus*] *devastator* and *Caloptenus differentialis*; recommends the use of coal-oil pans against them.

2324. RILEY, C. V. Pests of the strawberry. <Rural New-Yorker, 18 July, 1885, v. 44, p. 484. S.-b. No. 61, p. 17.

Answer to inquiry of J. H. J.; means against *Agrotis tricola*, *Phloxopteris fragariae*, *Eccopsis permundana* and *Emphytus* [= *Harphiphorus*] *maculatus*.

2325. RILEY, C. V. The imported elm-leaf beetle. <Harper's Weekly, 18 July, 1885, v. 29, p. 463, 1 fig. S.-b. No. 61, pp. 21-22, fig.

Natural-history descriptions and figures of all stages of *Galeruca xanthomelæna*; means against the same.

2326. RILEY, C. V. Premature appearance of the periodical Cicada. <Sci. Amer. Suppl., 15 August, 1885, v. 20, p. 8021.

Criticism of L. F. Ward's record of the occurrence and song of *Cicada* [= *Tibicen*] *septendecim*; an introductory note states that this article was prepared for Science, but that it appeared in that journal in a mutilated and weakened form. See No. 2320.

2327. RILEY, C. V. The cyclone nozzle. <Rural New-Yorker, 22 August, 1885, v. 44, p. 567. S.-b. No. 61, p. 34.

Facts relative to the invention of the cyclone nozzle.

2328. RILEY, C. V. A new remedy against destructive locusts. <Rural New-Yorker, 29 August, 1885, v. 44, p. 577. S.-b. No. 61, p. 33.

Recommends the use of poisoned bait; formula of the same.

2329. RILEY, C. V. The influence of climate on *Cicada septendecim*. <Entom. Amer., August, 1885, v. 1, p. 91.

Records the transfers of eggs of brood XXII (*septendecim*) of *Tibicen septendecim* to the extreme southern States where no *septendecim* brood is known to occur, and of brood VII (*tredecim*) to northern States where no *tredecim* brood is known to occur.

2330. RILEY, C. V. Department of insects. <Ann. Rept. of Regents Smith. Inst. for 1883, 1885, pp. 239-244.

Brief mention of work accomplished in the U. S. National Museum; list of accessions to the collection.

2331. RILEY, C. V. Insects of the year. <Prairie Farmer, 3 September, 1885, v. 57, p. 567. S.-b. No. 63, p. 37; 134. See: <Entom. Amer., December, 1885, v. 1, pp. 176-177.

Ravages of *Agrotis messoria*, *Anthonomus musculus*, *Eurycreon rantalis*, *Cecidomyia destructor*, and *Acrididae* on the Pacific coast.

2332. RILEY, C. V. On the parasites of the Hessian fly. <Proc. U. S. Nat. Mus., 14-17 September, 1885, v. 8, pp. 413-422, pl. 23. Abstract: <Proc. Amer. Assoc. Adv. Sci. for 1885, [August], 1886, v. 34, pp. 332-334. <Amer. Nat., November, 1885, v. 19, pp. 1104-1105.

Description, synonymy, habits, and figures of *Merisus destructor* (Say); *M. subapterus* n. sp. [p. 416, pl. 23, f. 2: p. 333]; *Eupelmus allynii* French; *Tetrastichus productus* n. sp. [p. 419, pl. 23, f. 5: p. 333]; and *Platygaster herrickii* Packard.

2333. RILEY, C. V. Enemies of the black-walnut and willow. <Rural New-Yorker, 19 September, 1885, v. 44, p. 632. S.-b. No. 61, p. 35.

Habits, description of eggs, larva, and adult of *Datana ministra*; description of eggs, larva, and adult of *Cimbex americana*; means against both species.

2334. RILEY, C. V. The song-notes of the periodical Cicada. <Science, 25 September, 1885, v. 6, pp. 264-265. Reprint, with additions: <Proc. Amer. Assoc. Adv. Sci. for 1885, [August], 1886, v. 34, pp. 330-332. Translation: <Stett. Ent. Zeit., 1886, jahrg. 47, pp. 158-160. See: <Science, 11 September, 1885, v. 6, p. 225. <Kansas City Review, October, 1885, p. 171.

