Education Department Bulletin

Published fortnightly by the University of the State of New York

Entered as second-class matter June 24, 1908, at the Post Office at Albany, N. Y., under the act of July 16, 1894

No. 455 ALBANY, N. Y. SEPTEMBER 15, 1909

New York State Museum

JOHN M. CLARKE, Director
EPHRAIM PORTER FELT, State Entomologist

Museum bulletin 134

24th REPORT OF THE STATE ENTOMOLOGIST

ON

INJURIOUS AND OTHER INSECTS

OF THE

STATE OF NEW YORK

1908

ALBANY
UNIVERSITY OF THE STATE OF NEW YORK
1909

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STATE OF NEW YORK

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New York State Education Department
Science Division, February 10, 1909

Hon. Andrew S. Draper LL.D.
Commissioner of Education

SIR: I have the honor to communicate herewith for publication as a bulletin of the State Museum, the annual report of the State Entomologist for the fiscal year ending September 30, 1908.

Very respectfully
JOHN M. CLARKE
Director

State of New York
Education Department
COMMISSIONER'S ROOM

Approved for publication this 11*th day of February* 1909

Commissioner of Education

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JOHN M. CLARKE, Director
EPHRAIM PORTER FELT, State Entomologist

Museum bulletin 134

24th REPORT OF THE STATE ENTOMOLOGIST 1908

To John M. Clarke, Director of Science Division

I have the honor of presenting herewith my report on the injurious and other insects of the State of New York for the year ending October 15, 1908.

A number of species have inflicted serious injuries upon both fruit and shade trees. A most interesting phenomenon was the widespread and abundant flight of the snow-white linden moth. An unusual feature was the capture, within the limits of the city of Albany, of two specimens of a small, green, subtropical cockroach.

Fruit tree insects. Fruit trees in the western part of the State were seriously injured in some sections by the cigar case bearer, a species which is very rarely abundant enough to cause material damage in the Hudson river valley. Depredations by the above mentioned case bearer were frequently associated with severe injury by a small plant mite known as the blister mite. Western fruit growers were also greatly exercised by the caterpillars of the white marked tussock moth eating into the young fruit, a troublesome departure from the normal habit. The fall canker worm was unusually abundant and destructive on eastern Long Island and in the vicinity of New York city. The San José scale is one of the most serious insect pests of the horticulturist. The warm, dry weather the latter part of the season has been favorable to the unrestricted multiplication of this insect, and in some cases infested orchards have become very badly affected. Our

observations show that, as a rule, fruit growers are experiencing much less trouble in keeping this scale insect in check than was the case in earlier years. Early spring applications of a lime-sulfur wash are giving very good satisfaction. Some parties are meeting with excellent results from applications of a miscible or so called "soluble" oil. We have preferred, as a rule, to confine our recommendations to a material like the lime-sulfur wash, which is not only effective but safe and also valuable in controlling fungous diseases. Numerous observations have been made on the above mentioned and other insects.

It is gratifying to state that conditions in the Chautauqua grape belt have materially improved, so far as injury by the grape root worm is concerned. Though this insect is generally distributed throughout the grape belt, severe injuries by it have been confined to restricted areas. The grape blossom midge was responsible for an unprecedented outbreak, destroying from 50 to 75% of the blossoms on one acre of Moore's early grapes at Fredonia. It was generally present throughout the grape section and somewhat abundant in limited portions of certain vineyards. It is probable that this species has been responsible for failure to fruit in other cases where the losses were attributed to some unknown cause or possibly to unfavorable weather conditions. This insect is now under investigation. We hope to solve its life history next spring, a necessary preliminary to devising a practical method of preventing serious injury in the future.

Shade tree protection. Ravages by the elm leaf beetle have been very severe in many Hudson valley cities and villages and, as a result, popular interest in the welfare of our shade trees has increased greatly. This concern has been accentuated by extensive defoliations inflicted by the white marked tussock moth, a species which has been quite injurious in Buffalo for some years past.

Injuries by these and other shade tree pests have emphasized most strongly the recommendations of the Entomologist and, as a result, more than ever before is being done to protect our shade trees. The work of the city forester of Albany has been very beneficial, though owing to certain hindrances his work was not as effective as it might otherwise have been. The city of Buffalo has at last committed itself to a definite policy of shade tree protection. A forester was appointed and excellent work has already been accomplished in that municipality. The authorities of several

villages have given careful consideration to shade tree protection and there is a good prospect that more will be accomplished another year. The work against the gipsy moth, noticed below, has resulted in a marked improvement in the spraying outfit. We believe that certain of this apparatus, modified to suit our conditions, could be adopted to advantage and would prove of much benefit, since it would, by making the spraying easier and quicker, afford great encouragement on account of the largely increased efficiency. Our work upon shade tree insects, consisting mostly of local examination and recommendation, has consumed much time and has been productive of marked improvement in the welfare of the trees.

Gipsy and brown tail moths. These two insects have continued their injurious work in Massachusetts, the first named being by far the more destructive. The gipsy moth has been found in small numbers at both Springfield and Greenfield, Mass., as recorded in our previous report. Points where this insect was likely to become established have been closely watched and as yet it has not been found in this State. A warning placard, illustrating this species and the brown tail moth, has been conspicuously posted in many post offices and other public places in the State. Prompt and efficient treatment of isolated colonies, should they be found in this State, is of utmost importance if extended injury is to be avoided.

The work against the gipsy moth, as revealed by a personal examination the past summer, is being prosecuted with great vigor. The residential sections are in excellent condition, though large woodland areas have been seriously damaged. The work with parasites, conducted by the state of Massachusetts in cooperation with the federal government, is most encouraging. The staff in charge of this work has been materially strengthened during the past year, and its efficiency greatly increased by the dispatch of a special agent to Japan. The latter secured some most promising parasites which already have been bred through one generation in this country, and lead us to hope that they may soon become important factors in controlling this species. The control of these introduced pests should be encouraged in every possible manner, since it is much more economical to check them in a restricted area than to allow the struggle to extend over a wide territory.

Forest insects. The extensive outbreaks by the green striped maple worm, recorded in our previous report, have been continued in southern Rensselaer county, and it is probable that this species

was associated, as was the case last year, with the antlered maple caterpillar. The depredations by the snow-white linden moth, noticed in our preceding report, were continued in the Catskills and extensive injuries in the Adirondacks were also brought to our attention. The only hope of preventing damage of this character is by the encouragement of natural agents, prominent among which may be mentioned native birds. The efficiency of insectivorous birds has been repeatedly emphasized by the Entomologist.

The bark borers or Scolytidae comprise a large number of very destructive species. The literature relating to this group is greatly scattered and comparatively inaccessible, hence a bibliographic catalogue is a necessary preliminary to further work upon these insects. We submit for publication, as an appendix of this report, a catalogue of the described Scolytidae of America north of Mexico by Mr J. M. Swaine.

Gall midges. The studies upon this important group have progressed very successfully. We have already prepared preliminary keys for the separation of most forms into subfamilies, tribes, genera and species, together with tables giving the food habits of those which have been reared. Some idea of the magnitude of this work may be gained when it is remembered that we have studied over 300 bred species and now recognize 700 species, representing about 50 genera. The systematic arrangement alone of this large number of microscopic insects is an immense task. And in addition to the above, many descriptions have been drafted and numerous biological notes transcribed.

The later work upon these insects has of necessity been confined mostly to systematic study, owing to the fact that material was coming in faster than it could be worked up in a satisfactory manner. We have succeeded, in spite of the pressure of other matters, in rearing during the past season about 75 species, the biology of most of which was previously unknown. There is on hand a large series of galls from which some extremely desirable material may be expected another season. The work upon this group is so well in hand that there should be no difficulty in bringing it to a successful conclusion in the near future.

The rearing and care of breeding jars containing gall midges require much time. Assistant Entomologist D. B. Young had general charge of this work and was ably assisted by Miss Fanny

T. Hartman. In addition, Mr Young rendered material service in separating our large amount of material into the major groups, while Miss Hartman has made over 600 microscopic preparations.

Flies and mosquitos. The ubiquitous and well known house fly has been the recipient of much attention because recent investigations show it may be the responsible agent, under certain conditions, in the dissemination of typhoid fever and other grave intestinal disorders. Observations upon its life history and habits have established the practicability of largely reducing if not eliminating this menace to health and personal comfort. A press bulletin on this insect was issued and this will be supplemented by a more extended account.

There is much interest in the control of mosquitos. The Entomologist inspected the work in progress on the Flushing meadows and has kept in touch with similar operations in other localities. Attention has also been given to the control of fresh-water species, especially the malaria-carrying form. The practicability of such work has been established and we look for a great extension of interest in the local suppression of these annoying pests.

Aquatic insects. The studies of insects inhabiting our fresh waters have been continued by Dr James G. Needham. His report on the work done at Old Forge was made public in the report of this office for 1907. Dr Needham is now engaged in completing his monographic account of the stone flies (Plecoptera), a work which should be ready for the printer some time during the coming winter. Dr Betten has made good progress in his studies of the caddis flies (Trichoptera), and it is expected that his work upon this group will be completed the coming spring. These two publications, when issued, will supply a most important want in our knowledge of aquatic forms and add much of value to the series of reports and bulletins on aquatic insects.

Publications. Many popular economic notices have been contributed by the Entomologist to the agricultural and local press, and a few accounts of more general interest have been widely disseminated through the agency of the Associated Press. The large number of Cecidomyiidae reared in 1907 rendered it advisable to publish preliminary descriptions of these, and a reprint from the report for that year, entitled *New Species of Cecidomyiidae II,* was issued October 26, 1907. Owing to numerous delays in printing, the report for last year did not appear during the fiscal year, al-

though a large amount of time was necessarily expended upon the more technical part in carrying it through the press.

Collections. The additions to the collections have not been as numerous as in preceding years, owing to the necessity of giving more attention to the arrangement and classification of material on hand. A number of previously unknown Cecidomyiidae were reared and several important gaps in our knowledge respecting this group filled.

Several extremely desirable accessions, aside from those mentioned above, have been made to our biological collections. One of the most interesting was a complete series representing the egg, larva, pupa and adult of the remarkable Taeniorhynchus perturbans Walk., generously contributed by Mr J. Turner Brakeley of Hornerstown, N. J., the discoverer of the early stages and one of the most active in working out the life history of this previously very elusive species.

Two important additions have been made to our exhibit collections, namely, an enlarged model of the onion fly, showing the egg, maggot, puparium, adult fly and an onion infested by maggots; also an enlarged model of the cigar case bearer showing its work upon apple leaves. Both of these were executed by Mrs Otto Heidemann of Washington, D. C.

The arrangement and classification of the collection has received much attention. Assistant Entomologist D. B. Young has separated the Staphylinidae into their major groups and determined many species. He has also given considerable time to the arrangement of the Syrphidae. The completion of the catalogue of the Hill collection occupied much time during the past year. Miss Hartman also assisted in the preparation of the above mentioned catalogue and has done a great deal of general curatorial work, such as mounting, labeling and caring for insect specimens.

Office matters. The general work of the office has been conducted as in previous years, the Assistant Entomologist being responsible for the correspondence and other matters during the absence of the Entomologist. Assistant I. L. Nixon resigned October 12, 1907, and Miss Fanny T. Hartman was temporarily appointed to the vacancy October 26, with subsequent confirmation. Numerous specimens have been received for identification and many inquiries made concerning injurious forms. Owing to their having been no important bulletin or report issued during the season, there has been a decrease in the number of packages sent

through the mails or by express. This latter has undoubtedly had some effect upon the correspondence. 1470 letters, 171 postals, 42 circulars, 408 packages were sent through the mails and 39 packages were shipped by express.

Nursery certificates. We have continued, as in past years, to indorse upon the request of the State Commissioner of Agriculture nursery certificates issued by his office and destined for points in the state of Virginia, since the Virginia authorities insist that all certificates accompanying shipments of nursery stock to that state shall be indorsed by an official entomologist. The following is a list of firms to whom these nursery certificates were issued during 1908:

Stark Bros. Nursery Co., George A. Sweet, Bryant Bros., all of Dansville; George S. Josselyn, T. S. Hubbard Co., F. E. Schifferli, Lewis Roesch, Foster & Griffith, all of Fredonia; The Chase Nurseries, Henry Sears & Co., The M. H. Harmon Co., H. E. Merrell, all of Geneva; E. Moody & Sons, Lockport; Jackson Perkins, Newark; Allen Nursery Co., Brown Bros. Co., Herrick Seed Co., Perry Nursery Co., First National Nurseries, Chase Bros. Co., Ellwanger & Barry, Western N. Y. Nursery Co., Rochester Nursery Co., H. S. Taylor Nursery Co., Glen Bros., all of Rochester; F. R. Pierson Co., Tarrytown.

General. We would acknowledge at this time our indebtedness to Dr L. O. Howard, Chief of the Bureau of Entomology, United States Department of Agriculture, and his associates for identifying a number of insects. Several correspondents have rendered valuable services in securing desirable material for the collection. There has been, as in previous years, a most helpful cooperation on the part of all interested in the work of this office.

The tacit limitations of earlier years confined the studies of the economic entomologist to insect enemies of well recognized farm crops, such as corn, potatoes, fruit, or to those forms annoying or injurious to domestic animals. The later extensive insect depredations upon shade and forest trees have served to emphasize the practical importance of this field. The more recent discoveries that malaria and yellow fever are transmitted by mosquitos, and that typhoid fever and other grave intestinal diseases may be conveyed by house flies, has made the entomologist a most welcome ally of the sanitarian. Furthermore, careful investigations of injurious and dangerous insects have repeatedly demonstrated the value of such studies as a necessary preliminary to practical con-

trol work on the farm or marsh, in the orchard or even about the home. Prophylactic measures against yellow fever, malaria and typhoid must depend in large measure upon an intimate knowledge of the habits of certain insects and their part in the dissemination of the dangerous germs. The study of injurious insects is by no means completed. There is great need of investigations that can not be adequately conducted with our present resources. The exhibit collections should be greatly strengthened by a large series of well executed, enlarged models of the smaller, more injurious insects. Such a departure would greatly increase the practical and educational value of the entomologic exhibits, particularly as the significance of some of the more recent discoveries can not be adequately portrayed without such aid. This latter would also do much to bring the larger exhibit necessary for the Education Building up to a high standard.

Respectfully submitted

EPHRAIM PORTER FELT

State Entomologist

Office of the State Entomologist, October 15, 1908

INJURIOUS INSECTS

Poplar sawfly

Trichiocampus viminalis Fallen

This sawfly, first observed in this country in 1888 by Dr J. A. Lintner, has become rather abundant upon Carolina poplars in the vicinity of Albany during recent years. Complaint of injuries by this species has also been received this season from Cambridge, N. Y. Dr Lintner stated in 1888 that this species was so abundant upon small poplars in his garden that it was necessary to pick and burn the infested leaves in order to prevent more serious injury.

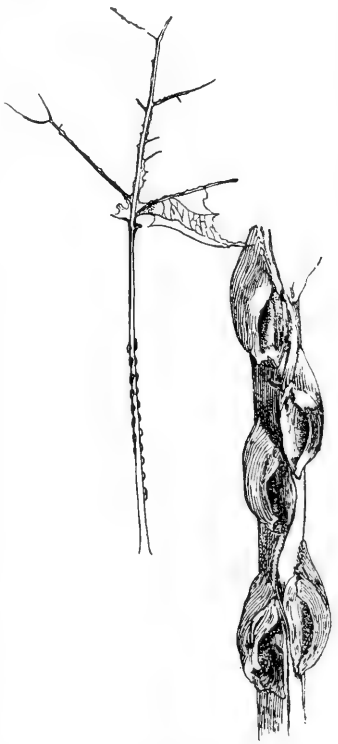

FIG. 1 Poplar sawfly, leaf stem showing oviposition and a portion of the stem greatly enlarged. (Original)

Life history and habits. The orange-yellow, black spotted, false caterpillars may be seen in early June. The young larvae feed in company on the under side of the foliage, skeletonizing most of the leaf. The larvae then break up into clusters of 6 to 8 or 10, migrate to other leaves and by this time are large enough so that everything is devoured except the larger veins, feeding invariably beginning at the tip of the leaf. The presence of leaves eaten in the above described ways is most characteristic of this species. The larvae attain full growth very quickly and some may be observed spinning up the latter part of June. The period of oviposition is quite extended and eggs, young larvae and full-grown larvae may frequently be observed upon the same tree the latter part of June and into July. A second generation of larvae occurs about the middle of August. The full-grown larvae of the

first generation may spin their oval, brown cocoons in leaves or other debris. The second generation presumably hibernate in the cocoon, adults appearing the following spring and depositing their eggs in minute slits on either or both sides of the petiole in series of 10 to 15 or even more, since Dr Lintner records as many as 28 or 30 in one row.

Description. The egg is pearly white, oval and about 1 mm in length. Its position is indicated by a slight swelling about 1.5 mm long, the swellings being about 1 mm apart.

Larva. The young larvae are about 6 mm long, have dark brown or blackish heads and pale green or yellowish green bodies.

Partly grown larva. Length 1 cm. Head subglobose, jet-black, the most of the body being a very pale green with a conspicuous row of sublateral, subquadrate, black spots, a pair on each segment. The anterior portion of the body, namely the first thoracic segment and the lateral tubercles on the 2d, 3d and the 11th segments, particularly laterally, is variably tinged with pale orange, giving a very characteristic appearance. The larvae are rather thickly clothed with short, whitish setae arising from inconspicuous tubercles. True legs pale yellowish basally, yellowish transparent apically. The whitish transparent prolegs occur on the 2d to the 7th and 8th and 9th abdominal segments, each segment also with a small, black, lateral dot. Anal plate subcircular, black with whitish setose tubercles.

Full-grown larva. Length 1.5 cm. Head jet-black. Body a deep yellowish orange, sparsely covered with fine, whitish hairs and with a conspicuous row of irregular subquadrate lateral markings, a pair on each segment, and a substigmatal row of small triangular, black markings. The black anal plate bears several pairs of submedian white setae.