Description of the three prevalent notes of *Cicada* [= *Tibicen*], *septendecim*.

2335. RILEY, C. V. The probabilities of locust or "grasshopper" injury in the near future, and a new method of counteracting their injury. <Colman's Rural World, 29 October, 1885, v. 38, p. 348. S.-b. No. 63, pp. 32-33. Reprint: <Proc. Amer. Assoc. Adv. Sci. for 1885, [August], 1886, v. 34, pp. 519-520. <Proc. 6th Meeting Soc. Prom. of Agric. Sci., Manhattan, Kans., 1886, pp. 38-39. See: <Mich. Christian Herald, 3 September, 1885. S.-b. No. 63, p. 39. <Amer. Grange Bull., 5 November, 1885. S.-b. No. 63, p. 34. <Prairie Farmer, 10 October, 1885, v. 57, p. 669. S.-b. No. 61, pp. 34-35.

The advance of settlement and cultivation will prevent such widespread injuries of *Caloptenus spretus* as occurred between 1874 and 1877; use of poisoned baits.

2336. RILEY, C. V. The present status and future prospects of silk-culture in the United States. <Entom. Amer., October, 1885, v. 1, pp. 139-140. Reprint: <Proc. Amer. Assoc. Adv. Sci. for 1885, [August], 1886, v. 34, p. 516. See: <Science, 11 September, 1885, v. 6, p. 236.

Abstract; headings under which the subject is discussed; summary of conclusions.

2337. RILEY, C. V. The grain moth. <Rural New-Yorker, 7 November, 1885, v. 44, p. 744. S.-b. No. 63, p. 56.
Habits, descriptions, ravages, and means against *Asopia farinalis*.
2338. [RILEY, C. V.] Profits of silk-culture. <Rural New-Yorker, 26 December, 1885, v. 44, p. 885. S.-b. No. 63, pp. 50-51.
Answer to inquiry of J. M. S.; actual cost of producing silk in different parts of the United States.
2339. RILEY, C. V. *Aletia xyliua* vs. *A. argillacea*. <Entom. Amer., December, 1885, v. 1, pp. 161-163.
Reasons for considering *Aletia xyliua* the correct name for the cotton-worm; advance print from No. 2343.
2340. [RILEY, C. V.] [*Euphanessa mendica*, etc.] <Entom. Amer., December, 1885, v. 1, pp. 170-171, 173, 176.
Remarks on papers read at the A. A. A. S.; *Euphanessa mendica* considered a geometrid; some characters of the Lepidoptera; life-habits of *Egeridæ*.
2341. RILEY, C. V. On the hitherto unknown mode of oviposition in the *Carabidæ*. Abstract: <Proc. Amer. Assoc. Adv. Sci. for 1884, 1885, v. 33, pp. 538-539.
History of *Chalaniemus impunctifrons* traced from egg to imago; eggs laid singly on leaves of trees inclosed in mud or clay.
2342. RILEY, C. V. [Report of the Edinburgh International Forestry Exhibition.] <Rept. U. S. Dept. Agric. for 1884, 1885, pp. 167-179.
Brief mention of some of the insect collections exhibited.
2343. RILEY, C. V. Fourth report of the United States Entomological Commission, being a revised edition of Bulletin No. 3, and the final report on the cotton-worm, together with a chapter on the boll-worm, with maps and illustrations. <Washington: 1885, [3 February, 1886], pp. 38+399+147, 45 figs., 64 pl., 2 maps.
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2344. RILEY, C. V. Reports of experiments with various insecticide substances, chiefly upon insects affecting garden crops, made under the direction of the entomologist. <Bull. No. 11, Div. Ent. U. S. Dept. Agric., [February 26], 1886, 34 pp.

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2345. [RILEY, C. V.] [The study of entomology.] <Entom. Amer., March, 1886, v. 1, pp. 225–227.