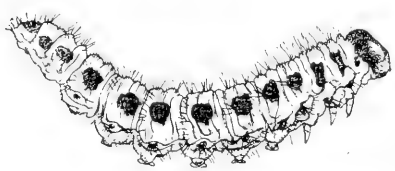

FIG. 2 Poplar sawfly, side view of larva, enlarged. (Original)

Adult. Length .8 cm. Wing spread 1.8 cm. Head shining black, short, broad. Antennae nearly as long as the body, composed of nine segments, the first two short, the others long, slender and tapering successively to the apex. Thorax black dorsally, the venter and the abdomen yellowish. Wings yellowish basally, the stigma large, distinct. Legs mostly pale yellowish, the pulvilli dark brown.

Remedial measures. This leaf feeder should be easily controlled by timely applications of an arsenical poison, preferably arsenate of lead.

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1888 **Lintner, J. A.** Ins. N. Y. 4th Rep't, p. 44–46. (Brief account, as Aulacomerus lutescens)

1889 ——— Ins. N. Y. 7th Rep't, p. 223–24. (Synonymy, as Aulacomerus lutescens)

1906 **Felt, E. P.** N. Y. State Mus. Mem. 8, 2:568–69. (General account)

Grape blossom midge

Contarinia johnsoni Sling.

The work of this little midge has been observed here and there in Chautauqua vineyards for the last four years. The enlarged blossom buds, infested by maggots, have been found in small numbers each spring. Nothing was known as to the source of these little pests, aside from the fact that they were produced by some small fly. It was not till the spring of 1909 that we were enabled to rear this insect and show that it belonged to the genus Contarinia and has as allies several destructive species. One closely related form, Contarinia violicola Coq., has proved very injurious to the extensive violet-growing industry located at Rhinecliff, N. Y. Another member of this genus, Contarinia pyrivora Riley, is well known on account of its destroying young pears. A third form, Contarinia sorghicola Coq., infests sorghum in the South and causes a serious shrinkage in the production of seed, while a West Indian species, Contarinia gossypii Felt, is injurious to cotton. In addition, Contarinia viticola Rübs., which further study may show to be identical with the species attacking grape blossoms in the Chautauqua region, has been recorded as injurious to grape blossoms in Europe by Rübsaamen,[1] a noted authority upon this group.

Injuries. The grape blossom midge of the Chautauqua region was first observed in scattering numbers by the late Professor Slingerland and Fred Johnson in 1904, at which time it was recorded from the towns of Ripley, Westfield, Portland and Brocton. It has occurred in small numbers from year to year since then, and in 1908 aroused considerable apprehension among growers on ac-

[1] 1906 **Rübsaamen, E. H.** Zeitschrift für Wissenschaftliche Insektenbiologie, 2:194–98.

1909 ——— Die Wichtigsten deutschen Reben-Schädlinge und Reben-Nützlinge, p. 74–76.

count of injuries inflicted upon early Moore grapes. One acre of this variety, belonging to Mr H. L. Cumming of Fredonia, had 60 to 75% of the blossoms destroyed by this midge. Investigations by the writer last June showed that the insect was generally distributed, even in extensive vineyards, throughout the grape belt, being observed from Fredonia westward to Ripley, while Mr Fred Johnson recorded its occurrence at North East, Pa. The injury resulting from the attack of this insect simply causes the destruction of infested blossom buds. There was some complaint of grape clusters being unusually open and irregular during 1908, and as this midge was abnormally abundant, it was undoubtedly a factor in the production of light bunches. Furthermore, it is probable that some of the mysterious failures of the grape crop in restricted areas may be attributed to the work of this species. An examination of grapevines in the vicinity of Albany and at Nassau, N. Y. failed to reveal any signs of this insect's work.

Description. The presence of this enemy in a vineyard is easily recognized. The infested blossom buds remain closed and are conspicuous on account of their abnormal size. They are about 1/8 of an inch in length and usually longer than broad. They vary in color from the nearly normal green to a variable red tinted extremity. The actual presence of the destructive yellowish maggots is easily demonstrated by opening a bud. Seven to eight or ten larvae may occur in one blossom bud. The affected buds remain on the vines only a short time, dropping within a few days to a week after the injury becomes noticeable.

Larva. The pale yellowish or whitish maggot or larva is about 1/12 of an inch long and may be easily recognized by the presence of a somewhat characteristic, brownish, forked breastbone near the anterior extremity. The younger maggots are whitish, becoming lemon-yellow upon attaining full growth. The maggots, together with those of related species, have a peculiar method of locomotion. The extremities are brought together and then suddenly released. The movement frequently results in throwing the maggot a distance several times its own length.

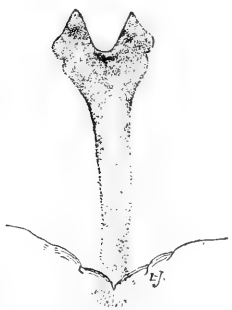

FIG. 3 Maggot of grape blossom midge, breastbone greatly enlarged. (Original)

Fly. The parent insect is an extremely delicate, pale yellowish fly only about 1/25 of an inch long. The male is easily recog-

nized by the long, knobbed, hairy feelers or antennae one half longer than the body. The female is about 1/16 of an inch long and may be distinguished by the shorter, less densely haired feelers or antennae. This sex is provided with a long, slender ovipositor as long as the body, well adapted to placing the tiny eggs within the developing floral tissues.

Technical description. *Larva.* Length 1.5 to 2 mm. The smaller larvae are whitish, the larger ones pale yellowish. Head rather short, broad, with a length about equal to the diameter. Antennae short, stout, uniarticulate. Breastbone bidentate, the teeth rather broadly triangular and moderately chitinized, the basal

FIG. 4 Maggot of grape blossom midge, view of head, enlarged. (Original)

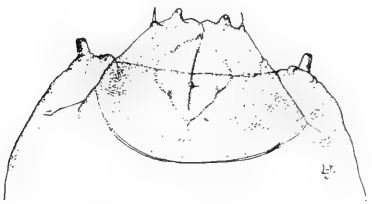

FIG. 5 Maggot of grape blossom midge posterior extremity, enlarged. (Original)

portion semitransparent and tapering posteriorly. The segmentation of the body rather distinct, the skin nearly smooth. The penultimate segment with a short, stout, cuticular process at the posterior lateral angles. Terminal segment broadly rounded, subtruncate distally, posteriorly with a pair of submedian acute dermal papillae, and just within, a pair of stouter, semitransparent, strongly curved pseudopods. Anus ventral, broadly oval.

Male. Length 1 mm. Antennae one half longer than the body, thickly haired, fuscous yellowish; 14 segments, the fifth with the basal portion of the stem with a length one half greater than its diameter, the distal part with a length three times its diameter, the enlargements subglobose, the basal one with a sparse subbasal whorl of setae, the circumfilum with the loops sparse, long and extending to or a little beyond the middle of the subglobular distal enlargement, which latter has a scattering subbasal whorl of curved setae and a similar circumfilum, the loops extending to the base of the following segment. Palpi; first segment short, subquadrate, the second stout, with a length over three times its diameter, the third a little longer, more slender, the fourth one fourth longer than the third. Mesonotum fuscous yellowish. Scutellum and postscutellum yellowish. Abdomen fuscous yellowish; genitalia darker. Wings hyaline, costa light brown, subcosta uniting therewith before the basal third, the third vein at the apex; fringe abundant. Halteres whitish transparent. Legs mostly pale yel-

lowish; claws long, slender, evenly curved, the pulvilli as long as the claws. Genitalia; basal clasp segment stout, truncate; terminal clasp segment rather stout, slightly tapering; dorsal plate short, deeply and triangularly emarginate, the lobes diverging, obliquely truncate and sparsely setose; ventral plate long, very deeply and roundly emarginate, the lobes long, slender, with a few coarse setae at the narrowly rounded apex; style short, stout.

Female. Length 1.5 mm. Antennae nearly as long as the body, rather thickly haired, fuscous yellowish, yellowish basally; 14 segments, the third greatly produced, with a length six times its diameter, the fifth subsessile, cylindric, with a length two and one half times its diameter, slightly constricted near the basal third, subbasal and subapical whorls rather thick, short, strongly curved; terminal segment somewhat produced, the apical fourth forming a broadly rounded knob. Mesonotum fuscous yellowish, the submedian lines sparsely haired. Scutellum and postscutellum fuscous yellowish. Abdomen a little lighter, the distal segments slightly fuscous. Halteres pale yellowish. Coxae, femora and tibiae mostly pale straw, the anterior and midtarsi fuscous yellowish, the posterior tarsi apparently pale yellowish. Ovipositor nearly as long as the body, the terminal lobes with a length six times their width, very slender, subacute apically and with a few coarse setae.

Life history. The delicate parent midges undoubtedly appear with the unfolding of the blossom buds or soon after, and the female deposits 7 to 10 or more eggs. These hatch quickly, the maggots develop rapidly and become full grown at about blossoming time. Infested blossom buds were very abundant in vineyards June 11, 1908, while a week or 10 days later the insects had practically disappeared. This indicates clearly that the period of larval existence is very short. The maggots or larvae either drop from the infested bud or fall with it and seek shelter in the ground, remaining in an earthen cocoon during the rest of the season and transforming to pupae the following spring. The few adults reared by us under artificial conditions appeared April 30, 1909. It is probable that those hibernating in the field do not emerge till much later, namely, early in June before the grapes are in bloom. There appears to be no reason for believing that this insect can subsist upon other vines than grape, unless it be the allied Virginia creeper. The extent of injury is undoubtedly influenced greatly by the time the midges appear, since if they fly in large numbers just as the blossom buds appear and the latter are therefore in a favorable condition for infestation, there is likely to be much more serious injury. This is probably the explanation of

the almost total destruction of the bloom in the acre of early Moore grapes noticed above. It is possible that this new American pest is an introduced species, brought to the Chautauqua region on recent importations of grape. It is to be hoped that it will not multiply greatly and become a serious menace to this important industry.

Remedial measures. Nothing very definite can be advised in the way of control measures. Clean culture, supplemented by liberal feeding, is the most hopeful method of avoiding serious injury, as we have yet to find this insect very abundant throughout large, well cultivated vineyards. Most of the infested clusters so far as our observation goes, occur near the outside of a vineyard in the vicinity of abundant natural shelters. The burning over of grassy headlands and margins of ditches in early spring could hardly cause much injury and might be of service in destroying the wandering maggots. The delicate parent insects would succumb readily to pyrethrum powder and presumably would be stupefied by heavy smoke. These insects fly mostly during the quieter part of the day and it might be practical, in the case of a badly infested vineyard, to watch for the appearance of the adults and then stupefy or destroy them by generating a heavy smudge throughout the vineyard. Attempts to control this midge by applications to the vines before the flies appear are very likely to result in failure.

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Gladioli aphid

Aphis gladioli n. sp.

The abundant occurrence of a plant louse upon gladioli bulbs is something unusual. No outbreak of the kind had been previously brought to our attention, and Dr L. O. Howard informs the writer that he is unable to find any record of an aphid occurring upon this showy plant. This new form of injury was first brought to

our attention last July, by the reception of a number of gladioli bulbs badly infested with plant lice, although they had been previously fumigated with sulfur. The insect must be exceedingly prolific, since one small box containing about a dozen bulbs had the interstices almost filled with exuviae and plant lice. The presence of large numbers of these insects injures the salability of the bulbs, since it weakens them materially and frequently results in a failure to bloom. This species has caused more or less trouble to some of our growers for the past two or three years, particularly in late winter. Examples of this plant louse were submitted to Mr Pergande, through Dr L. O. Howard, and by him pronounced to be an unknown species of aphis.

Description. The very young plant louse is about .75 mm long, pale yellowish or whitish transparent with an obscure subapical orange band on the abdomen. The antennae are slightly fuscous apically, the tip of the beak, the distal tarsal segments and the cornicles being fuscous; the eyes are black. The antennal segments in this stage have the following measurements: Third .21 mm, fourth .06 mm, fifth .141 mm. The cornicles are subcylindric, being .09 x .045 mm.

The partly full grown wingless female has the following antennal measurements. Third segment .195 mm, fourth .12 mm, fifth .085 mm, the sixth .415 mm, the cornicles being subcylindric, .135 x .06 mm.

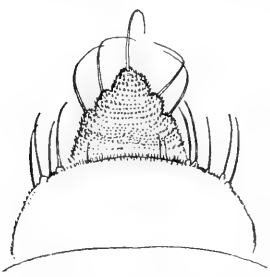

FIG. 6 Gladioli aphid, posterior extremity of wingless female, enlarged. (Original)

The full grown wingless female is rather stout, a pale yellowish white, the head dorsally, frequently having a distinct yellowish cast and the subapical abdominal segments a deeper yellowish cast on the venter. The apex of the third, fourth and fifth antennal segments and the apexes of the tibiae, tarsi and the beak are fuscous. The cornicles are light fuscous and the eyes black.

Winged female. Length 1.75 mm. This form is dark brown and yellowish, the antennae being mostly a fuscous yellowish, the head fuscous, the pronotal lobes a variable fuscous and separated from the mesonotum by a yellowish or deep orange area. The thorax has the median and two conspicuous submedian lobes fuscous. Scutellum fuscous, postscutellum light fuscous. Abdomen a variable yellowish orange and with a variable, oval, or sub-

quadrangular, fuscous area on the dorsum of the fourth, fifth, sixth and seventh segments. Cornicles fuscous and tapering slightly. Wings with a yellowish white stigma. Legs mostly a pale

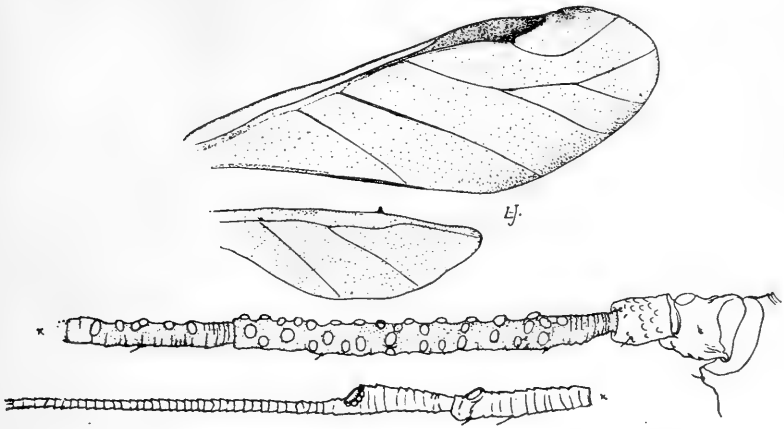

FIG. 7 Gladioli aphid, wings and antenna, much enlarged. (Original)

yellowish, the femora and tibiae apically and the tarsi fuscous. Venter of prothorax yellowish, the mesothorax with broad, angulate, fuscous sclerites ventrally. The abdomen ventrally yellowish and deep orange, the two apical segments narrowly margined mesially with fuscous. The antennal segments have the following measurements: The third .36 mm, the fourth .165 mm, the fifth .105 mm and the sixth .375 mm, the sensoria being very abundant on the third and fourth segments; cornicles .15 x .045 mm, tapering gradually.

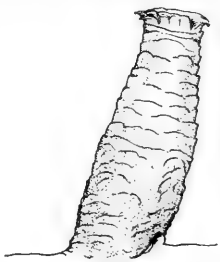

FIG. 8 Gladioli aphid, honey tube, enlarged. (Original)

Life history. Gladioli bulbs are kept by growers in large warehouses, the temperature being maintained at about 40 degrees throughout the winter. This insect is evidently unable to breed under these conditions. As spring advances and the house begins to warm up in March, the aphids appear in large numbers, reproducing so abundantly that the window frames and sills may become literally covered with wings and bodies of plant lice. It is comparatively easy, in a badly infested house, to sweep up a gill of wings and exuviae from under one window. This plant louse multiplies freely upon the bulbs, usually being massed around the origin of the roots and sometimes nearly covering the entire

under surface. Breeding evidently continues from some time in March until into July, with the production of numerous winged individuals the latter part of July, at least in the case of bulbs submitted for examination, though winged females undoubtedly occur earlier in the season under warehouse conditions. By July 28th winged females had entirely disappeared in our breeding cages, though young were still numerous on the bulbs; later, all disappeared. An investigation about the middle of August resulted in finding no living aphids in the storage warehouse or upon the plants in the field. It is stated that when digging in October a few plant lice may be found upon the bulbs. These evidently remain in a dormant condition till the house warms up in the spring as described above.

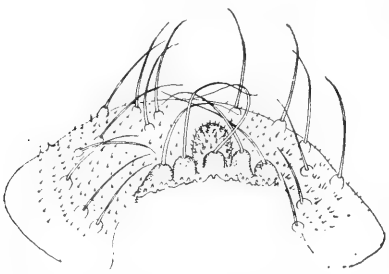

FIG. 9 Gladioli aphid, posterior extremity of young nymph, enlarged. (Original)

Remedies. Fumigation with sulfur has been found ineffective in controlling this species. It is more than probable that judicious fumigation with hydrocyanic acid gas would be entirely successful in controlling this pest. This might be accomplished by treating the entire house or by arranging for the fumigation of badly infested trays whenever necessary. The bulbs would probably not be injured by any strength of gas which would be harmless to ordinary growing plants, and it is probable that more gas could be used with safety. This point can be determined only by actual tests made preferably under warehouse conditions.

Green cockroach

Panchlora hyalina Saus.

Two specimens of this Central American form, kindly determined through the courtesy of Dr L. O. Howard, were brought to the office in March, each taken from a different section of Albany, N. Y. The occurrence of a single specimen would have little significance, as it might easily have been brought to the city upon fruit boats, but the finding of two in different sections is not so readily explained, particularly as we find records of this species having been taken in other parts of the country. The earliest record is that of a specimen being captured in a store in Boston

December 26, 1878, and is given on the authority of the late Dr Samuel Kneeland. Again in 1879 a female was found alive with numerous young in a house at Salem, Mass. In both of the above mentioned cases the insect was identified as Panchlora nivea Linn. A specimen was also taken by Dr Carl F. Gissler of Brooklyn, N. Y., September 21, 1890. It has also been recorded from Porto Rico.

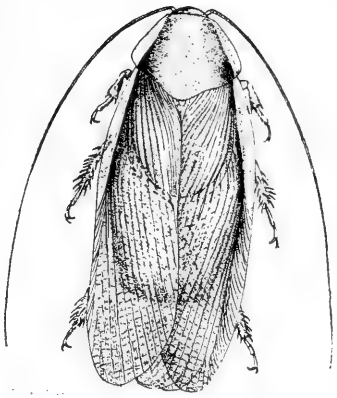

FIG. 10 Green cockroach, enlarged. (Original)

Description. This slender species is a rather fragile, light green, yellow margined form with the thinner portions of the wings transparent. It is nearly an inch long and has the long, slender, pale yellowish antennae characteristic of this group, the terminal segments of which are interesting, since they are strongly constricted at the base and thus subsessile. The legs and undersurface are pale yellowish green.

The young, as noted by Dr Howard, are light brown and are remarkable in that the body becomes broader posteriorly.

Life history and habits. This species, aside from being a tropical form, is particularly interesting because of its viviparous habits, most cockroaches producing large, characteristic oötheca. It is a tropical form and the abundance of constantly warm houses, not to mention greenhouses, should render it comparatively easy for this species to maintain itself in our climate, particularly when reinforced by frequent importations as appears to be the case at the present time. This or an allied form, according to Malcomb Burr, is occasionally found in Europe, being brought from South America.

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The typhoid or house fly and disease

Musca domestica Linn.

The house fly is such an extremely common species that description appears unnecessary. Dr Howard's investigations show that fully 98% of the flies in houses are ordinary house flies. A few others are associated with this dominant species. The stable fly, Stomoxys calcitrans Linn. may be rather abundant about houses in the fall and is responsible for the persistent belief that under certain conditions the house fly bites. Invariably the offender is this last named species, a form which presents an extremely close general resemblance to the house fly and may be dis-

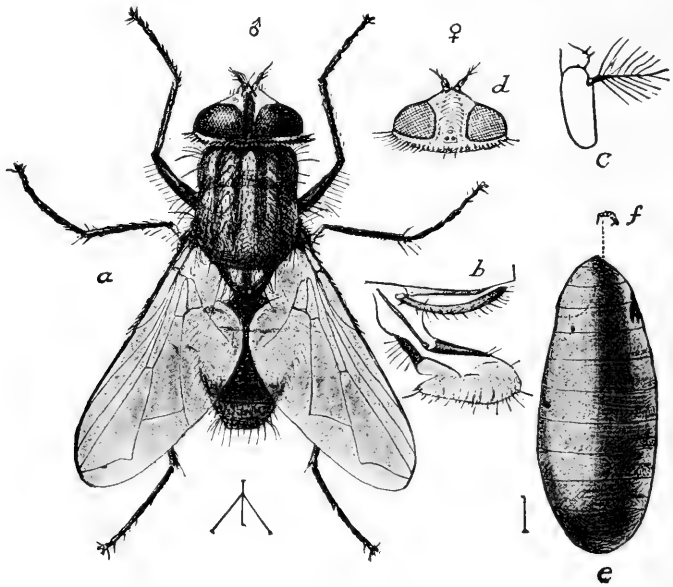

FIG. 11 Typhoid or house fly: *a*, male, seen from above; *b*, proboscis and palpus from the side; *c*, tip of the antenna; *d*, head of female; *e*, puparium; *f*, the anterior breathing-pore or spiracle, all enlarged. (After Howard & Marlatt, U. S. Dep't Agric. Div. Ent. Bul. 4. n. s. 1896)

tinguished therefrom at once by its bite. It occurs, as a rule, about the stable. Another fly liable to be abundant about houses in the fall is the cluster fly, Pollenia rudis Fabr., a species somewhat larger than the house fly and easily recognized by the yellowish hairs upon the thorax. The small, yellowish fruit fly, Drosophila ampelophia Loew, only about 1/8 inch long, is sometimes rather abundant in houses and is invariably found in association with overripe or decaying fruit. These

various species, although annoying and under certain conditions dangerous, sink into insignificance compared with the common house fly.

Habits. The house fly subsists entirely upon fluids taken up by means of the fleshy tongue. It apparently feeds with equal gusto upon fresh manure, decaying vegetable matter or the daintiest culinary preparations. This catholicity of taste frequently results in flies feeding greedily upon exposed discharges, in open vessels or poorly constructed privies, from patients suffering from typhoid fever or other grave intestinal diseases. The hairy legs are thus fouled with thousands of deadly bacilli and countless numbers of germs are swallowed. Shortly thereafter the same flies may appear in the house and incidentally contaminate the food, to the great peril of the consumer, with the germs adhering to the limbs and those deposited with undiminished virulence in the familiar fly specks. This, while disgusting and abhorrent to every sense of decency, occurs repeatedly in nature and is apparently ignored by the masses, despite the deadly peril incurred.

There is abundant evidence to show that this insect breeds by preference in horse manure, though it also occurs to a limited extent in cow manure and in miscellaneous collections of filth and specially decaying vegetable matter. The parent insects deposit their eggs upon manure and similar materials, the young maggots hatching therefrom in less than 24 hours and, under favorable conditions, completing their growth in five to seven days later. The maggots then transform to the oval, brown, resting or pupal stage, remaining therein from five to seven days. The life cycle is thus completed in 10 to 14 days, the shorter period being true of the warmer parts of the year, particularly in the vicinity of Washington, D. C. One fly may deposit about 120 eggs, and as there may be 10 to 12 generations in one season, it is not surprising that this insect should become extremely abundant by midsummer. Calculations show that under favorable conditions the descendants from one fly might at the end of a season reach the stupendous number of over 190 quintillion. Dr Howard's studies show that as many as 1200 house flies, in various stages, might be found in one pound of manure. At this rate, one good load of manure might produce two and a half million flies. Fortunately, breeding is confined to the warm months, only a few flies wintering in houses in a more or less dormant condition.

Flight and dissemination. This is something of great importance in view of the part flies may play in the spread of disease. The experiments of Dr L. O. Howard, Government Entomologist, have shown conclusively that the major portion of the flies about a building breed in the immediate vicinity, probably within 300 to 500 feet. There is no denying the fact that this insect is capable of flying considerable distances but ordinarily this does not seem to occur. There is another phase of this question which has apparently received little consideration, namely, the conveyance of flies by vehicles of one kind or another. Only a little observation is necessary to show that the butcher cart of the country is a very efficient carrier of flies, presumably receiving accessions and leaving individuals at almost every stopping place, even though the route traversed may occupy an entire day. The same is true, though to a more limited extent, of trolley cars and express cars carrying sacked meat or other supplies equally attractive to flies. It is only necessary for these carriers to load where conditions are favorable for the infection of flies and we may have a mysterious outbreak of disease at some distance from the source of trouble.

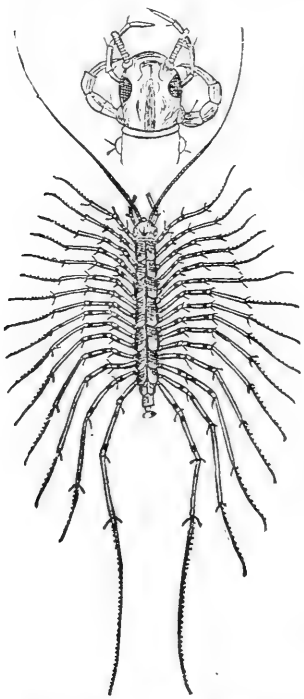

FIG. 12 House centipede; seen from above, enlarged, the head still more enlarged. (After Wood)

Natural enemies. The house fly, though so abundant, is subject to attack by various natural enemies. One of the most common is a fungous disease known as Empusa muscae which is occasionally responsible for the death of many flies, particularly toward the end of the summer. It is not uncommon to find a few individuals affected by this disease every year. A small, reddish mite may be occasionally found attached to flies, seriously weakening the host. There are, in addition, wasps and spiders which prey upon flies and undoubtedly are of considerable service though they are very rarely sufficiently abundant to materially reduce the numbers of this pest. Another interesting enemy of the house fly is known as the house centipede, Scutigera forceps Raf.,

a harmless species which, in recent years, has become well established in many houses in New York State. It is credited with preying on house flies, cockroaches and presumably other insect inhabitants of dwellings.

The house fly as a carrier of disease. The house fly is such a common insect that altogether too much has been taken for granted. Up to recently it has been considered simply as an inevitable nuisance. Later developments have shown that this insect may be an important factor in the dissemination of certain diseases.

Typhoid fever is one of the most serious ailments to which man is subject. There are about 250,000 cases of this disease annually in America, about 35,000 proving fatal. 60% of the deaths in the Franco-Prussian War and 30% of the deaths in the Boer War were caused by this disease. Positive statements have been made to the effect that the house fly was an active agent in the dissemination of this disease, while certain reputable physicians consider this charge unproved. The Spanish-American War, if it accomplished nothing else, called attention in a most forcible manner to the part flies might play in the dissemination of typhoid bacilli. Dr M. A. Veeder of Lyons writing in 1898 was very strongly of the opinion that the house fly was largely responsible for the dissemination of this disease in camps. Dr Walter Reed writing of an outbreak near Porto Principe in the annual report of the War Department states that the outbreak "was clearly not due to water infection but was transferred from the infected stools of patients to the food by means of flies, the conditions being especially favorable for this manner of dissemination." Dr L. O. Howard, writing in 1900 on the fauna of human excrement, quotes from Dr Vaughan, a member of the army typhoid commission, as follows:

27 Flies undoubtedly served as carriers of the infection.

My reasons for believing that flies were active in the dissemination of typhoid may be stated as follows:

a Flies swarmed over infected fecal matter in the pits and then visited and fed upon the food prepared for the soldiers at the mess tents. In some instances where lime had recently been sprinkled over the contents of the pits, flies with their feet whitened with lime were seen walking over the food.

b Officers whose mess tents were protected by means of screens suffered proportionately less from typhoid fever than did those whose tents were not so protected.

c Typhoid fever gradually disappeared in the fall of 1898, with the approach of cold weather, and the consequent disabling of the fly.

It is possible for the fly to carry the typhoid bacillus in two ways. In the first place fecal matter containing the typhoid germ may adhere to the fly and be mechanically transported. In the second place, it is possible that the typhoid bacillus may be carried in the digestive organs of the fly and may be deposited with its excrement.

Dr Alice Hamilton in 1903, studying the part played by the house fly in a recent epidemic of typhoid fever in Chicago which could not be explained wholly by the water supply nor on the grounds of poverty or ignorance of the inhabitants, captured flies in undrained privies, on the fences of yards, on the walls of two houses and in the room of a typhoid patient and used them to inoculate 18 tubes, from five of which the typhoid bacillus was isolated. She further found that many discharges from typhoid patients were left exposed in privies or yards, and concluded that flies might be an important adjunct in the dissemination of this infection. More recently, Dr Daniel D. Jackson investigating in 1907 the pollution of New York harbor, found that by far the greater number of cases occurred within a few blocks of the water front, the outbreak being most severe in the immediate vicinity of sewer outlets. He gives a series of charts showing an almost exact coincidence between the abundance of house flies and the occurrence of typhoid fever, when the dates are set back two months to correspond to the time at which the disease was contracted. The bacilli of typhoid fever were found by Ficker in the dejecta of house flies 23 days after feeding, while Hamer records the presence of this bacillus in flies during a period of two weeks. Most significant of all, it should be noted that competent physicians in position to make extended observations upon this disease and the methods by which it may become disseminated, are most strongly of the opinion that under certain conditions at least, the fly is a most important factor. Epidemics spread by flies, according to Dr Veeder, tend to follow the directions of prevailing warm winds. He considers flies the chief medium of conveyance in villages and camps where shallow, open closets are used, thus affording the insects free access to infected material, and where it is possible to eliminate water and milk as the sources of infection. Drs Sedgwick and Winslow, writing in 1903 state that "the three great means

for the transmission of typhoid fever are fingers, food and flies," the authors holding the last to be the most important.

The possibilities of transmitting typhoid fever are appalling to the layman when it is remembered that the germs of this disease may be in the system several weeks before diagnosis is possible, continue in numbers six to eight weeks after apparent recovery and in exceptional cases may be discharged from the system during a period of several years. There are authentic records of a patient distributing these germs for 17 years and being the incipient cause of 13 cases during 14 years of that period. Furthermore, Dr M. A. Veeder of Lyons cites a case where typhoid fever was perpetuated from year to year in a locality, ascribing it to a physician recommending the burial of all typhoid excreta and the execution of this direction by a favorite nurse. It is well known that soil infected by these germs may be the origin of new cases, and Dr Veeder significantly observes that the annual recurrence of typhoid fever in the above mentioned locality ceased with the death of the two parties mentioned above and a change in the method of disposing of typhoid discharges.

The evidence against this insect may therefore be summed up briefly as follows: Virulent typhoid bacilli have been found upon the legs and within the body of this insect, persisting in the latter case for 23 days. A number of serious outbreaks have been observed by competent physicians, where infection through a common water or food supply did not satisfactorily explain the outbreak. This positive evidence, while not establishing beyond all question the culpability of the fly, is further supported by the opinion of a number of reputable physicians who have had extensive experience with outbreaks of this character.

The evidence showing that flies may play an important part in the diffusion of cholera is, according to Dr Nuttall, absolutely convincing. He cites experiments showing that cholera bacilli may be found on flies in large numbers, while they may occur in the dejecta within 17 hours after feeding and as late as four days. Infected flies have been given access to milk and cholera cultures made therefrom.

Typhoid fever and cholera, while both serious infections, are by no means the only diseases which may be conveyed by flies. Certain forms of diarrhoea and enteritis are undoubtedly due to specific germs, and there is no reason why the bacilli causing these infections may not be carried as easily and in the same way as

those responsible for typhoid fever. The monthly bulletin of the New York State Department of Health for October 1908, states that during 1907 there were in New York State 37,370 deaths of infants under 2 years of age, 9213 being due to diarrhoea and enteritis. Careful investigators, it is stated, have placed the proportion of deaths between bottle-fed and breast-fed babies as 25 to 1. Physicians recognize the necessity of providing pure milk for young children, and in most instances it is comparatively easy to see how flies might be responsible for the major portion of the infections, since they usually occur in numbers about stables, in the vicinity of milk houses, in the neighborhood of milk stations, on milk wagons and, in fact, are found in greater or less numbers wherever milk is stored, excepting in refrigerators and similar places. Martin states that each succeeding year confirms his observation of 1898 to the effect that the annual epidemic of diarrhoea and typhoid is connected with the appearance of the common house fly, while Nash, in the *Lancet,* records no mortality from diarrhoea among infants at Southend during July and August 1902, this immunity being accompanied by the almost complete absence of the house fly. This insect was abundant in that locality in September and coincidently epidemic diarrhoea developed. Sandilands, in the *Journal of Hygiene,* states that the great majority of cases of diarrhoea are due to the consumption of infected food, and suggests that the seasonal incidence of diarrhoea coincides with and results from the seasonal prevalence of flies. Dr Jackson records several epidemics of a malignant type of dysentery radiating from a single point and disappearing entirely when proper disinfection of closets was enforced.

The evil possibilities of the fly are by no means exhausted in the above recital. It is well known that flies feed upon sputum. Experiments by Lord recorded in the *Boston Medical and Surgical Journal* show that flies may ingest tubercular sputum and excrete tubercular bacilli, the virulence of which may last for at least 15 days. He considers the danger of human infection from this source to lie in the ingestion of fly specks on food, and suggests that during the fly season great attention should be paid to the screening of rooms and hospital wards containing patients with tuberculosis and laboratories where tubercular material is examined.

Nuttall considers that the evidence previously submitted proves that the house fly may carry about and deposit anthrax bacilli,

though there may be a question as to how generally flies are responsible for the dissemination of this disease. Parke admits the possibilities of flies distributing, in addition to those mentioned above, plague, trachoma, septicemia, erysipelas and leprosy. Furthermore, there are those who would hold flies responsible for the more frequent new cases which occur in the zone immediately surrounding the smallpox hospital and which may be due either to the wafting out of infected particles or their carriage by flies. The latter is considered the more probable. Howe, according to the statement of Dr Howard, has demonstrated that the purulent conjunctivitis of the Egyptians is spread by the house fly. The experiments of Grassi show that the eggs of Taenia, Trichocephalus and Oxyuris pass uninjured through the alimentary tract of flies.

Sanitary and control measures. It is perhaps needless to add, in view of the foregoing, that the greatest care should be taken to exclude flies from the sick room, especially in the case of contagious diseases. The flies are not only annoying to the patient but may aid in carrying the disease to others. The proper disposal of infected discharges such as those from typhoid patients should never be neglected. Vessels which have contained any such material should be thoroughly cleaned and never left where flies may gain access to the infection.

All food, particularly that eaten without cooking, should be carefully protected from flies by the use of screens. This is especially true of milk, since it affords a favorable medium for the multiplication of certain disease germs. This applies to dealers in food supplies as well as to the home. An important step toward better sanitation would be taken if the public refused to patronize stores and eating places overrun by flies.

A large reduction in the number of house flies found in most places is thoroughly practical. This end can be best attained by doing away with conditions favorable to the unrestricted multiplication of this pest. The first step is to prevent flies from breeding in horse manure and other waste products from the stable. All manure should be placed in a fly proof receptacle or the accumulation treated daily with small quantities of chlorid of lime. If all manure is removed from the stable at intervals of three days and spread upon the field, there will be comparatively little breeding. Some one of these measures can be applied to every stable in cities and villages. The farmer, if unable to carry out any of the

preceding suggestions, will find a large measure of relief from the fly nuisance, if the manure is stored in tight, practically fly proof cellars, such as can be easily constructed with the modern concrete foundation. Flies breed but little in darkness, and the writer has known of barns comparatively free from flies, simply because the manure was stored in the darker parts of a large barn cellar.

The treatment of manure described above should be supplemented by care in preventing the accumulation about the premises, of decaying organic matter such as fruit, table scraps, etc. Swill barrels should always be provided with tight covers and care exercised that there be no leakage or an accumulation of fly-breeding material about the barrel. The old-fashioned box privy should be abolished unless the same be conducted on the earth closet principle and the contents kept covered with lime or dry earth, so as to prevent both the breeding and infection of flies. The modern water-closet is by far the best and safest solution of this last named difficulty. The presence of numerous flies about the dwelling may be construed as indicating a nearby, usually easily eliminated breeding place.

It will be found in practice that some flies are very apt to exist in a neighborhood even after the adoption of rigid precautions. They should be kept out of houses, so far as possible, by the use of window and door screens, supplemented by the employment of Tanglefoot or other sticky fly paper. This, though somewhat disagreeable, is much to be preferred to the use of poisonous preparations which are likely to result in dead flies dropping into food. Prof. C. P. Lounsbury, Government Entomologist of South Africa, suggests, in addition to the above, putting fresh pyrethrum powder upon window sills and supplementing this by the judicious use of an insect net.