Remarks made at a meeting of the A. A. A. S.; books useful for beginners,

2346. [RILEY, C. V.] [Habitat of *Mezium americanum*.] <Proc. Ent. Soc. Wash., [30 March], 1886, v. 1, p. 14.
Occurrence of *Mezium americanum* in old hay.
2347. [RILEY, C. V.] [Arctic insects.] <Proc. Ent. Soc. Wash., [30 March], 1886, v. 1, pp. 14-15.
Remarks on collection of insects made at Point Barrow, Alaska; prevalence in Arctic regions of species common to America and Europe; occurrence of *Urocerus flavicornis* in Alaska.
2348. [RILEY, C. V.] [Habits of *Isosoma*.] <Proc. Ent. Soc. Wash., [30 March], 1886, v. 1, p. 15.
Phytophagic habits of the genus *Isosoma*; *I. grande* observed ovipositing.
2349. [RILEY, C. V.] [Cranberry fruit-worm.] <Proc. Ent. Soc. Wash., [30 March], 1886, v. 1, p. 15.
Names *Aerobasis vaccinii* as the well-known cranberry fruit-worm.
2350. [RILEY, C. V.] [*Rhyssa lunator*.] <Proc. Ent. Soc. Wash., [30 March], 1886, v. 1, p. 15.
States that *Rhyssa* [= *Thalessa*] *lunator* is parasitic and not lignivorous.
2351. [RILEY, C. V.] [*Tiphia* and *Rhipiphorus*.] <Proc. Ent. Soc. Wash., [30 March], 1886, v. 1, p. 15.
Refers to O. Lugger's statements in regard to the habits of *Tiphia* and *Rhipiphorus* as manifestly incorrect.
2352. [RILEY, C. V.] [Insects attracted to light.] <Proc. Ent. Soc. Wash., [30 March], 1886, v. 1, pp. 15-16.
Disfigurement of buildings by the insects and spiders attracted to the electric light on the dome of the Capitol.
2353. [RILEY, C. V.] [Parasitic Coleoptera.] <Proc. Ent. Soc. Wash., [30 March], 1886, v. 1, p. 16.
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2354. [RILEY, C. V.] [*Scenopinus*.] <Proc. Ent. Soc. Wash., [30 March], 1886, v. 1, p. 16.
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2355. RILEY, C. V. Annual address of the president. <Proc. Ent. Soc. Wash., [30 March], 1886, v. 1, pp. 17-27.
Brief comments upon the histories or injuries of *Agrotis fennica*, *Hadena devastatrix*, *Nematus erichsoni*, *Phytonomus punctatus*, *P. nigrirostris*, *Pulvinaria innumerabilis*, *Systæchus leucophæus*, and *Phylloxera vastatrix*; notes on the egg parasites of the *Acrididæ*; mode of oviposition of some *Carabidæ*; advantages of Washington from an entomological standpoint.
2356. [RILEY, C. V.] [Gall-making moths.] <Proc. Ent. Soc. Wash., [30 March], 1886, v. 1, p. 30.
Walshia amorphella, previously known as a gall-maker on *Amorpha fruticosa*, bred from roots of loco weed; *Euryptychia saligneana* distinct from *Pædisca scudderiana*.
2357. [RILEY, C. V.] [*Sphida*, Grote.] <Proc. Ent. Soc. Wash., [30 March], 1886, v. 1, p. 30.
Considers *S. obliquata* synonymous with *Arzama densa*.

2358. [RILEY, C. V.] [Food of *Calopteron* and *Photinus*.] <Proc. Ent. Soc. Wash., [30 March], 1886, v. 1, p. 31.
Larva of *Calopteron terminale* gregarious and lignivorous; *Photinus pyralis* feeds on snails.
2359. RILEY, C. V. A carnivorous butterfly larva. <Science, 30 April, 1886, v. 7, p. 394.
Distribution and recorded food-habits of *Feniseca tarquinius*; *Aphididæ* the normal food of the same.
2360. RILEY, C. V. Entomology. Professor Riley to Dr. Shaffer. <Daily Globe [Keokuk, Iowa], 2 May, 1886. S.-b. No. 63, p. 30.
Injuries of and means against *Abia caprifolium* [= *Zaræa inflata*].
2361. RILEY, C. V. A carnivorous butterfly larva.—Plant-feeding habit of *Feniseca tarquinius*. <Amer. Nat., June, 1886, v. 20, pp. 556-557.
Supposed food-plants of the larva of *Feniseca tarquinius*; first publication of proof that it feeds on plant-lice; *Schizoneura tessellata*, *Pemphigus fraxinifolii*, and *P. imbricator* the species preyed upon.
2362. RILEY, C. V. Thrips—Leaf hoppers. <Gardener's Mo. and Hortic., June, 1886, v. 28, p. 174. S.-b. No. 61, p. 56.
Letter to Duncan Rhind; remedies against *Erythroneura vitifex* [= *Typhlocyba vitis*].
2363. RILEY, C. V. Report of the entomologist. <Ann. Rept. [U. S.] Commissioner Agric. for 1885, 1886, pp. 207-343, 1 map, 9 pl. Separate: <Washington: June, 1886, pp. 10+137+10.

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2364. RILEY, C. V. Miscellaneous notes on the work of the Division of Entomology for the season of 1885, prepared by the Entomologist. <Bull. No. 12, Div. Ent. U. S. Dept. Agric. [13 July], 1886, 46 pp. 1 plate.

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2365. RILEY, C. V. Hessian-fly. <Suppl. Encyclopædia Britannica, 9th Ed., 1886, v. 3, p. 324, fig.

Natural history, remedies, and figures of *Cecidomyia destructor*.

2366. R[ILEY], C. V. Locust. <Suppl. Encyclopædia Britannica, 9th Ed., 1886, v. 3, pp. 626-628, fig., map.
Ravages, life-history, enemies of, and means against *Caloptenus spretus*; migrations and their cause; map of the region overrun; figure of adult.
2367. RILEY, C. V. Some popular fallacies and some new facts regarding *Cicada septendecim* L. <Proc. Amer. Assoc. Adv. Sci. for 1885, [August], 1886, v. 34, p. 334.
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2368. RILEY, C. V. Report of the curator of the department of insects in the U. S. National Museum for 1884. <Ann. Rept. of Regents of Smith. Inst. for 1884, 1885 [1886], pp. 185-188.
List of accessions, with notes; recommendations for utilizing the Glover plates; needs of the Department.
2369. RILEY, C. V. Notes on *Feniseca tarquinius*, Fabr. <Ca. Ent., October, 1886, v. 18, pp. 191-193.
Comments on article by W. H. Edwards; records made at the Department of Agriculture proving the carnivorous habits of the larva of *Feniseca tarquinius*.
2370. RILEY, C. V. Two useful lives. <Sci. Amer., 29 January, 1887, v. 56, p. 64. S.-b. No. 63, p. 122. See: <Wine and Fruit Grower, January, 1887, v. 9, p. 10. S.-b. No. 61, pp. 55-56.
Brief obituary notices of Louis Bazille and Jules Liechtenstein.
2371. RILEY, C. V. Mr. Hulst's observations on *Pronuba yuccasella*. <Entom. Amer., March, 1887, v. 2, pp. 233-236.
Criticism of the observations of G. D. Hulst; summary of the method of oviposition of *Pronuba yuccasella*; pollination of *Yucca* by the same.
2372. [RILEY, C. V.] Fruit pest extermination. <San Diego Mirror, 5 April, 1887. S.-b. No. 63, pp. 88-89.
Means against *Coccidæ*.
2373. [RILEY, C. V.] [Californian orange insects.] <Daily Herald [Los Angeles], 9 April, 1887. S.-b. No. 63, p. 88.
Means against *Coccidæ*.
2374. [RILEY, C. V.] Our bugs. <San Francisco Daily Examiner, 16 April, 1887. S.-b. No. 63, p. 80; 86-87.
Food-plants, ravages, and means against the white-scale.
2375. [RILEY, C. V.] [Remedies and appliances.] <Press and Horticulturist, 16 April, 1887. S.-b. No. 61, pp. 82-84.
Replies to inquiries made at the annual convention of the State Board of Horticulture of California; means against the codlin-moth; methods of spraying; differences between allied scales; their methods of dispersal and means against them.
2376. RILEY, C. V. Bumble-bees vs. red-clover. <Rural New-Yorker, 23 April, 1887, v. 46, p. 270. S.-b. No. 61, pp. 36-37.
Revival of unsettled questions; red-clover sterile in the absence of bumble-bees in New Zealand; some fertilization by other insects probable; introduction of bumble-bees into New Zealand; their rapid propagation there; beneficial effects on red-clover.