Bibliography

The following bibliography comprises most of the more important literature relating to the life history and habits of the house fly and its part in the dissemination of various diseases affecting man.

1869 **Packard, A. S.** Am. Nat. 2:638–40

Observations on the anatomy and life history.

1873 ——— On the Transformations of the Common House Fly, with Notes on Allied Forms. Bost. Soc. Nat. Hist. Proc. 16:136–50.

A detailed account of the life history and of the anatomy of the early stages, with brief notices of allied species.

1876 ——— The House Fly. Am. Nat. 10:476–80

Observations on the life history and habits.

1883 **Harrington, W. H.** House Flies. Ent. Soc. Ont. Rep't. 1882. p. 38–44

A somewhat extended discussion with quotations from Packard and other authorities.

1884 **E. P. W.** Dangers from Flies. Nature, 29:482–83

Abstract of a note by Dr B. Grassi in which he calls attention to flies occurring upon various pathogenic materials and conveying germs to receptive membranous surfaces. Ophthalmia is noted as an Egyptian complaint, very probably carried by flies. Grassi's experiments show that flies may ingest and pass unharmed, eggs of a human parasite (Trichocephalus) and probably of the tapeworm (Taenia solium).

1884 **Riley, C. V.** Am. Nat. 18:1267–68

Note on Grassi's experiments showing that flies are agents in the diffusion of infectious maladies, epidemics and even parasitic diseases and recording the ingestion and passage of Trichocephalus eggs and also of alcoholic eggs of Taenia solium.

1887 ——— The Plymouth Typhoid Epidemic. Science, 10:214

Gives the mortality figures of the outbreak in 1885 and cites an instance "in which the disease seems to have been transmitted through the air." The first case, that of a stranger, occurred in a hotel, the discharges being thrown without treatment into a water-closet which communicated with a room only 3 feet distant in which the landlord's daughters slept. The drinking water of the place was good and the three cases following the first were in all probability due to germs transmitted by flies.

1887 **Fyles, Thomas W.** Insects Troublesome in the Household and How to Deal with Them. Ent. Soc. Ont. 17th Rep't, p. 33-34

A summarized biologic account.

1890 **Aaron, C. B.** In Dragon Flies *vs.* Mosquitos, p. 37–42, 53–54

A brief discussion of the life history and habits with observations on the house fly as a carrier of disease.

1890 **Beutenmueller, William.** In Dragon Flies *vs.* Mosquitos, p. 123–24

Brief observations on the habits of the house fly and the possibility of controlling the insect.

1890 **Weeks, A. C.** In Dragon Flies *vs.* Mosquitos, p. 81–84

Brief notice of habits of the house fly with frequent references to associated species.

1891 **Marlatt, C. L.** Insect Life, 4:152–53

Records unusual mortality among flies in Washington caused by Empusa Americana Thax.

1892 **Power, Henry.** Conjunctivitis Set Up By Flies. Brit. Med. Jour. Nov. 19, p. 1114

Records the severe inflammation of the conjunctiva accompanied by extensive corneal ulceration within 24 hours after having been stung in the eye by a fly which had apparently risen from a dung hill. The case was marked by general prostration and feebleness for months after. Another case was recorded, diphtherial in nature, after a fly had gotten into a man's eye. [The first case can hardly be attributed to a house fly.]

1894 **Skinner, Henry.** Ent. News, 5:18

Surgeon General Sir William Moore is quoted as reporting an instance where anthrax was spread by flies from the unburied carcass of a dog. It is also noted that the greatest abundance of flies in India is coincident with cholera outbreaks. It is suggested that leprosy is often conveyed by flies. Ophthalmia is thus disseminated. [These notes may not all apply to the house fly.]

1896 **Aylett, W. R.** Am. Microscopical Jour. 18:288

Summary of Dr Aylett's experiments showing that flies ingest and pass tubercular bacilli.

1896 **Lugger, Otto.** Entomologist, Minn. State Exp. Sta. 2d Rep't, p. 145–55

A somewhat extended account of the life history and habits of the house fly. The opinion is expressed that the larvae may be beneficial because they breed in and destroy material which might produce pathogenic germs, though attention is called to the probability of flies carrying cholera and gangrene.

1896 **Howard, L. O. & Marlatt, C. L.** U. S. Dep't Agric. Div. Ent. Bul. 4. n. s. p. 43–47

A summarized gene ral account of the house fly with mention of several associated species Preventive measures are discussed briefly.

1896 **Osborn, Herbert.** U. S. Dep't Agric. Div. Ent. Bul. 5. n. s., p. 19–20

Refers to opinions in which flies are held to be the authors or probable carriers in epidemics of anthrax, cholera, typhoid fever, phthisis, leprosy and ophthalmia.

1896 **Sibthorpe, E. H.** Cholera and Flies. Brit. Med. Jour. Sept. p. 700

Flies are considered as scavengers not conveyers of cholera. An outbreak of disease occurred in a native regiment and on each occasion after leaving an old camp for a new, a recrudescence occurred. This was attributed to leaving flies behind; when they followed and mustered in force the disease abated.

1897 **Buchanan, W. J.** Cholera Diffusion by Flies. Indian Med. Gazette, 3:86–87

Gives details respecting a cholera outbreak in a jail, stating that all prisoners affected fed in the corner of the jail near infected huts, whereas those eating in the opposite hospital corner, diagonally across, escaped the malady. This data was considered sufficient to indicate the fly as a very probable carrier of the contagion.

1898 **Howard, L. O.** House Flies. U. S. Dep't Agric. Div. Ent. Cir. 35, ser. 2, p. 1–8

A summarized account of the life history of this insect, with a discussion of remedial measures.

1898 ———— Further Notes on the House Fly. U. S. Dept. Agric. Div. Ent. Bul. 10. n. s. p. 63–65

Gives details of experiments with applications of air-slaked lime, land plaster, gas lime, chlorid of lime and kerosene to horse manure, the treatment with kerosene and chlorid of lime being advised. Data on the abundance of larvae and puparia in manure are also given.

1898 **Veeder, M. A.** Flies as spreaders of sickness in camps. Med. Record, 54:429–30

Records flies feeding upon typhoid excreta and passing from that to food supplies. Bacterial cultures were made from both fly tracks and fly excreta.

1899 **Howard, L. O.** The Economic Status of Insects as a Class. Science, 32:233–47

It is stated on page 237 that purulent conjunctivitis of the Egyptians is spread by the house fly, while anthrax bacilli may be conveyed by the bite of Tabanus or Stomoxys. The house fly is mentioned as a probable carrier of typhoid fever.

1899 **Hutt, H. L.** Ent. Soc. Ont. 29th Rep't. 1898. p. 99–100

A summarized account of the life history and habits of the house fly, with mention of a few associated species.

1899 **Nuttall, G. H. F.** On the Role of Insects, Arachnids and Myriapods as Carriers in the Spread of Bacterial and Parasitic Diseases of Man and Animals, a Critical and Historical Study. Johns Hopkins Hosp. Rep't, 8:1–152

Concludes that the evidence that flies transmit anthrax is not above question. Grants that flies are important agents in conveying cholera and assumes that the evidence relating to the dissemination of this disease could safely be applied to typhoid fever. Flies ingest and pass tubercular bacilli. An exhaustive examination of the evidence relating to the dissemination of a number of diseases. An extended bibliography is given.

1899 **Reed, Walter.** War Dep't An. Rep't, p. 627–33

Major Reed reporting on the local epidemics of typhoid fever in the 8th cavalry and 15th infantry encamped near Porto Principe in February and March 1899, after detailing the conditions existing in the camps, states that the outbreak " was clearly not due to water infection, but was transferred from the infected stools of patients to the food by means of flies, the conditions being especially favorable for this manner of dissemination."

1899 **Veeder, M. A.** The Relative Importance of Flies and Water Supply in Spreading Disease. Med. Record, 55:10–12

Flies are responsible for such typhoid and other intestinal diseases as occur in small neighborhood epidemics extending in short leaps from house to house, without reference to water supply or anything else in common. Epidemics spread by flies tend to follow the directions of prevailing warm winds. In villages and camps where shallow open closets are used, giving free access of flies to the chief source of infection, the flies are the most important carriers. These diseases are therefore usually fly-borne in villages and camps. The burial of typhoid infected matter in the ground is no protection against flies. On the contrary it actually perpetuates it in the locality from year to year.

1900 **Howard, L. O.** A Contribution to the Study of the Insect Fauna of Human Excrement. Wash. Acad. Sci. Proc. 2:541–600

A detailed study of the insects breeding in human excrement, with special reference to the house fly and its part in disseminating typhoid fever. Unquestioned evidence is submitted to show that this insect may breed in human excrement, and the following conclusions from a paper read by Dr Vaughan before the American Medical Association at Atlantic City, N. J. June 6, 1900, are quoted.

27 Flies undoubtedly served as carriers of the infection.

My reasons for believing that flies were active in the dissemination of typhoid may be stated as follows:

a Flies swarmed over infected fecal matter in the pits and then visited and fed upon the food prepared for the soldiers at the mess tents. In some instances where lime had recently been sprinkled over the contents of the pits, flies with their feet whitened with lime were seen walking over the food.

b Officers whose mess tents were protected by means of screens suffered proportionately less from typhoid fever than did those whose tents were not so protected.

c Typhoid fever gradually disappeared in the fall of 1898, with the approach of cold weather, and the consequent disabling of the fly.

It is possible for the fly to carry the typhoid bacillus in two ways. In the first place fecal matter containing the typhoid germ may adhere to the fly and be mechanically transported. In the second place, it is possible that the typhoid bacillus may be carried in the digestive organs of the fly and may be deposited with its excrement.

1900 **Reed, Walter, Vaughan, V. C., & Shakespeare, E. O.** Abstract of Report on the Origin and Spread of Typhoid Fever in the U. S. Military Camps During the Spanish War of 1898. Washington, Government Printing Office

1901 **Fletcher, James.** Can. Ent. 33:84–88

A review of Dr Howard's paper entitled: *A Contribution to the Study of the Insect Fauna of Human Excrement*, and giving the more important conclusions resulting from the investigation.

1901 **Howard, L. O.** The Carriage of Disease by Flies. U. S. Dep't Agric. Div. Ent. Bul. 30. n. s. p. 39–45

A discussion of the house fly and associated species as carriers of disease, with a consideration of protective measures. It is assumed that the fly was responsible in a large measure for the typhoid outbreak in the army camps during the late Spanish-American War.

1902 **Ehrhorn, Edward M.** Insects as Distributors of Human Diseases. Cal. State Bd Hort. 8th Biennial Rep't, 1901–2, p. 103–14

The life history and methods of controlling the house fly are briefly discussed on pages 111–12. It is considered an active agent in the dissemination of typhoid fever.

1902 **Firth, R. H. & Horrocks, W. H.** An Inquiry into the Influence of Soil, Fabrics and Flies in the Dissemination of Enteric Infection. Brit. Med. Jour. no. 2178, p. 936–43

An extended discussion with the conclusion that house flies, Musca domestica, can convey enteric infective matter from specific excreta or other polluted material to objects on which they may walk, rest or feed, and that enteric bacilli pass through the digestive tract of the fly.

1902 **Howard, L. O.** Insects as Carriers and Spreaders of Disease. U. S. Dep't Agric. Year Book, 1901, p. 177–92

The life history of the house fly and methods of controlling it and at the same time o preventing the dissemination of typhoid fever by means of flies is given on pages 185–88.

1902 **Lounsbury, C. P.** Agric. Jour. (South Africa) Jan. 30, repr. p. 1–10

A detailed account of the house fly with a discussion of repressive measures. It is stated that medical men in India firmly believe that cholera is very frequently transmitted by the house fly, though typhoid or enteric fever is considered the most important disease conveyed by this insect. It is stated that an American zoologist found that fly maggots, genus Musca (species not stated), will devour the common round worm eggs and that the eggs of the latter are passed off alive in the excreta of the winged adults.

1902 **Veeder, M. A.** Typhoid Fever From Sources Other Than Water Supply. Med. Record, 62:121–24

A case is cited where typhoid was perpetuated from year to year, the continuation of the trouble being ascribed to a physician recommending the burial of typhoid excreta and its execution by a nurse. The death of these two parties was followed by a change in the disposal of typhoid infected material and the practical disappearance of the disease. A typhoid outbreak in the Spanish-American War, occurring in a company of the best and most intelligent men, is charged to improper sanitary regulations, actuated by kindliness on the part of comrades. Data is also given respecting a picnic ground where unsanitary conditions prevailed and have undoubtedly been responsible for a number of typhoid cases, through the agency of the house fly.

1903 **Geddings, H. D.** The Fly and Mosquito as Carriers of Disease. Ohio Sanitary Bul. 7:31–39

Recommends the employment of every possible means to prevent the multiplication of flies and the infection by them of kitchens and messing places.

1903 **Hamilton, Alice.** The Fly as a Carrier of Typhoid. Am. Med. Ass'n Jour. 40:576–83

A detailed study of a typhoid outbreak in Chicago. She states that Majors Firth and Horrocks succeeded in proving that flies feeding on typhoid infected material could carry the same to suitable cultural mediums. The following are her conclusions:

1 The epidemic of typhoid fever in Chicago during July, August, September and October of 1902 was most severe in the 19th ward which, with 1-36 of the city's population, had over 1-7 of all the deaths from this disease.

2 A concentration of the epidemic in this locality can not be explained by contamination of the drinking water, or of food, or on the ground of ignorance and poverty of the inhabitants, for the 19th ward does not differ in these respects from several other parts of the city.

3 An investigation of the sanitary conditions of this region shows that many of the street sewers are too small and that only 48% of the houses have sanitary plumbing. Of the remaining 52%, 7% have defective plumbing, 22% water-closets with intermittent water supply, 11% have privies connected with the sewer but without water supply and 12% have privies with no sewer connection.

4 The streets in which the sanitary arrangements are the worst had the largest number of cases of typhoid fever during this epidemic, irrespective of poverty of the inhabitants.

5 Flies caught in two undrained privies, on the fences of two yards, on the walls of two houses and in the room of a typhoid patient, were used to inoculate 18 tubes and from five of these tubes the typhoid bacillus was isolated.

6 Many discharges from typhoid patients are left exposed in privies or yards and flies may be an important adjunct in the dissemination of the typhoid infection.

1903 **Martin, A. W.** Flies in Relation to Typhoid Fever and Summer Diarrhoea. Public Health, 15:652–53

Each succeeding year confirms my observation in 1898, that the annual epidemic of diarrhoea and of typhoid is connected with the appearance of the common house fly. . . . The annual epidemic of these two diseases begins and ends with the appearance and disappearance of the domestic fly.

1903 **Nash, J. T. C.** The Etiology of Summer Diarrhoea. The Lancet, 164:330

Records no mortality from diarrhoea among infants at Southend during July and August 1902, this immunity being accompanied by the almost complete absence of the house fly. In September the fly made its appearance and coincidentally, epidemic diarrhoea. The year preceding had 23 deaths during this period.

1904 **Hayward, E. H.** The Fly as a Carrier of Tuberculosis Infection. N. Y. Med. Jour. 80:643–44

Flies feeding on tuberculous sputum in six hours passed tubercular bacilli unimpaired

1904 **Lord, F. T.** Flies and Tuberculosis. Bost. Med. & Surg. Jour. 151:651–54

The experiments show

1 Flies may ingest tubercular sputum and excrete tubercle bacilli, the virulence of which may last for at least 15 days.

2 The danger of human infection from tubercular fly specks is by the ingestion of the specks on food. Spontaneous liberation of tubercular bacilli from fly specks is unlikely (experiment B), if mechanically disturbed infection of the surrounding air may occur. As a corollary to these conclusions it is suggested that

3 Tubercular material (sputum, pus from discharging sinuses, fecal matter from patients with intestinal tuberculosis) should be carefully protected from flies lest they act as disseminators of the tubercular bacilli.

4 During the fly season greater attention should be paid to the screening of rooms and hospital wards containing patients with tuberculosis, and laboratories where tubercular material is examined.

5 As these precautions would not eliminate fly infection by patients at large, food stuffs should be protected from flies who may already have ingested tubercular material.

1905 **Cobb, J. O.** Is the Common House Fly a Factor in the Spread of Tuberculosis? Am. Med. 9:475–77

Refers to experiments by Hayward and Hoffman showing that tubercle bacilli can be ingested and discharged by the house fly with undiminished virulence. He holds that the bacilli may enter the system through the digestive tract rather than by the lungs. He calls attention to the universal prevalence of house flies about stores of all kinds dealing in human foods, and states that here we have a most prolific source of infection. He claims to have collected reliable data from all over the world on this point. He states that army medical officers from the Philippines find that cholera was continually spread by street venders and small shopkeepers.

1905 **Melander, A. L.** The Common House Fly a Dangerous Pest. Wash. Agric. Exp. Sta. Press Bul. p. 1–7

A summarized account of the life history, habits and methods of control.

1905 **Mays, Thomas J.** The Fly and Tuberculosis. N. Y. Med. Jour. & Phila. Med. Jour. 82:437–38

Unreservedly condemns the article of J. O. Cobb on the dissemination of tuberculosis by the house fly, claiming that his data is far from conclusive.

1905 **Ward, Henry B.** The Relations of Animals to Disease. Science, 45:194–95

The spread of typhoid germs by flies is accepted and the reported conveyance by this insect, of cholera, anthrax, septicemia, pyemia, erysipelas, tuberculosis and bubonic plague is noted, some being regarded as well proved and others as open to question. Mention is made of Grassi's experiments in which the eggs of both tapeworms and round worms, Taenia solium, Oxyuris and Trichuris were sucked up by flies and recovered unaltered from their dejecta.

1906 **Howard, L. O.** House Flies U. S. Dep't Agric. Bur. Ent. Cir. 7, p. 1–9

A summarized discussion of the house fly and other species associated therewith, with particular reference to remedial measures.

1906 **Sandilands, J. E.** Epidemic Diarrhoea and the Bacterial Content of Food. Jour. Hygiene, 6:77–92

Important conclusions:

4 The great majority of cases of diarrhoea are due to the consumption of food which has been infected in the district in which the cases have occurred.