2377. RILEY, C. V. Young grasshoppers. <San Francisco Examiner, 25 April, 1887. S.-b. No. 63, p. 85.
Interview with reporter; ravages of and means against *Melanoplus* [= *Caloptenus*] *devastator*.
2378. RILEY, C. V. Our shade trees and their insect defoliators. Being a consideration of the four most injurious species which affect the trees of the capital; with means of destroying them. <Bull. No. 10, Div. Ent. U. S. Dept. Agric. [7 May], 1887, 69, pp. 27 figs.

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2379. RILEY, C. V. Remarks on the insect defoliators of our shade-trees. <New York, 1887, t-p.+12 pp.

Report of address made before the New York farmers, 10 March, 1887; ravages and means against *Galeruca xanthomelæna*, *Thyridopteryx ephemeraformis*, *Orgyia leucostigma* and *Hyphantria eunea*.

2380. RILEY, C. V. Variable moulting in *Orgyia*. <Ent. Mo. Mag., May, 1887, v. 23, p. 274.

The female of *Orgyia leucostigma* undergoes four molts, the male undergoes three; tendency of individual larvæ of all orders to vary from the normal number in the species; whenever there is a discrepancy in size of the sexes the smaller undergoes a less number of molts; number of molts when not sexual dependent on food supply; molting correlated with rate of growth and nutrition.

2381. RILEY, C. V. Pedigree moth-breeding. <Ent. Mo. Mag., May, 1887, v. 23, pp. 277-278.

Recommends *Seriearia mori* as the most favorable insect to experiment with; its tendency to vary under new conditions.

2382. RILEY, C. V. Reports of observations and experiments in the practical work of the division, made under the direction of the entomologist. <Bull. No. 13, Div. Ent. U. S. Dept. Agric. [3 June], 1887, 78 pp., 4 figs.

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2383. RILEY, C. V. A new apple pest. <Sci. Amer., 18 June, 1887, v. 56, p. 384. S.-b. No. 61, p. 50. <Colman's Rural World, 23 June, 1887, v. 40, p. 185. S.-b. No. 61, p. 112. <Gardener's Mo. and Hortic., July, 1887, v. 29, p. 216. S.-b. No. 61, p. 111; 138; 148.

Food-plants, habits, description of larva and adult of *Haltica punctipennis*; the species subdued by arsenical poisons.

2384. RILEY, C. V. A destructive cricket in Louisiana. <Florida Dispatch, 20 June, 1887, v. 7, p. 576. S.-b. No. 61, pp. 64-65. Reprint: <Insect Life, 2 October, 1888, v. 1, pp. 87-88.

Ravages and means against *Gryllus* sp., destructive to cotton, peas, tobacco, sweet and Irish potatoes.

2385. RILEY, C. V. Strawberry borers. <Pacific Rural Press, 25 June, 1887, v. 33, p. 559. S.-b. No. 61, p. 90; No. 63, p. 110.

Letter to I. A. Wilcox; recommends bisulphide of carbon as a means against *Egeria impropria*.

2386. RILEY, C. V. Life-history of the *Icerya*. <Pacific Rural Press, 25 June, 1887, v. 33-34, p. 565; 2 July, p. 9. S.-b. No. 61, pp. 60-64, 9 figs.

From advance proof of Report of U. S. Commissioner of Agriculture for 1886. See No. 2394 for synopsis of contents.

2387. [RILEY, C. V.] Cut-worms. <Pacific Rural Press, 25 June, 1887, v. 33, p. 578. S.-b. No. 63, p. 108.

Means against cut-worms.

2388. RILEY, C. V. Reports of observations and experiments in the practical work of the division made under the direction of the entomologist. <Bull. No. 14, Div. Ent. U. S. Dept. Agric. [3 August], 1887, 62 pp., 1 pl., 4 figs.

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2389. RILEY, C. V. The <i>Icerya</i> or fluted scale, otherwise known as the cottony cushion-scale. <Bull. No. 15, Div. Ent. U. S. Dept. Agric. [18 August], 1887, 40 pp. <San Diego Union, 16 April, 1887. S.-b. No. 61, pp. 90-97. <Los Angeles, 13 April, 1887.	

2389. RILEY, C. V.—Continued.

S.-b. No. 61, pp. 97-104. <Los Angeles Tribune, 14 April, 1887. S.-b. No. 61, pp. 104-111. See: <Pacific Rural Press, 23 April, 1887, v. 33, pp. 361-362; 364. S.-b. No. 61, p. 48; No. 63, p. 76. <Riverside Daily Press, 12, 13 April, 1887. S.-b. No. 61, pp. 65-68; No. 63, pp. 98-105. <Press and Horticulturist, 16 April, 1887. S.-b. No. 61, pp. 74-82. <Florida Dispatch, 2 May, 1887, v. 7, pp. 385-388. S.-b. No. 63, pp. 75; 77. <Pacific Rural Press, 2 July, 1887, v. 34, p. 9.

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2390. [RILEY, C. V.] [Classification of insects.] <Entom. Amer., September 1887, v. 3, p. 102.
Comments on the address of J. H. Comstock before the A. A. A. S.
2391. [RILEY, C. V.] [*Pronuba* and its connection with the pollination of *Yucca*.] <Entom. Amer., September, 1887, v. 3, pp. 107-108.
Record of the results of recent experiments on the pollination of *Yucca* and the agency of *Pronuba* in this work.
2392. RILEY, C. V. Beschreibung einer den Birnen schädlichen Gallmücke (? *Diplosis nigra* Meig.). <Wiener Entomol. Zeit., September, 1887, v. 6, pp. 201-206, 3 figs.
Discovery of the species in America; its habits and life-history; detailed description of all stages; possible difference between European and American specimens; suggests *D. pyrivora* for the latter, if distinct.
2393. RILEY, C. V. Some important discoveries in the life-history of the hop-plant louse (*Phorodon humuli* Schrank). <Soc. for Prom. Agric. Sci., September, 1887, 1, No. 9, p. 205. Reprint: <Sci. Amer. Suppl., 24 September, 1887, v. 24, p. 9781. S.-b. No. 61, pp. 117-119. <Gardener's Mo. and Hortic., October, 1887, v. pp. 309-311. S.-b. No. 61, p. 124.
Résumé of recent discoveries in the life-history of *Phorodon humuli*; proof of its migration from plum to hop; life of the egg on plum in winter; spring migration to hop; number of broods thus far observed; probable course of later broods.
2394. RILEY, C. V. Report of the entomologist. <Ann. Rept. [U. S.] Commissioner Agric. for 1886, 1887, pp. 459-592, 11 pl. Separate: <Washington, September, 1887, pp. 459-592+6+9, 11 pl.

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2395. RILEY, C. V. The Hessian-fly in England; its origin; its past; its future. <London Times, 17 October, 1887. S.-b. No. 61, pp. 144–147.

Date of the introduction of *Cecidomyia destructor* into England; probability that it has been introduced from continental Europe since the time of Curtis; conditions in Great Britain unfavorable for its increase.

2396. RILEY, C. V. The problem of the hop-plant louse fully solved. <Gardener’s Chronicle, 22 October, 1887. S.-b. No. 61, pp. 133–135. Reprint: <Mark Lane Express, 31 October, 1887, v. 57, pp. 135–137. S.-b. No. 63, pp. 136–140.

Life-history, migrations, and mode of hibernation of *Phorodon humuli*.

2397. RILEY, C. V. On the luminous larviform females of the *Phengodini*. <Ent. Mo. Mag., [December], 1887, v. 24, pp. 148–149.

Structural characters of the larval *Phengodini*; food of *Zarhipis*; characters of eggs, young larvæ, and female larvæ of *Zarhipis* and *Phengodes*; female *Phengodini* considered an archetypal hexapodal form; relations between phosphorescence and differentiation of the sexes.