5 The infected matter thus conveyed to food is generally the excrement of some person suffering from diarrhoea.

6 The life history of house flies and the facility with which they can convey the fecal excrement of infected infants to the food of the healthy, suggests that the seasonal incidence of diarrhoea coincides with, and results from the seasonal prevalence of flies.

1907 ———— Method of Transmission of Contagious Diseases. N. Y. State Dep't Health. Mo. Bul. August, p. 11–13

An abstract of a circular issued by the Public Health Department of France, flies being credited with disseminating typhoid fever, tuberculosis, cholera, etc.

1907 **Buchanan, R. A., Glasg, M. B. & Glasg, F. F. P. S.** The Carriage of Infection by Flies. Lancet, 173:216–18

An illustrated account with the following conclusions: The experiments conclusively show that flies alighting on any substances containing pathogenic organisms are capable of carrying away these organisms in large numbers on their feet and of depositing them in a gradually diminishing number on surface after surface with which they come in contact. They further serve to demonstrate the necessity for the exercise of stringent measures for preventing access of flies to all sources of infection and to protect food of all kinds against flies alighting on it.

1907 **Dickinson, G. K.** The House Fly and its Connection with Disease Dissemination. Med. Record, 71:134–39

An extended summarized statement with bibliography.

1907 **Hewitt, C. Gordon.** On the Bionomics of Certain Calyptrate Muscidae and their Economic Significance, with Special Reference to Flies Inhabiting Houses. Jour. Econ. Biol. 2:79–88

The house fly is briefly treated on pages 83–86.

1907 **M'Vail, John C.** The Prevention of Infectious Diseases, p. 61, 66–67

The part flies play in the spread of typhoid or enteric fever is assumed and preventive measures described.

1907 **Preston, C. H.** Insect Carriers of Infection. Pub. by Contemporary Club, Davenport, Ia. p. 20–21

The fly is charged with carrying germs of typhoid fever, tuberculosis, dysentery, etc.

1908 **Bruner, Lawrence.** The House Fly. [Neb.] State Ent. Cir. 10, p. 1–4

A summarized account.

1908 **Frost, W. & Vorhees, C. T.** The House Fly Nuisance. Country Life in America, May

1908 ——— Fighting the House Fly. North Carolina State Board of Health Bulletin. Reprint from Country Life in America

A general account.

1908 **Hamer, W. H.** Nuisance from Flies. London County Council Rep't, No. 1138, p. 1–10

Observations on flies, with special reference to their development in horse manure, their occurrence about stables and similar places, and their relation to diarrhoea.

1908 ——— Nuisance from Flies. London County Council Rep t, No. 1207, p. 1–6

Further observations, with remarks on behavior of Homalomyia, Musca and Stomoxys, and additional observations on flies and diarrhoea.

1908 ——— The Breeding of Flies. Summarized. Am. Med. 3:431

The breeding of flies in horse manure, collection of dust and other refuse confirmed. Children, dirty walls and ceilings and particles of food on the floor and in sinks are attractive to flies. Laboratory experiments demonstrate that flies may carry the typhoid bacillus in a living condition for over two weeks. They also disseminate the germs of zymotic diarrhoea and Asiatic cholera. Tubercle bacilli have been found alive in the intestinal tract of the house fly.

1908 **Hewitt, C. Gordon.** The Biology of House Flies in Relation to Public Health. Royal Inst. Public Health Jour. Oct. Separate p. 1–15

1908 **Howard, L. O.** How Insects Affect Health in Rural Districts. U. S. Dep't Agric. Farmers' Bul. 155, p. 1–19

The house fly is characterized as the principal insect agent in the spread of typhoid fever.

1908 **Jackson, Daniel D.** Pollution of New York Harbor as a Menace to Health by the Dissemination of Intestinal Diseases through the Agency of the Common House Fly. Pub. by the Merchants' Ass'n, p. 1–22

A detailed examination of local conditions showing that by far the greater number of cases of typhoid fever in 1907 occurred within a few blocks of the water front, the outbreaks being most severe in the immediate vicinity of sewer outlets. The same was also found true of deaths resulting from intestinal diseases. Charts are given showing an almost exact coincidence between deaths from the latter and the prevalence of the house fly. The same is shown to be true of typhoid fever when the dates are set back two months to correspond to the time at which the disease was contracted. Several epidemics of dysentery of a malignant type have been known to radiate from a single point and to entirely disappear when proper disinfection of closets was enforced. On several occasions local epidemics of typhoid fever were traced to transmission by flies.

1908 ——— Conveyance of Disease by Flies. Summarized. Bost. Med. & Surg. Jour. 159:451

Reports that he finds that the relation between the number of flies captured and the number of deaths reported are substantially the same as in 1907. A notable decrease in mortality this summer corresponded with catching a much smaller number of flies. Dr Jackson finds on 18 swill barrel flies 18,800,000 bacteria or over 1,000,000 to each fly.

1908 **N. Y. State Dep't Health.** Mo. Bul. October, p. 259–83

Summary of International Congress on Tuberculosis, page 284, Mortality Statistics of Infants.

1908 **The House Fly.** Cur. Med. Lit. 50:1656

Summary of Newstead's report. Flies breed in horse manure, a mixture of this with cow dung, fermenting hops, ash pits containing fermenting vegetable matter and all temporary collections of fermenting matter. They feed on most decaying vegetable matter, manure and particularly human, rotten flock beds, straw mattresses, old cotton garments and sacks and waste paper, bread, fruits and vegetables and excreta of animals generally.

1908 **Robertson, Alexander.** Flies as Carriers of Contagion in Yaws (Framboesia tropica). Trop. Med. & Hyg. Jour. 11:213

Experiments show that flies may carry the virus of yaws.

1908 **Smith, Theobald.** The House Fly as an Agent in the Dissemination of Infectious Diseases. Amer. Jour. of Public Hygiene, August, p. 312–17

Summary discussion.

1908 **Theiss, Mary B. & Louis E.** An Advance Agent of Death. Good Housekeeping, May

1908 **Wilcox, E. V.** Fighting the House Fly. Country Life in America, May

Discussion of repressive measures.

1908 ———— House Flies. Florida Health Notes, May

Brief general notice.

1909 **Davis, Dora.** Hops and Flies. The Christian Advocate, June 17, 1909, 84:954

Immunity from flies is believed to have been secured by shading porch and open windows with hop vines.

1909 **Felt, E. P.** The Economic Status of the House Fly. Econ. Ent. Jour. 2:39–44

A general discussion of the fly as a disease carrier.

1909 ———— Control of Household Insects. N. Y. State Mus. Bul. 129, p. 7–11

A summarized account.

1909 **Griffith, A.** The Life History of House Flies. Public Health, 21:122-27

Biologic studies and observations on the house fly.

1909 **Howard, L. O.** Economic Loss to the People of the United States through Insects that Carry Disease. U. S. Dep't. Agric. Bur. Ent. Bul. 78:23–36

A general summary of the losses caused by disease-carrying insects.

1909 **Metcalf, Z. P.** The House Fly. N. C. Dep't Agric. Ent. Cir. 25, p. 1–8

A summary account with special reference to control measures.

1909 **Smith, Theobald.** The House Fly as an Agent in the Dissemination of Infectious Diseases. Amer. Health Mag. May, 2:38–39

1909 ———— The House Fly at the Bar. Merchants Ass'n, New York, p. 1–48

A resumè of the evidence against the house fly, consisting of letters from health officers and others interested in sanitation, and with short articles or excerpts from publications by Dr D. D. Jackson, Dr L. O. Howard, Dr Alice Hamilton, Dr J. B. Huber, Prof. W. L. Underwood and others. There is also a brief bibliography.

NOTES FOR THE YEAR

A number of insects have been brought to attention during the past season. Some of the more important outbreaks are noticed in the following paragraph. The large, greenish caterpillar of the imperial moth, Basilona imperialis Drury, was unusually abundant during August and September, and on Staten Island it was credited with being somewhat injurious. Ordinarily this species is so rare as to attract no attention. The scurfy bark louse, Chionaspis furfura Fitch, has been abundant in several localities. This species has attracted more notice in recent years, partly because the presence of the San José scale has increased popular interest in the work of all Coccidae. The scurfy scale, however, appears to have been more destructive during the last five years than the equally common oyster scale, Lepidosaphes ulmi Linn.

Maple trees have been injured somewhat in various localities by the cottony maple scale, Pulvinaria innumerabilis Rathv., and also by the false maple scale, Phenacoccus acericola King. Both of these species are more likely to be injurious in the southern part of the State, though the false maple scale was sufficiently abundant to attract attention at Johnstown. The elm bark louse, Gossyparia spuria Mod., occurred in numbers on elms in both Brooklyn and Mt Vernon and also at Schenectady. This latter pest is rather generally distributed in the eastern portion of the State at least and, as pointed out by the writer earlier, the English sparrow is probably an important factor in carrying the pest from tree to tree in our cities.

Fruit tree insects

Gipsy moth (Porthetria dispar Linn.). This insect has not to our knowledge established itself in New York State, though a marked advance in our direction was discovered during the season, small colonies having been found at Springfield and Greenfield, Mass., both localities about 50 miles from our State line. The work against this insect in Massachusetts, as shown by our investigations in midsummer, is being most vigorously pushed, particular stress being laid upon preventing its further spread. This species, as has been repeatedly explained, spreads slowly, being dependent largely upon the activity of man and beast for convey-

ance from one locality to another. The continued exercise of vigilance by both state and national authorities may perhaps delay the invasion of this State for a decade or more. The warning placard illustrating both this species and the brown tail moth, has been conspicuously posted in many post offices and other public places located in portions of the State where the pest is most liable to appear. Additional copies are on hand and can be used to replace those broken or lost and also for sending to other localities should future developments warrant such procedure.

A better idea of what gipsy moth infestation means may be gained from the following notes made June 24, while examining conditions in the infested territory. Starting from Boston we passed through Cambridge and Brookline to Waltham, observing in particular conditions in Waltham park. This latter comprises over 100 acres of rocky land mostly covered with a dense growth of oaks some 20 to 40 feet high. No winter work such as creosoting egg masses on trees and clearing out underbrush was done, though the whole was rather badly infested. The entire park was sprayed with poison with one of the giant outfits described below, though the application was made rather late. The results were very gratifying, since practically no trees were seriously injured by caterpillars, though the park is surrounded by badly infested territory. The policy has been to safeguard such treated areas by clearing a strip about 100 feet wide around the entire border. This is done by cutting out and burning all underbrush and then applying tree Tanglefoot to the trunks of the remaining trees, so as to prevent caterpillars from ascending the trees. The latter do not, as a rule, pass this barrier, though at the time of our visit some were entering the park and supplementary spraying was necessary here and there in order to prevent further damage. Continuing from Waltham we passed through Arlington, Winchester and Stoneham to Melrose. Here and there along the entire route considerable woodland areas were stripped or nearly defoliated by gipsy moth caterpillars, and in one instance at least, the badly affected area was fully a mile and a quarter in length. These woodlands were all on hillsides and consisted mostly of oak ranging from 30 to 50 feet or more in hight. These stony hills are said to have very little agricultural value, being rated at $15 per acre. The cost of adequately controlling a pest like the gipsy moth in such situations is at once apparent. The general condi-

tion of the residential area was very gratifying, practically no trees either along the roads or on private estates were defoliated. Continuing, we passed from Melrose northward and eastward to Lynn, thence to Salem and across to Beverly. The same conditions prevailed as were observed in the vicinity of Arlington, except that the injury north of Salem appeared for the most part to be more recent and the woodland had not suffered so much, though limited tracts here and there were evidently badly infested. The street trees of Salem, though in very bad condition a few years ago, are now practically free from the pest.

The authorities are depending upon several methods for the control of the gipsy moth. Owing to the short season during which spraying is practical, an effort has been made to accomplish as much as possible by winter work, which latter consists in creosoting egg masses on trees throughout the infested area. This is supplemented, in the case of woodlands, by burning over the ground in order to destroy egg masses which may have been broken while climbing the trees or dislodged by birds or other natural agents. This burning is preferably deferred till early spring, after the eggs have hatched, and is usually preceded by cutting out the underbrush. The latter, if abundant, must be removed so that the trees will not be injured by fire. Then, by carefully controlling the flames, and especially by backfiring, it is possible to burn over a large area without materially injuring the forest. The extended area infested makes it impossible to treat all parts in an ideal manner, and a rather crude method of controlling the pest in woodlands has been adopted in some cases. This is accomplished by simply allowing the caterpillars to strip the woods and then burn over the ground just as the majority of them are leaving the trees and seeking food elsewhere. This method of procedure, while undoubtedly injurious to the trees, is much less harmful than were the insects allowed to propagate without restriction.

The work with parasites conducted by the state of Massachusetts in cooperation with the federal government is most encouraging. The work of 1907 has been considerably extended by providing larger quarters and a more adequate staff. Furthermore, special efforts have been made to secure larger sendings from European countries, and a special agent was dispatched to Japan. This latter undertaking has proved most encouraging, in that a large Apanteles and a new egg parasite of the gipsy moth have been received from Japan, and the Apanteles at least, has been bred

through one generation in American caterpillars. The sendings from Japan have in addition resulted in the introduction of four species of Tachinidae which promise to be very efficient parasites of the brown tail moth. Marked improvements have been made in methods of handling and rearing parasites and other natural enemies. These latter justify the expectation that it will be practical to breed thousands of the more effective species prior to their being liberated under favorable conditions. This work with parasites may rightly be considered as most important, owing to the fact that the gipsy moth is now so widely established as to render any widespread method of control, aside from that by natural enemies, exceedingly costly.

Recent progress in wholesale spraying for the control of the gipsy moth has been most striking and should prove suggestive to the fruit grower and immensely helpful to all parties having charge of extensive spraying operations such as the control of insect pests upon shade trees. The capacity of the ordinary spraying outfit has been greatly increased by replacing the usual 6 horse power gasolene engine weighing some 1800 pounds, by a 10 horse power engine made especially for automobiles and weighing only 400 pounds. Furthermore, a heavier and more powerful pump has been employed, the whole weighing no more than the usual spraying outfit. The machinery is mounted upon a stout wagon with a 400 gallon tank, and a heavy inch and a half hose some 400 to 800 feet long, with a smooth one quarter inch nozzle is used for work in the woodlands. A pressure of 200 to 250 pounds is maintained. The hose is handled much as though a fire was in progress. Ten men, at intervals of 6 or 8 feet, carry the end of the hose, the nozzle being in charge of a superior man with instructions to keep it moving all the time. The pressure is sufficient to throw the insecticide 40 or 50 feet, and the resistance of the air breaks it into a fine spray. The foliage is well covered if the nozzle is handled intelligently. This giant outfit is particularly adapted to work in woodlands. It usually requires four horses and is capable of spraying 14 to 16 acres a day, much depending upon conditions. The cost of treatment in this manner is reduced to about $10.20 per acre where the woodland is fairly clear of underbrush. An interesting modification of this apparatus has been employed for spraying strips along the roadside. It simply consists of a giant extension nozzle mounted on a universal joint so that the tip may be lifted 40 or 50 feet from the ground. This last named appa-

ratus, with a favorable wind, can cover a strip 400 feet wide. Contractors with apparatus such as that described above have been able to spray woodland where there was little or no underbrush and the trees ranging from 40 to 50 feet high at $17.50 per acre. This improved apparatus can also be employed in spraying street trees, a contractor being able to make money therewith at the rate of $1 to $1.25 per tree for spraying large elms. A responsible contractor stated that he could ship apparatus and men to a city at a considerable distance and treat a number of trees thoroughly at less than $2 per tree. The above is given since there are numerous inquiries as to the best method of spraying shade trees and the cost of doing such work.

Brown tail moth (Euproctis chrysorrhoea Linn.). The brown tail moth, though widely distributed in Massachusetts, seems to have become in the last year or so a pest of much less importance than the gipsy moth. Its nests are to be noted here and there but as a rule it is not very destructive. Part of the immunity from damage may be due to a fungous disease which has destroyed millions of the caterpillars, and also to the fact that many of the hibernating caterpillars were killed by the exceptionally cold weather of last winter. There is no record known to us of this insect having made its way nearer the New York State line than the Connecticut river valley.

Cankerworms. Reports of injuries by these looping caterpillars were received from several localities on the north shore of eastern Long Island and also from the vicinity of New York city. Specimens submitted upon examination showed that both the spring cankerworm, Anisopteryx vernata Peck, and the fall cankerworm, Alsophila pometaria Harr., were responsible for the injury, the last named species, however, being by far the more abundant on eastern Long Island and also in certain Connecticut localities. The caterpillars vary greatly in color, ranging from light green to almost black, and are usually ornamented with several narrow, white lines, some specimens frequently being adorned with a broad, dorsal, black stripe margined by white lines and with the sides light green, thus presenting an intermediate condition between the two extremes in color. The spring cankerworm may be recognized by the presence of but two pairs of legs at its posterior extremity, while the fall cankerworm has three pairs. The females of both species are wingless, grayish, grublike moths which are obliged to crawl up the tree if they deposit their eggs

where the newly hatched caterpillars can find an abundance of sustenance. The spring form is so called because the females remain in the ground till some time after midwinter, crawling up the trees during warm weather, even in February though more usually in March. The fall cankerworm is thus designated because the females usually crawl up the trees and deposit their eggs in late fall or early winter. The eggs of both species hatch at about the same time, namely, when the young leaves begin to appear.

Cankerworms are exceedingly voracious and, when present in numbers, nothing but the most prompt action will be of service in mitigating the trouble. The larvae are somewhat resistant to insecticides and as a consequence it is advisable to spray at the inception of the outbreak with paris green used at the rate of 1 pound of poison with an equal amount, by weight, of lime, to 50 to 75 gallons of water. The lime is added to lessen the danger of injury by poison. Arsenate of lead can be employed at the rate of 1 pound to 7 gallons of water, though as it is a slower acting poison, it is usually advisable to apply paris green. The homemade arsenite of lime is equally effective. Ordinarily one application of poison is sufficient, but if this does not prove satisfactory, a second treatment should be given a few days or a week later.