2398. RILEY, C. V. [Introduction of the Hessian-fly into England.] <Trans. Ent. Soc. London, [December], 1887, pp. 45-48, Proc. Discussion of the date of introduction of *Cecidomyia destructor* into America and England; concludes from a study of the historical evidence, the distribution and parasites of the insect, that it was probably introduced into England about three or four years ago.
2399. RILEY, C. V. Poisonous insects. <Reference Handbook of the Medical Sciences, 1887, v. 5, pp. 741-760, figs. 2971-3020. An exhaustive illustrative review of the *Arachnida*, *Myriapoda*, and *Hexapoda* which secrete a poison injurious to man; descriptions of their life-histories; the manner in which the injury is inflicted and the remedies for the same.
2400. RILEY, C. V. The problem of the hop-plant louse [*Phorodon humuli*, Schrank] in Europe and America. <Rept. Brit. Assoc. Adv. Sci., 1887, pp. 750-753. Separate: <pp. 1-3. See: <Nature, 13 October, 1887, v. 36, pp. 566-567. <Gardener's Chronicle, 17 September, 1887. S.-b. No. 61, pp. 333-334. Life-habits of *Phorodon humuli*; effects of extreme heat and of meteorological conditions; natural enemies and means against the *Phorodon*.
2401. RILEY, C. V. On *Icerya purchasi*, an insect injurious to fruit trees. <Rept. Brit. Assoc. Adv. Sci., 1887, p. 767. Separate: <p. 1. See: <Nature, 20 October, 1887, v. 36, p. 592. Summary statement of food-plants, original home, synonymy, and means against *Icerya purchasi*.
2402. RILEY, C. V. On the luminous larviform females in the *Phengodini*. <Rept. Brit. Assoc. Adv. Sci., 1887, pp. 760-761. Separate: <pp. 1-2. See: <Entom. Amer., September, 1887, v. 3, p. 107. <Proc. Amer. Assoc. Adv. Sci., 1887 [May, 1888], v. 36, p. 262. Résumé of facts relating to the history, characters, and life-habits of the luminous larviform females in the *Phengodini*; bearing of these facts on the theory of evolution.
2403. RILEY, C. V. [Scale on *Euonymus latifolia*?] <Sci. Amer., 14 January, 1888, v. 58, p. 27. S.-b. No. 61, p. 148. Means against *Chionaspis euonymi* and other *Coccidæ*; formulæ of kerosene emulsions.
2404. [RILEY, C. V.] [Larval habits of *Lixus*.] <Proc. Ent. Soc. Wash., [13 March], 1888, v. 1, p. 33. *Lixus macer* bred from stems of *Chenopodium hybridum* and from *Helianthus*; larva of *L. parvus* a gall producer on stems of *Amelanchier*.
2405. [RILEY, C. V.] [Girdling habits of *Pædisca obfuscata*.] <Proc. Ent. Soc. Wash., [13 March], 1888, v. 1, p. 33. Larva of *P. obfuscata* spins a web over the orifice at the amputated end.
2406. [RILEY, C. V.] [Early stages of *Aphorista vittata* and *Epipocus punctatus*.] <Proc. Ent. Soc. Wash., [13 March], 1888, v. 1, p. 37. Comparative characters between corresponding stages of the two species.