Cankerworms spread very slowly, owing to the fact that the females are wingless, and as a result the species must depend largely for carriage upon winds and other natural agencies, consequently an orchard once freed of the pest is not likely to be attacked for some time. We have yet to hear of a serious outbreak in orchards systematically sprayed from year to year. The ordinary treatment for the control of the codling moth and other leaf feeding insects is usually sufficient to keep this pest under control. Advantage may also be taken of its limited means of locomotion and injury prevented by the use of sticky bands, such as Tree Tanglefoot, tar or printers ink. The Tree Tanglefoot is a new material which has come into high favor in eastern Massachusetts where it is used extensively in gipsy moth work. Experience has shown that it can be applied with practically no injury to most trees, and possesses a decided advantage in remaining adhesive for a considerable period. It is advisable, if either tar or printers ink is used, to apply these materials to a band of tarred paper wrapped around the trunk of the tree, rather than to make the application direct to the bark. We much prefer to advise the employment of arsenical poisons, since they are of service in checking other leaf feeders, rather than to

recommend adhesive bands, because the latter have a very limited range of usefulness.

Cigar case bearer (Coleophora fletcherella Fern.). This insect was responsible last spring for very severe injuries to a number of orchards at South Byron and vicinity. An examination of conditions early in June showed that a considerable proportion of the foliage was badly damaged and would drop within a few weeks. The operations of this insect were so severe in some places as to give the trees a brownish appearance when viewed from a distance.

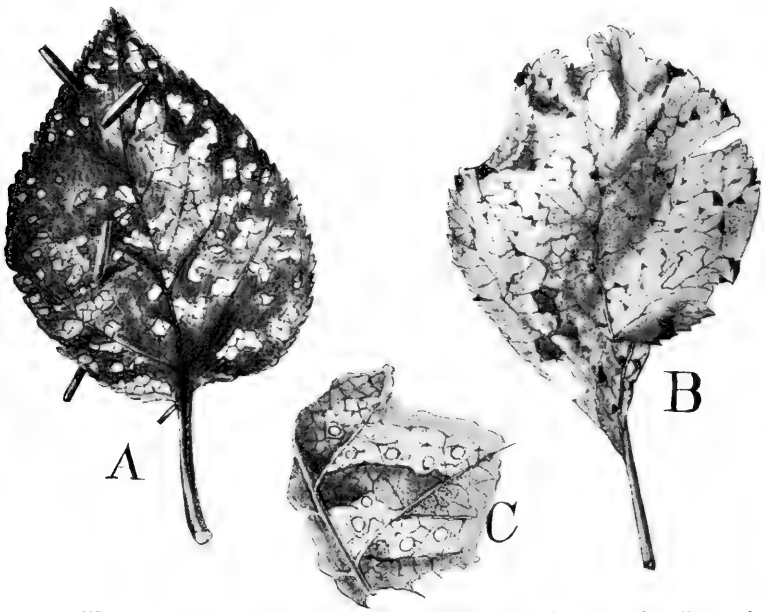

FIG. 13 Work of cigar case bearer. *a*, showing the spotted character of earlier work; *b*, leaf with the parenchyma entirely destroyed; *c*, a portion more enlarged. (Original)

An examination in the fall showed that this species was rather abundant at Albion and promises to cause considerable injury another spring unless controlled by timely spraying. The cigar case bearer was by far the more abundant though a few specimens of the pistol case bearer, Coleophora malivorella Riley, were also present in the orchard. Both of these insects are amenable to the same treatment, namely, thorough spraying with an arsenical poison at the time the young leaves appear in the spring. It is important that the application be made early, otherwise it may be difficult to destroy the voracious caterpillars before the buds have been seriously injured.

Blister mite (Eriophyes pyri Nal.). The blister mite is widely distributed in western New York and has also been found in several places in the Hudson valley. It has been especially destructive the past season to apple trees, being so abundant upon the foliage at South Byron early in June as to give many trees a brownish appearance when viewed from a distance. Many of the badly infested leaves dropped later and the same is true of orchards in the vicinity of Albion. In some instances at least half of the leaves must have been destroyed by the work of this pest. The characteristic blister of this form is easily distinguished by its peculiar, raised, spongy, brick-red appearance. The venation disappears in the affected area and furthermore, there is almost invariably a small, round hole near the center of the blister. These blisters may occur singly or in groups and frequently fuse to form irregular, reddish brown blotches which eventually may include a considerable proportion of the leaf. Inasmuch as the mites spend most of their time within the leaves, it is impractical to attempt any remedial measures during the summer. The pest winters under the bud scales and at such times it can be destroyed in large numbers by spraying with a lime-sulfur wash or one of the miscible or so called "soluble" oils. An application of a lime-sulfur wash is in our judgment preferable, since there is not the slightest danger of injuring the trees. Furthermore, reliable commercial preparations of this material can now be purchased, so that it is not necessary to bother with boiling if one feels that the delay incident to preparation is a serious hindrance. Orchards which have shown during the past season a more or less general infestation by this mite should be sprayed after the leaves drop and before they appear again in the spring with one of the contact insecticides named above, in order to prevent the chance of serious injury occurring another season.

Small fruit insects

Grape root worm (Fidia viticida Walsh). This insect is generally distributed throughout the Chautauqua grape belt. There has been a marked improvement in conditions over those obtaining last year, as there was comparatively little evidence of injury, though there were reports of severe local damage in vineyards in Sheridan or Fredonia. An examination of a number of vineyards failed to disclose any alarming conditions, and we are well satisfied that as a whole there has been a material betterment. Part of this is undoubtedly due to better cultivation, particularly

the stirring of the soil when the majority of the insects are in the pupal stage. Furthermore, many growers have sprayed with an arsenical poison, and this treatment has undoubtedly been of great service in preventing the pest from becoming unusually abundant. Severe local injuries may be expected in the future, and all growers are advised to keep a close watch of their vineyards, remembering that the insect may be very destructive in one portion of the field and hardly be present in another.

Shade tree insects

Elm leaf miner (Kaliosysphinga ulmi Sund.). The injurious work of this European species was first observed by us in this country in 1895, and a brief notice was given thereof in the report of this office for the year 1898. This miner was at that time very injurious to Camperdown elms in Washington park, though its operations were also very apparent upon Scotch elms and were less extensive upon English elms in both Albany and Troy. The severe injuries of earlier years have been somewhat lessened though it has been reported from other sections of the State. A few years ago it was quite destructive to elms at Ithaca, N. Y. and last year it was reported as being very injurious to weeping elms at Syracuse. Complaints of its ravages were also received from Kenwood near Albany.

Fig. 14 Elm leaf miner (author's illustration)

There is no very satisfactory method of controlling this pest, since the larvae work exclusively between the upper and lower epidermis, devouring the tender parenchyma and making a rather characteristic, irregular blotched mine. The insect hibernates within a cocoon just below the surface. It has been suggested that the upper layer of soil might be removed and buried at some depth. Ordinarily the

insect is not sufficiently destructive to warrant adopting such measures.

Elm leaf beetle (Galerucella luteola Mull.). This imported species continues to be a serious pest of elms, particularly in the Hudson valley, many of the elms of Yonkers, Poughkeepsie, Hudson, Albany, Troy, Schenectady, Schuylerville and Ithaca and probably other localities in the State being very badly injured. The work at Schuylerville and Schenectady was exceptionally severe and the same is also true of its operations at Ithaca. The major part of the injury in Albany at least was due to delay in appointing a city forester and getting the spray apparatus into operation. Furthermore, it is very difficult to secure men who can be relied upon to do thorough work. Experience has demonstrated beyond all question the practicability of keeping the elm foliage practically intact, even in localities where the pest is very abundant. It is for public spirited citizens in affected localities to insist upon the maintenance of such a standard.

The observations of the past season show in a most striking manner the extremely local character of this pest. The badly infested area in Albany has been restricted for the past decade to the older and more thickly settled fourth of the city. A study of conditions in Schenectady showed a similar restriction, the destructive work of the pest being limited almost exclusively to a small section of the older part of the city, in the vicinity of Church street and not extending in any direction more than 10 blocks from the center of the infestation. Furthermore, the most severe injury was noticed upon a group of elms near the open belfry of a church, clearly indicating that the insects winter most successfully where a structure of this kind affords abundant shelter.

Bag worm (Thyridopteryx ephemeraeformis Haw.). New York city and its vicinity represents about the northern extension of this species, as a rule. It was somewhat surprising, therefore, to receive healthy larvae from Germantown, only about 40 miles south of Albany. Mr T. F. Niles, who sent in the specimens, states that no young trees have been set in this locality within the past 2 years nearer than a quarter of a mile, consequently it would seem as though the species was able under certain conditions to maintain itself considerably farther north than has heretofore been supposed possible.

Fall webworm (Hyphantria textor Harr.). This common species has been unusually abundant in some portions of the

State, its webs on willow in particular forming conspicuous features in the landscape. In several instances small wild cherry trees were entirely defoliated by this pest. The promiscuous breeding of this insect on roadside and other trees, simply increases the danger of attack to more valuable trees, particularly when the latter are not sprayed systematically. Well cared for and systematically sprayed orchards suffer very little from injuries by this species.

White marked tussock moth (Hemerocampa leucostigma Sm. & Abb.). The white marked tussock moth continues to be a serious pest on horse-chestnuts and lindens in particular. It was extremely abundant and destructive in both Brooklyn and New York. It was numerous, though probably not quite so injurious in some other localities in the State. The impending destruction in Buffalo, we are pleased to state, was greatly mitigated by the activity and efficiency of the newly appointed city forester, Mr H. B. Filer. Buffalo has long held an unenviable reputation because of the poor condition of its shade trees, particularly horse-chestnuts, and we trust that the above mentioned appointment means a well supported and an advanced policy respecting shade tree protection.

The caterpillars of this notorious shade tree pest also occasioned considerable anxiety in the fruit section of the western part of the State. The partly grown caterpillars were found in considerable abundance in orchards, eating into the young fruit, the amount of damage being estimated at from 10 to 80%. This method of injury is by no means unknown, since similar work was observed in Nova Scotia in the summer of 1907. Though it is difficult to adequately control caterpillars which have developed the fruit-eating habit, it is very easy to keep this pest under control in commercial orchards. Systematic spraying with an arsenical poison will in the long run, at least, prove most efficacious in destroying the pest, though it may take a few years to bring about these results in badly infested orchards fruiting every season. It is comparatively easy to practically clear trees of this insect by collecting the conspicuous white egg masses any time during the winter. This work can be done thoroughly and at comparatively slight expense, then there is no occasion for worry as to the outcome another season, and an orchard once cleared is easily kept comparatively free from subsequent injury.

Snow-white linden moth (Ennomos subsignarius Hubn.). This species, at one time recognized as a most destructive

enemy of lindens, has risen with phenomenal rapidity from the obscurity of recent years. The past season has been most remarkable for the extensive flights of the snow-white moths [pl. 1, fig. 2] in many cities and villages, not only in New York State but in other sections. The moths were so numerous about electric lights as to attract widespread attention. Their advent in New York city occurred about July 16 and the effect was aptly compared by various writers to a snowstorm. In the well lighted sections myriads could be seen circling about the electric lights and invading many brilliantly lighted places in such numbers as to be a veritable nuisance. The following morning the arc lights were found choked with the insects, and characteristic groups of snow-white wings here and there were mute evidences to the voracity of the English sparrow. This bird, despite its numerous failings, destroyed thousands of the moths, hunting them without mercy until there were comparatively few survivors from the night before. The abundance of the insects and the extended area where swarms were present is most remarkable. Aside from New York city, where the largest number of the moths seemed to be present, they were reported by the local press as swarming at Nyack, Ossining, Newburgh, Hudson, Albany, Troy, Cohoes, Ballston, Saratoga, Glens Falls, Schenectady, Amsterdam, Johnsonville, Gloversville, Little Falls, Herkimer, Ilion and Utica. It is interesting to note that the moths appeared in Albany and other northern localities about five days later than at New York city. Aside from the above mentioned records, the local press of numerous other cities and villages contained brief notices of the swarming of this species, though with no record as to local occurrence. The widespread character of the flight is well illustrated by authentic records of hosts occurring at Newark, N. J., Springfield, Mass. and Ottawa, Can., the latter flight occurring July 23d. This visitation is all the more striking when it is recalled that in recent years at least, this moth has been comparatively rare, hardly attracting notice for a generation, despite the fact that in earlier years it was considered an important enemy of lindens.

The remarkable local swarms recorded above are probably due to conditions being generally favorable for the multiplication of the species throughout the infested area. There is a possibility that some of the flights were due to swarms drifting with the wind from defoliated tracts lying at some distance. This is hardly an adequate explanation for the presence of many of the local swarms, particularly as observations in Albany show that the linden foliage in the

western part of the city, where the trees are somewhat abundant, was badly injured by the insect, and it was in this section of the city where the moths were most numerous. It is probable that there were comparatively few extensive flights. The causes for this excessive abundance are probably to be found in the scarcity of bird life, in the temporary reduction of native parasites and possibly in part to unusually favorable climatic conditions.

The extensive defoliations by this species, recorded in our report for last year,[1] have been continued and large areas in the Catskills have suffered severely. Reports of injury in the towns of Hardenburg, Shandaken and Ladleton, Ulster co., indicated defoliation of extensive tracts of beech. There is also a record of severe injury by this pest from DeBruce, Sullivan co. This species was likewise destructive to beeches in the Adirondacks, Forester E. S.

FIG. 15 Snow-white linden moth, larva on twig. (Original)

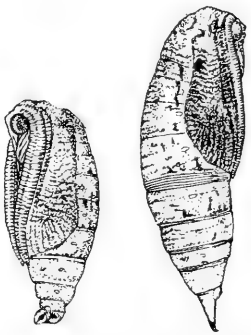

FIG. 16 Snow-white linden moth. pupae, enlarged. (Original)

Woodruff reporting that the beeches on the John Brown tract number 2, ranges 12 and 13, lots 3 to 8 were defoliated, the stripped area being about 3 miles long and having a width of ½ mile at one end and 1 mile at the other. The caterpillars fed at first upon young beeches, then stripped the older beeches, practically skeletonizing the foliage, and then turned to birches and maples, eating holes in the foliage of the latter. The lower limbs of the trees on the defoliated area bore numerous empty pupal cases in September, and irregular egg masses occurred in abundance upon the bark of beech, birch and maple. The eggs of this species are deposited at an oblique angle to the supporting surface, are about 1 mm in length, barrel-shaped and light brown, with a conspicuous dark salmon ring at the extremity. They occur in irregular

[1] N. Y. State Ent. 23d Rep't, 1907. N. Y. State Mus. Bul. 124, p. 23–28.

masses [pl. 1, fig. 1] about half an inch in diameter, each containing from 50 to over 100 eggs.

It is not expected that the above recorded flights in cities and villages will be followed by extensive injuries another season, since it is very probable that the English sparrows destroyed many of the adults before there was an opportunity for the deposition of eggs.

Spruce gall aphid (Chermes abietis Linn.). This introduced, widely distributed species has been the cause of an unusual number of complaints in New York State. Mr John Herliky, arboriculturist of Brooklyn, writing under the date of June 22d stated that many Norway spruce trees throughout Prospect park, and in fact in different parts of that section of the State, have been

FIG. 17 Spruce gall aphid, normal type of gall. (Original)

dying of late. Specimens were submitted for examination and were found to contain a few of the characteristic galls of this insect and, in addition, an apparently undescribed injury. Numerous subglobular, aborted buds were found here and there at the base of the branches or at the base of new growth and on investigation were found to contain numerous small, light brown aphids. It is probable that these aphids entered the developing buds the preceding year and, on account of their abundance, prevented the usual growth and the development of the normal type of gall. An examination, at this time, of spruces in Albany showed that these trees likewise, in addition to the typical galls produced by this aphid, bore the subglobular dead buds inhabited by numerous aphids described above. An examination of infested trees in Albany the latter part of September showed that the dead buds described

above had been deserted by the aphids and many of them contained numerous cast skins. Some showed evidence of having been invaded by parasites, which latter presumably preyed upon the young plant lice.

Complaint of this insect's work, accompanied by specimens, was received from Mr C. C. Laney, superintendent of parks, Rochester, N. Y. This gentleman stated that the galls were more abundant on white spruce than upon any other coniferous tree. Serious injuries were reported from Elizabethtown by Mr Seth Sprague Terry, who stated that 50 spruce trees, none over 25 feet high, have practically all the new growth affected by this insect. Mr John Nill sent from Star lake, in the southwestern part of St

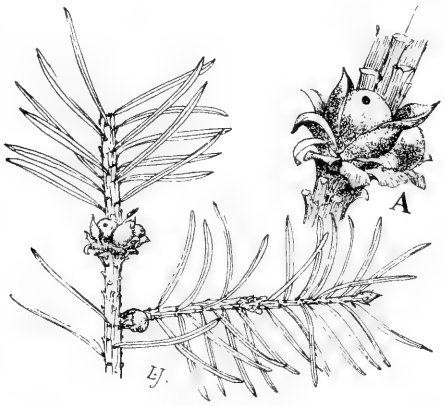

FIG. 18 Spruce gall aphid, destroyed buds; *a*, one enlarged. (Original)

Lawrence county, badly infested spruce twigs with an inquiry as to the cause of the trouble.

This insect, while rarely causing the death of the trees, frequently produces serious deformities, because twigs bearing galls are very likely to die, thus producing a very unsightly tree. Experiments conducted by Mr R. A. Cooley showed that thorough spraying in April with a whale oil soap solution, 1 pound to 2 gallons of water, is very effective in checking this insect. A more detailed discussion is given in New York State Museum memoir 8, volume 1, pages 189–91.

Miscellaneous

Corn worm (Heliothis armiger Hubn.). This species is much better known as the boll worm of the South, though it is

frequently quite destructive in that section to corn. Occasionally it becomes somewhat abundant and injurious in New York State. Dr Lintner in his first report records this insect as being quite abundant and destructive to corn in Ontario county and its probable occurrence at the same time in the vicinity of Albany. Six years ago this insect was somewhat abundant in the vicinity of New York city, complaint of injuries having been received from Mt Vernon.

The operations of this species in the North are confined mostly to corn and tomatoes, the major portion of the damage being inflicted in the late summer or fall. This latter was true of injuries reported from Shelter Island, the caterpillars being brought to notice about the middle of October. The damage at Mt Vernon in 1902 did not occur until the latter part of August. The caterpillar of this species is extremely variable in color, ranging from a light green with reddish brown marks on the side to a darkish green, brown or even nearly black caterpillar with a variable whitish lateral line. It closely resembles in general appearance some of our common cutworms, being stout, and when full grown is an inch or more in length. The caterpillars begin their operations near the tip of the ear, eating down between the husks and making irregular frass-filled galleries over the face of the green cob, destroying a considerable proportion of the corn and defiling most of the remainder. Occasionally this species is quite destructive to tomatoes, on account of its eating rather large holes into the ripening fruit.

The pest can be controlled in the North only by recourse to hand picking. This measure will be particularly valuable at the incipiency of the attack, since ears which have been injured somewhat are more attractive to the insect than those protected by tightly folded husks. Care should also be exercised when removing caterpillars from recently infested ears to replace the husks so far as possible and thus reduce the chances of reinfestation.

White ants (Termes flavipes Koll.). It is not often that these insects are recorded as injurious in New York State, though they are undoubtedly present in many dwellings, particularly in the southern part of the State and occasionally inflict serious injury. Our attention was called last winter to the operations of white ants in the storage vaults of a New York city printing company. The vaults were filled with electrotypes and halftones

mounted and unmounted, newspaper files and other material. The white ants fairly riddled the blocks upon which the electrotypes were mounted and ran galleries through files of back publications, thus causing heavy losses.

These insects can be easily recognized as white, wingless, ant-like forms. They are only seen, as a rule, when material in which they are boring has been disturbed as in the above mentioned

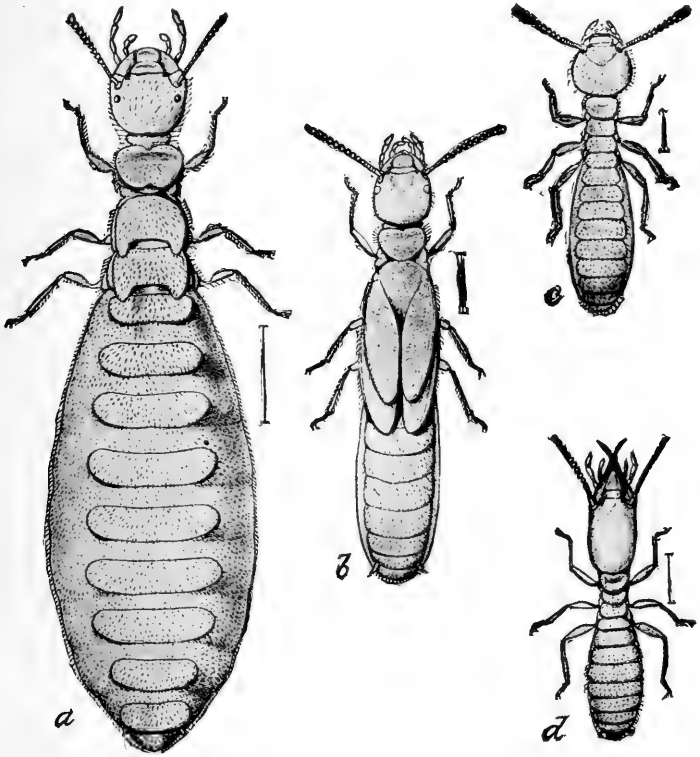

FIG. 19 Termes flavipes: *a*, queen; *b*, young of winged female; *c*, worker; *d*, soldier, all enlarged. (After Marlatt, U. S. Dep't Agric. Div. Ent. Bul. 4. n. s. 1896)

instance. This form remains active throughout the year in buildings that are kept warm during the winter. The ants excavate numerous irregular galleries through wood, paper and almost any material except stone or metal. They are communistic in habit and with a social organization similar to that of the honey bee. The only satisfactory method of preventing injury in vaults and similar places is first to thoroughly clean the infested chamber or chambers

by removing everything in which the insects may be living. The door of the vault should be tight enough so that there would be no danger of subsequent entrance, and great care should be exercised to prevent reintroduction of the pest with material for storage. Fumigation with hydrocyanic acid gas would be of but limited value, since the fumes would hardly destroy all the insects in their galleries. The infested backing of electrotype blocks should be burned, while the insects in bulky papers or other material could be destroyed either by spreading the papers out loosely and drying thoroughly, or in some instances by subjecting to a gentle heat for a considerable period, since white ants succumb readily to both heat and excessive dryness. Storage boxes for valuable papers should be of metal or at least lined with tin and special care exercised to avoid any crevice which would allow the insects to enter.

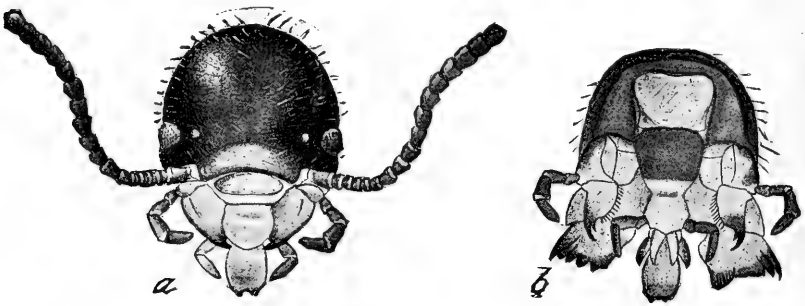

FIG. 20 Termes flavipes: *a*, dorsal view of head of winged female; *b*, ventral aspect of same, with mouth parts open, greatly enlarged. (After Marlatt, U. S. Dep't Agric. Div. Ent. Bul 4. n. s. 1896)

Mosquito notes. The season of 1908 was particularly interesting because a considerable proportion of New York city was invaded by large swarms of the salt marsh mosquito, Culex sollicitans Walk. Undoubtedly the insects came from adjacent marshes, possibly those of New Jersey and very likely some at least, from undrained areas on Long Island. The pests were so numerous in the city as to be a pronounced scourge for a few days, and did much to arouse popular interest in the problem of mosquito control.

The draining operations on Staten Island have been completed and the resultant change for the better has been most marked. Many places which were previously almost uninhabitable because of the swarms of mosquitos are now comparatively free. The work of draining marshes in other portions of Greater New York has been

continued and during the summer a large proportion of the salt marsh areas in Flushing and its immediate vicinity has been ditched. Nine tenths of the Flushing meadows are now already drained, and it is probable that the work on the remaining tenth will be completed this fall. Operations have already been begun about Jamaica bay.

The antimosquito work at Orient, L. I., begun some two years ago, has been pushed to a successful completion and most gratifying results have been obtained. The indications are that operations of this kind will be continued until most of the salt marshes

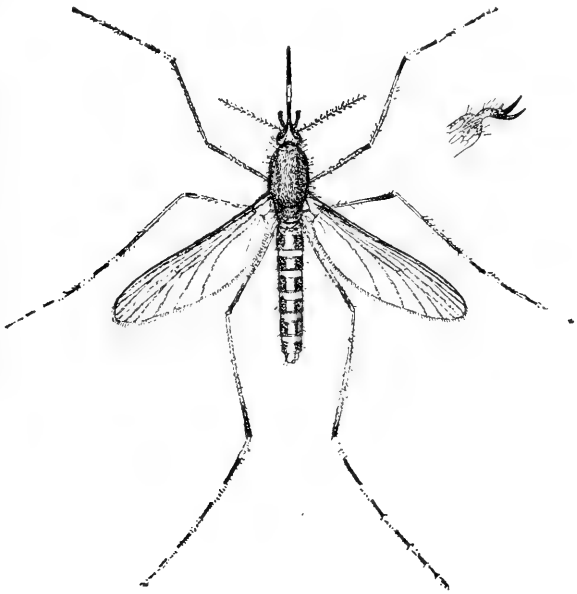

FIG. 21 Salt marsh mosquito from above, the toothed front claw more enlarged. (After Howard, U. S. Dep't Agric. Div. Ent. Bul. 25. n. s. 1900)

on Long Island will be practically free from these pests. The operations against the salt marsh mosquito naturally lead to some consideration being given to the fresh-water forms, particularly the common house mosquito, Culex pipiens Linn., and the malarial mosquito, Anopheles maculipennis Meig. Experience has demonstrated the practicability of controlling these two species, and it is only a question of time before this knowledge will be taken advantage of, and will lead to a great increase in comfort and practical freedom from malarial infections.

LIST OF PUBLICATIONS OF THE ENTOMOLOGIST

The following is a list of the principal publications of the Entomologist during the year 1908. Fifty-seven are given with title,[1] time of publication and a summary of the contents of each. Volume and page number are separated by a colon, the first superior figure gives the column and the second the exact place in the column in ninths: e. g. 71:969[27] means volume 71, page 969, column 2, in the seventh ninth, i. e. a little more than two thirds of the way down.

New Species of Cecidomyiidae II. N. Y. State Mus. Bul. 124, p. 286–304. Separate, p. 1–23 (Issued Oct. 26, 1907)

A number of new species are described.

A Caterpillar. Country Gentleman, Oct. 31, 1907, 72:1025[21]

A brief descriptive account of the red humped apple caterpillar, Schizura concinna Sm. & Abb.

Shade Tree Protection. Troy Record, Oct. 29, 1907

The elm leaf beetle, Galerucella luteola Mull.; the white marked tussock moth, Hemerocampa leucostigma Sm. & Abb. and several other injurious pests are discussed and a plea made for the better protection of shade trees.

Notes on the Insects of the Year 1906 in New York State. U. S. Dep't Agric. Bur. Ent. Bul. 67. 1907. p. 39–43

A number of insects are briefly noticed, the following being the more important: San José scale, Aspidiotus perniciosus Comst.; grape root worm, Fidia viticida Walsh; sugar maple borer, Plagionotus speciosus Say; white marked tussock moth, Hemerocampa leucostigma Sm. & Abb.; elm leaf bettle, Galerucella luteola Mull.; false maple scale, Phenacoccus acericola King; elm bark louse, Gossyparia Spuria Mod. and the violet gall midge, Contarinia (Mayetiola) violicola Coq.

Fighting the Scale. Suburban Life, 1908, 6:38–40

A summarized account of the San José scale, Aspidiotus perniciosus Comst.; and methods of control with brief notices of the oyster scale, Lepidosaphes ulmi Linn. and the scurfy scale, Chionaspis furfura Fitch.

The Insect Year. Country Gentleman, Jan. 30, 1908, 73:107[22]

A summary of insect injuries. The following species are noticed: San José scale, Aspidiotus perniciosus Comst.; grape root worm, Fidia viticida Walsh; apple leaf folder, Ancylus nubeculana Clem.; Epizeuxis denticularis Harv.; white marked

[1] Titles are given as published, and in some instances they have been changed or supplied by the editors of the various papers.

tussock moth, Hemerocampa leucostigma Sm. & Abb.; elm leaf beetle, Galerucella luteola Mull.; sugar maple borer, Plagionotus speciosus Say; green striped maple worm, Anisota rubicunda Fabr.; the antlered maple caterpillar, Heterocampa guttivitta Walk. and the snow-white linden moth, Ennomos subsignarius Hubn.

Hair Snake. Country Gentleman, Feb. 6, 1908, 73:128[42]

A summary account of the habits of hair snakes, Mermis sp. with a statement of their harmlessness.

Entomological Notes for 1907. American Fruits, 1908. 8:13

A summary account of injuries by the San José scale, Aspidiotus perniciosus Comst.; grape root worm, Fidia viticida Walsh; apple leaf folder, Ancylus nubeculana Clem.; Epizeuxis denticularis Harv., white marked tussock moth; Hemerocampa leucostigma Sm. & Abb., elm leaf beetle; Galerucella luteola Mull., green striped maple worm; Anisota rubicunda Fabr., antlered maple caterpillar; Heterocampa guttivitta Walk., snow-white linden moth, Ennomus subsignarius Hubn. and white grubs, Lachnosterna fusca Frohl.

Observations on the Biology and Food Habits of the Cecidomyiidae. Economic Entomology. Journal, Feb. 1908, 1:18–21

Summarized observations on the habits and life history of a number of forms.

Scale in an Apple Orchard. Country Gentleman, Mar. 26, 1908, 73:306[1]

A general discussion of remedial measures for San José scale, Aspidiotus pernicious Comst.

Gipsy and Brown Tail Moths and Miscellaneous Notes. Western New York Horticultural Society Proc. 53d An. Meeting 1908, p. 112–14

Notes on the progress made in controlling Porthetria dispar Linn. and Euproctis chrysorrhoea Linn., with special mention of the work with parasites. Also brief observations on a number of forms injurious in 1907.

Insect Control in its Larger Aspects. N. Y. State Fruit Growers Proc. 1908, p. 139–45. [Separate issued Apr. 11, 1908] In part in Country Gentleman, Mar. 5, 12, 1908, 73:229, 258

An address discussing briefly the present conditions and the methods most likely to be of service in the immediate future.

Entomological Notes for 1907. Economic Entomology. Journal, Apr. 1908, 1:148–50.

Brief notes are given on the San José scale, Aspidiotus perniciosus Comst.; grape root worm, Fidia viticida Walsh; apple

leaf folder, Ancylus nubeculana Clem.; Epizeuxis denticularis Harv.; white marked tussock moth, Hemerocampa leucostigma Sm. & Abb.; elm leaf beetle, Galerucella luteola Mull.; sugar maple borer, Plagionotus speciosus Say; green striped maple worm, Anisota rubicunda Fabr.; antlered maple caterpillar, Heterocampa guttivitta Walk.; snow-white linden moth, Ennomos subsignarius Hubn. and Lachnosterna fusca Frohl.

Contarinia gossypii n. sp. Entomological News, 1908, 19:210–11

Original description of a species injuring cotton in the British West Indies.

Bark Louse. Country Gentleman, May 14, 1908, 73:488[43]

Brief economic account of the scurfy bark louse, Chionaspis furfura Fitch.

[Report on the Work of Importing Parasites of the Gipsy and Brown Tail Moths, Porthetria dispar Linn., Euproctis chrysorrhoea Linn.] Sup't for Suppressing the Gipsy and Brown Tail Moths, 3d An. Rep't, 1908, p. 210–13

A great improvement in the condition of infested territory is noted. The methods of importing parasites and the progress made are both most commendable. Careful biological studies of the parasites are advised, because of the importance of such knowledge in establishing species. The desirability of giving special attention to the rarer parasites is urged. Attention is called to the advisability of obtaining parasites from Japan, even though it involves considerable expense.

Currant Worm. Country Gentleman, May 28, 1908, 73:536–37

Brief economic account of the currant worm, Pteronus ribesii Scop.

Protect the Trees. Troy Times, May 28, 1908; Ithaca Journal, Schenectady Star, Poughkeepsie Eagle, May 29; Albany Argus, May 30; Daily Saratogian, June 1; Albany Times Union, June 2

Brief warning notice in regard to the elm leaf beetle, Galerucella luteola Mull.

Maple Pest in Johnstown. Johnstown Republican, June 2, 1908

Brief descriptive account, with remedies for the false maple scale, Phenacoccus acericola King.

Moth Work in Massachusetts. Country Gentleman, June 11, 1908, 73:598[42]–99

A review of the third annual report on the work against the gipsy and brown tail moths in Massachusetts.

Grape Blossom Midge. Grape Belt, June 12, 1908, p. 4; Buffalo News, June 13

Brief statement of injury and life history of the grape blossom midge, Cecidomyia johnsoni Sling.

Insecticides. Country Gentleman, June 18, 1908, 73:606[45]–7[12]

Brief discussion of the relative merits of paris green and arsenate of lead in bordeaux mixture.

Apple and Grape Pests. Country Gentleman, June 18, 1908, 73:607[23]

Brief accounts of injuries by the cigar case bearer, Coleophora fletcherella Fern.; the apple blister mite, Eriophyes pyri Nal., and the grape blossom midge, Cecidomyia johnsoni Sling.

Cutworms and Wireworms. Country Gentleman, June 18, 1908, 73:608[26]

Brief general accounts with discussion of remedies.

Apple Canker Worms. Country Gentleman, June 18, 1908, 73:608[11]

Brief economic account of the fall and spring canker worms, Alsophila pometaria Harr. and Anisopteryx vernata Peck.

Observations on the Genus Contarinia. Economic Entomology. Journal, 1908, 1:225–28

Brief notes are given on the following species: Contarinia pyrivora Riley, C. sorghicola Coq., C. liriodendri O. S., C. ananassi Riley, C. rumicis Loew, C. gossypii Felt, C. setigera Lint., C. negundifolia Felt, C. perfoliata Felt, C. quercifolia Felt, C. agrimoniae Felt, C. virginianiae Felt and C. clematidis Felt.

Some Problems in Nomenclature. Entomological Society of America. Annals, 1908, 1:102–4

A brief discussion of the validity of descriptions of insect galls with special reference to the Cecidomyiidae.

Wireworms. Country Gentleman, July 2, 1908, 73:646[47]

Brief discussion of remedies.

Elm Leaf Aphis. Country Gentleman, July 2, 1908, 73:647[17]

The life history and remedial measures for the elm leaf aphis, Schizoneura americana Riley are briefly discussed.

San José Scale. Country Gentleman, July 2, 1908, 73:647[23]

Brief general discussion of the San José scale, Aspidiotus perniciosus Comst., with a summary statement of the comparative value of the various sprays.

Shade Trees and the Elm Leaf Beetle. Ossining Citizen, July 6, 1908

Brief statement respecting the practicability of protecting elms from the elm leaf beetle, Galerucella luteola Mull.

Elm Leaf Beetle. Schenectady Union, July 7, 1908

A summary of local conditions with directions for controlling the elm leaf beetle, Galerucella luteola Mull.

Protect the Birds. American Humane Association. Leaflet. [Issued July 8] 1908. p. 1–4, 6–7

A brief popular discussion of the economic value of birds as natural checks upon injurious insects.

The Hop Merchant. Country Gentleman, July 9, 1908, 73:667[34]

A brief economic notice of the hop merchant, Polygonia comma Harris with special reference to currant.

Gipsy Moth Work. Country Gentleman, July 9, 1908, 73:667[42]

A brief account of recent developments in Massachusetts with special reference to progress made in spraying and the necessity of keeping watch for the appearance of Porthetria dispar Linn. in New York State.

Elm Leaf Beetle. Ithaca Journal, July 13; Amsterdam Recorder, Hudson Register, Poughkeepsie Eagle, July 14; Schuylerville Standard, July 16

General account of injuries by the elm leaf beetle, Galerucella luteola Mull., with a discussion of remedial measures.

Oyster Scale. Country Gentleman, July 16, 1908, 73:686[37]

Brief economic account of the oyster scale, Lepidosaphes ulmi Linn.