2407. [RILEY, C. V.] [Food-habits of *Feniseca tarquinius*.] <Proc. Ent. Soc. Wash., [13 March], 1888, v. 1, p. 37.
List of *Aphididae* preyed upon by larvæ of *F. tarquinius*.
2408. [RILEY, C. V.] Notes on *Phengodes* and *Zarhipis*. <Proc. Ent. Soc. Wash., [13 March], 1888, v. 1, pp. 62-63.
Structural characters of the luminous larvæ of *Phengodes* and *Zarhipis* and of an unnamed form from Nevada; difference between the perfect female and the larva.
2409. [RILEY, C. V.] [Trees injured by spiders.] <Proc. Ent. Soc. Wash., [13 March], 1888, v. 1, p. 84.
Growth of trees retarded by spider-webs.
2410. [RILEY, C. V.] [Remarks on exhibited specimens.] <Proc. Ent. Soc. Wash., [13 March], 1888, v. 1, pp. 84-86.
1. Notes on the life-habits of *Ægeriidae*. Habits and early stages of *Melittia gloriosa*, *Sciapteron robiniae*, *Phemonoe 5-caudata*, *Ægeria impropria*, *A. albicornis*, and *A. pyri*.
2. Color variation in the larva of *Agraulis vanillæ*. Colorational variation between eastern and western larvæ of *A. vanillæ*.
3. Miscellaneous insects. Food-plants of *Eumenia atala* and *Cloantha derupta*; habitat of *Dendrotettix quercus* n. g. et sp.
2411. RILEY, C. V. Further notes on *Phengodes* and *Zarhipis*. <Proc. Ent. Soc. Wash., [13 March], 1888, v. 1, pp. 86-87.
Comparative characters of the larvæ of *Phengodes* and *Zarhipis*; life-habits and metamorphoses of the same; colorational and structural characters of the larva and larviform female of *Zarhipis*; description of the eggs of *Zarhipis*.
2412. [RILEY, C. V.] [Remarks on exhibited specimens.] <Proc. Ent. Soc. Wash., [13 March], 1888, v. 1, pp. 87-89.
1. Notes on the eversible glands in larvæ of *Orgyia* and *Parorgyia*, with notes on the synonymy of species. Presence of glands, probably scent organs, in the larvæ of *Orgyia* and *Parorgyia*; synonymy and food-plants of some species of *Parorgyia*.
2. Further remarks on *Phengodes*. Comparative characters of larva and larviform females of *Phengodes laticollis*.
3. Interesting Lepidoptera. Characters of *Syntomeida* sp., and of an undetermined moth.
2413. RILEY, C. V. The British pest. Worthlessness of the sparrow as an insect-killer. <National Tribune, 26 April, 1888.
Result of the examination of the stomach contents of 522 sparrows, of which 92 only, or 17 $\frac{6}{10}$ per cent., contained insects, a large proportion of these being innocuous or actually beneficial species; review of recorded observations in North America.
2414. RILEY, C. V. Elm-tree depredators. <Newark [N. J.] Press and Register, 10 May, 1888.
Report of an address before the Newark Board of Trade; life-history and means against *Galerna xanthomelæna*.
2415. RILEY, C. V. On the original habitat of *Icerya purchasi*. <Pacific Rural Press, 12 May, 1888, v. 35, p. 425.
Australia probably the true home of *Icerya purchasi*; its distinctness from *I. sacchari*.

2416. RILEY, C. V. The buffalo-gnat problem in the lower Mississippi Valley. Abstract: <Proc. Amer. Assoc. Adv. Sci. for 1887, [May], 1888, v. 36, p. 362.
Result of late investigations on species of *Simulium*.
2417. RILEY, C. V. Systematic relations of *Platypsyllus*, as determined by the larva. <Sci. Amer. Suppl., 2 June, 1888, v. 25, pp. 10356-10358, 4 figs.
Review of the literature concerning the systematic position of *Platypsyllus castoris*; additional facts confirming G. H. Horn's view of the coleopterous nature of the insect.
2418. RILEY, C. V. Report of the entomologist. <Ann. Rept. [U. S.] Commissioner Agric. for 1887, 1888, pp. 48-179, 8 pl. Separate: <Washington: June, 1888, pp. 48-179+6, 8 pl.

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INDICES TO PARTS I, II, AND III.

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[The Walsh and Riley names are followed by W. & R. The first number following the name refers to the number of the paper in the list, the second to the page where the species is first described. As is well known, the Walsh collection was destroyed in the Chicago fire in October, 1871. A few of the types sent to Drs. Hagen and Riley are in the collections of the Museum of Comparative Zoology at Cambridge and the National Museum at Washington. Those at Cambridge are indicated by a *, those at Washington by **.]

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[The types, without exception, are preserved in the collection of the National Museum, Washington, D. C.]

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* Described and figured in A. S. Fuller's "Injurious insects." <Tilton's Journ. of Hort. and Florist's Companion, October, 1868, v. 4, pp. 207-209.

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¹ Described and figured in Lintner's First Report N. Y. State Entomologist, p. 159.

² Proposed (Record of Amer. Ent., 1871, p. 8) for *Trichogramma minutum*. *Pentarthron* has, however, been used for a genus of beetles.

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