White Marked Tussock Moth. Grape Belt, July 17, 1908

Brief directions are given for controlling the white marked tussock moth, Hemerocampa leucostigma Sm. & Abb.

Shade Tree Pests. Dunkirk Observer, July 18, 1908; Grape Belt, July 28, p. 7

A reprint of a large portion of N. Y. State Museum bulletin 109 on the white marked tussock moth and the elm leaf beetle.

The Soldier Bug. Country Gentleman, July 23, 1908, 73:704[23]

Discusses briefly the habits of soldier bugs, Podisus sp., in connection with the finding of a nymph feeding on the grub of a potato beetle.

Blister Mites. Country Gentleman, July 23, 1908, 73:706[47]

A brief discussion of the character, extent of injuries and remedial measures for Eriophyes pyri Nal.

Giant Caterpillar. Country Gentleman, Aug. 6, 1908, 73:746[46]

Brief description of the larva of the giant caterpillar, Samia cecropia Linn. with observations on its life history.

Leaf Mites. Country Gentleman, Aug. 6, 1908, 73:747[22]

Remedial measures are given for the clover or brown mite, Bryobia pratensis Garm., and the red spider, Tetranychus telarius Linn.

Grain Moth. Country Gentleman, Aug. 13, 1907, 73:767[16]

Brief discussion of remedial measures for the grain moth, Sitotroga cerealella Oliv.

Flies as Carriers of Disease (Press Bulletin) Albany Evening Journal, Aug. 13; Brooklyn Eagle, Aug. 13; Utica Press, Aug. 14; Yonkers Statesman, Aug. 14; Boston Herald, Aug. 15; New York Farmer, Aug. 20, p. 7; Country Gentleman, Aug. 27, 1908, 73:830[15]–31[16]

A summary account of flies as carriers of disease, with directions for abating the nuisance.

[Scientific Notes] Economic Entomology. Journal, Aug. 15, 1908

Brief observations on the following: Grape blossom midge, Cecidomyia johnsoni Sling., page 243; white marked tussock moth, Hemerocampa leucostigma Sm. & Abb., page 276; bag worm, Thyridopteryx ephemeraeformis Haw., page 276; elm leaf beetle, Galerucella luteola Mull., page 280.

Notes on the Work Against the Gipsy Moth. Economic Entomology. Journal, Aug. 15, 1908, 1:275–76

A brief account with special reference to improved methods of spraying and the work with parasites.

Melon Aphis. Country Gentleman, Aug. 20, 1908, 73:786[47]

Remedial measures are given for the melon aphis, Aphis gossypii Glov.

Saddle Back. Country Gentleman, Aug. 27, 1908, 73:812[45]

Brief descriptive account of the saddle back caterpillar, Sibine stimulea Clem.

San José Scale. Country Gentleman, Sept. 17, 1908, 73:889[36]

Brief economic notice of the San José scale, Aspidiotus perniciosus Comst.

The Wheat Wire Worm. Country Gentleman, Sept. 24, 1908, 73:910[25]

A brief descriptive account of the wheat wire worm, Agriotes mancus Say, with a discussion of remedial measures.

Insect Bands. Country Gentleman, Oct. 8, 1908, 73:961[12]

Brief comments upon the use and value of sticky bands with specia reference to "Tree Tanglefoot."

A Scale. Country Gentleman, Oct. 8, 1908, 73:961[15]

A brief descriptive account of Chionaspis euonymi Comst. with a discussion of remedies.

The Difficult Apple Maggot. Country Gentleman, Oct. 8, 1908, 73:962[32]

A general account of the apple maggot, Rhagoletis pomonella Walsh, with a discussion of remedies.

Katydid Eggs. Country Gentleman, Oct. 15, 1908, 73:984[36]

Brief descriptive account of the eggs of Microcentrum retinervis Burm. or M. laurifolium Linn.

Scientific Notes. Economic Entomology. Journal, 1908, 1:330

Record of injury by Ennomos subsignarius Hubn. and its unusual abundance. A new injury to gladioli bulbs by a species of Aphis is also recorded.

23d Report of the State Entomologist on Injurious and Other Insects of the State of New York, 1907. N. Y. State Mus. Bul. 124. Oct. 15, 1908. 542p. 44 pl.

Contents

ADDITIONS TO COLLECTIONS OCT. 16, 1907–OCT. 15, 1908

The following is a list of the more important additions to the collections.

DONATION

Hymenoptera

Amphibolips prunus Walsh, oak plum gall, Sept., Michigan, through **R. B. Hough,** Lowville.

Trichiocampus viminalis Fallen, poplar sawfly larvae, Aug. 21, **Daniel Harrington,** Cambridge.

Kaliosysphinga ulmi Sund., leaf miner on elm, June 16, **L. L. Woodford,** Pompey.

Urocerus edwardsii Brulle, Jan. 7, **Hermann Von Schrenk,** St Louis, Mo.

Coleoptera

Eccoptogaster rugulosus Ratz., fruit tree bark beetle on pear, through State Agricultural Department, Sept. 15, Rochester.

Cryptorhynchus lapathi Linn., mottled willow borer, larvae on balm-of-gilead, Aug. 10, Corning, through **C. H. Peck,** Albany.

Tyloderma fragariae Riley, strawberry crown borer, June 11, **D. B. Belden,** Fredonia.

Pissodes strobi Peck, white pine weevil, larvae on pine, July 6, **J. G. Newbury,** Coxsackie.

Chelymorpha argus Licht., argus tortoise beetle, larva on grape, June 25, **G. H. Barber,** Westfield.

Galerucella luteola Mull., elm leaf beetle, larvae and pupae, July 9, **A. E. Milligan,** Schuylerville.

Plagionotus speciosus Say, sugar maple borer, adult on maple, June 26, **J. C. Von Steenburgh,** Ballston.

Photinus? pyralis Linn., fire fly, serial, longitudinal and transverse sections, adult, Dr **S. G. Shanks,** Albany.

Diptera

Culex perturbans Walk., all stages, June and July, **J. T. Brakeley,** Hornerstown, N. J.

A number of Cecidomyiid galls from Miss **Cora H. Clarke,** Magnolia, Mass.

Siphonaptera

Pulex irritans Linn., common human flea, adult; Ctenocephalus canis Curt., cat and dog flea, adult, July 24, **Dudley R. Kathan,** Schenectady.

Lepidoptera

Basilona imperialis Dru., imperial moth, larva, Sept. 3, **M. J. Dutche,** Oakwood Heights. Same, larva on maple, Aug. 12, Dr. **A. B. Kelly,** Albany.

Hyphantria textor Harr., fall webworm, larvae on apple, July 7 **J. A. Thompson,** Rochester.

Halisidota caryae Harr., hickory tussock moth, larvae, July 8 **H. N. Otterson,** Bolton, Mass. Same, larva, July 6, **Irving T. Thornton** Orchard Park.

Tolype velleda Stoll., lappet moth, larva, July 22, **George S Graves,** Newport.

Alsophila pometaria Harr., fall cankerworm, young, June 5 **A. Mair,** Oakdale.

Ennomos subsignarius Hubn., snow-white linden moth, adult July 23, **C. Gordon Reel,** Kingston, through Forest, Fish and Game Com'n. Same, pupae on oak, July 3, **W. O. Ensign,** Livingston Manor

Ania limbata Haw., filament bearer or horned spanworm, larva June 6, **H. W. Covert,** Waterford.

Memythrus tricinctus Harr., M. polistiformis Harr. M. simulans Grote, M. asilipennis Boisd., M. doli Neum., Aegeria apiformis Clerck, Sesia bassiformis Walk., S. albicornis Hy. Edw., S. corni Hy. Edw., S. pyr Harr., S. scitula Harr., S. rubristigma Kellicott, and S pyralidiformis Walk., Apr. 30, **G. P. Englehardt,** Brooklyn.

Thyridopteryx ephemeraeformis Haw., bag worm, larvae on red cedar, July 7, Germantown, through **T. F. Niles.** State Dep't Agric.

Sitotroga cerealella Oliv., adult in popcorn, Aug. 14, **F. B Holmes,** Albany.

Tischeria malifoliella Clem., apple leaf miner, larvae on apple, July 7. **J. A. Thompson,** Rochester.

Odonata

Hetaerina americana Fabr., adult, Aug. 26, **Winifred Goldring,** Slingerland.

Hemiptera

Phylloxera caryaecaulis Fitch, hickory gall aphid, adults and young on hickory, June 8, **The American Nursery Co.,** New York city. Same, gall on hickory, Sept. 1, **Munson-Whitaker Co.,** New York city.

Colopha ulmicola Fitch, cockscomb elm gall, on elm, June 18 **L. L. Woodford,** Pompey. Same, young on elm, July 6, **Irving T.Thornton** Orchard Park.

Pemphigus tessellata Fitch, nymphs on alder, Aug. 24 **George S. Downing.** Albany. Same on maple Sept. 19, Mrs **George H. Freeman,** Loudonville.

Chermes abietis Linn., spruce gall aphid, young on Norway spruce, June 22, **John Herliky,** Brooklyn. Same, galls, July 30, **Seth Sprague Terry,** Elizabethtown. Same, galls on spruce, Aug. 10, **C. C Laney,** Rochester. Same, dead adults on spruce, Aug. 31, **John Nill,** Star Lake.

Aspidiotus perniciosus Comst., San José scale, adult on hornbeam, Oct. 13, **W. E. Kenney,** Brooklyn.

Eulecanium tulipiferae Cook, tulip tree scale, young on tulip tree, Apr. 6, **J. Aspinwall,** Newburgh.

Pulvinaria innumerabilis Rathv., cottony maple scale, adults on elm, June 2, **E. S. Brignall,** Schenectady. Same, on maple, June 12, Mrs **Stephen Niles,** Coeymans. Same, adults on maple, June 24, **E. R. Concklin,** Pomona.

Phenacoccus acericola King, false maple scale, young on maple, Oct. 12, **Frank H. Downer,** New Rochelle. Same, May 29, **G. F. Beakley,** Johnstown. Same, adult on maple, July 29, **S. B. Huested,** Blauvelt.

Gossyparia spuria Mod., elm bark louse, adults on elm, June 2, **E. S. Brignall,** Schenectady. Same, Aug. 3, **W. E. Kenney,** Brooklyn. Same, young on elm, Sept. 16, Mrs **W. C. Mains,** Mt Vernon.

Icerya purchasi Mask., cottony cushion scale, on Acacia, Feb. 25, **L. Menand,** Albany.

Orthoptera

Panchlora hyalina Stoll., on apples, Mar. 16, Mrs **Abraham Lansing,** Albany. Same, Mar. 26, **J. R. Gillett,** Albany.

Isoptera

Termes flavipes Koll., white ant, adult, Feb. 3, **A. T. De La Mare Co.,** New York city.

EXCHANGE

Diptera

Culicidae

Banks, C. S., Government Entomologist, Manila, P. I. Myzomyia ludlowii Theob., M. mangyana Banks, Myzorhynchus barbirostris V. d. W., M. vanus Walk., Stegomyia aurostriata Banks, S. persistans Banks, S. samarensis Ludl., Worcesteria grata Banks, Helecoetomyia pseudotaeniata Giles, Leucomyia cuneatus Theob., Culex fatigans Wied., C. microannulatus Theob., Mansonia uniformis Theob., Banksinella luteolateralis Theob., Finlaya aranetana Banks, F. poicilia Theob., Aedomyia squamipenna Arriz.

Dolichopodidae

Aldrich, J. M., Moscow, Idaho. Psilopodinus mundus Wied., Agonosoma filipes? Loew, A. scintillans Loew, Mesorhaga albiciliata Ald., Diaphorus mundus Loew, D. opacus Loew, Asyndetus syntormoides Wheel., Chrysotus barbatus Loew, C. discolor Loew, C. picticornis Loew, Argyra robusta Jno., Leucostola cingulata Loew, Porphyrops effilatus Wheel., Syntormon affine Wheel., Neurigona carbonifer Loew, Medeterus aurivittatus Wheel., Hydrophorus philombrius Wheel., Scellus vigil O. S., Aphrosyllus praedator Wheel., Dolichopus acuminatus Loew, D. albicoxa Ald., D. detersus Loew,

D. lobatus Loew, D. ovatus Loew, D. pugil Loew, D. setifer Loew, D. sexarticulatus Loew, D. setosus Loew, Gymnopternus crassicauda Loew, G. debilis Loew, G. frequens Loew, G. phyllophorus Loew, Hercostomus unicolor Loew, Tachytrechus vorax Loew, Pelastoneurus laetus Loew, P. lamellatus Loew, P. neglectus Wheel.

Tabanidae

Hine, J. S., Columbus, O. Chrysops vittatus Weid., Tabanus fronto O. S., T. tener O. S., T. trispilus Wied.

PURCHASE

Onion fly, Phorbia ceparum Meig., enlarged models representing the egg, maggot, puparium, adult and an infested onion.

Cigar case bearer, Coleophora fletcherella Fern., an enlarged model representing the larva and its operations on an apple leaf. Both from Mrs **Otto Heidemann,** Washington, D. C.

Honey bee, Apis mellifica Linn., life history group.

European hornet, Vespo crabo Linn., life history group.

Ground beetle, Calosoma sycophanta Linn., life history group.

Corn stalk fly, Chlorops taeniopus Curtis, life history (in alcohol).

Cabbage butterfly, Pieris rapae Linn., life history group.

4 insects in amber.

The above from **The Kny-Scheerer Co.,** New York city.

Appendix A

STUDIES OF AQUATIC INSECTS

A PECULIAR NEW MAY FLY FROM SACANDAGA PARK

BY JAMES G. NEEDHAM

Among a small lot of neuropteroid insects sent me by Dr Felt for determination, was a new May fly with a remarkable development of the adbomen. Five of the abdominal segments have their flaring lateral margins expanded broadly, forming a wide parachute or aeroplane. This peculiarity has its parallel among known May flies only in the New Zealand species Oniscigaster wakefieldi; a species that was described by McLachlan 36 years ago, and made the subject of a special report by him to the British Association for the Advancement of Science[1] and an announcement to the Entomological Society of London,[2] and of two special papers.[3] The last paper gave full descriptions of both nymphal and adult[4] stages. Eaton's *Monographic Revision of Recent Ephemeridae* pages 224–26 gives a description of the adult insect, and adds [pl. 21, fig. 36] an excellent figure of the venation. In Hutton's list of New Zealand Neuroptera[5] is found another description of the adult. In 1899 Eaton[6] added two additional New Zealand species to the genus, O. intermedius, with considerably less dilatation of the lateral margins of the abdominal segments, and O. distans, with hardly any lateral expansion at all. So Eaton dropped from his characterization of the genus all mention of the onisciform abdomen, that had brought the type species into such prominent notice. In 1904 Hudson described the three species in his New Zealand Neuroptera [p. 42–45] and added a much needed description of the nymph of O. distans [pl. 1, fig. 11; pl. 11, fig. 15], which appears to agree quite well with that of the typical species.

The New York May fly about to be described exhibits a more

[1] Report of 1873, p. 118 (1874).
[2] Proceedings for 1874, p. vi.
[3] Ent. Mo. Mag. 10:108–9, wood cut, 1873; Linn. Soc. Zool. Jour. 1874. 12:39–46, pl. 5, fig. 1–5.
[4] The figure of the adult is copied by Sharpe in volume 5 of the Cambridge Natural History.
[5] New Zeal. Inst. Trans. 1898. 31:218.
[6] Ent. Soc. Lond. Trans. p. 292–93, pl. 10, fig. 6*a*, 6*b*, 6*c*.

marked dilatation of the lateral margins of the abdomen than even Oniscigaster wakefieldi. Its abdomen is more than oniscifform: it is a veritable parachute. The expansion involves segments 5 to 9 of the abdomen (in O. wakefieldi, only 6 to 9), and begins and ends more abruptly than in the New Zealand species. Our insect distinguishes itself from Oniscigaster, however, by lacking a median caudal seta, and by a symmetrical forking of the median vein, that forking being very unsymmetrical in Oniscigaster. And since in these respects it agrees with the genus Siphlurus, which stands in the system next Oniscigaster, I was at first inclined, in spite of the parachute, which in Oniscigaster is certainly of no great systematic consequence, to refer it to Siphlurus. By my key in Bulletin 86, N. Y. State Museum, page 22, it would be traced to Siphlurus, with the discrepancy that there is no backward prolongation of the sternite of the 9th abdominal segment in the female. It differs from Siphlurus, also, in having the claws of the forefeet differentiated from those of the other feet, being obtuse and inflated and not at all clawlike in form: also, in having the radial sector in the hind wing twice dichotomously and symmetrically forked. I think therefore that this species represents a genus distinct from both Siphlurus and Oniscigaster, although closely allied to both, and as such I describe it below. Probably the male, and the nymph if known, would add other differential characters.

Siphlonisca gen. nov.

Caudal setae two, slightly longer than the body. Claws of the front tarsus inflated and obtuse; those on the other tarsi hooked and clawlike, and similar each to each. Hind tibia longer than its tarsus: last segment of tarsus longest, in all the feet. Median and cubital veins in the forewing symmetrically forked, and the radial sector in the hind wing equally twice forked: no humeral angulation of hind wing. Mesothorax with a prominent midventral spine. Abdomen with conspicuous lateral expansion of the middle segments.

Type the following species.

Siphlonisca aerodromia sp. nov.

Length (♀) 19 mm, setae 20 mm additional; expanse of wings 37 mm. Abdomen 13 mm long and 2 mm wide, expanded to 4 mm wide on the 5th to 9th segments.

Color brown varied with paler. Head fawn-yellow above, marked with blackish on the sides of the vertical facial carina, and around the ocelli internally, and bearing a mark shaped like the zodiacal sign for Aries along the middle of the head, the open end of the sign being in front. Antennae pale, about as long as the head Thorax brown more or less blackish on the sides, and in the rear above, the top of the mesothorax somewhat rufescent and shining. Between the bases of the middle legs a stout, thornlike spine, inclined slightly to rear, arises from the mesosternum. Legs pale, the front femora being slightly darkened, and the tips of all tarsi indistinctly so.

Wings hyaline with brown veins, cross veins more or less bordered with brown in the costoradial strip, especially a few approximated cross veins near the bulla, and a line of others, similarly approximated, extending from that point posteriorly across the wing [pl. 2, fig. 1].

Abdomen with a definite pattern of brown and paler yellow (possibly, greenish in life), subcylindric, the lateral margins of segments 5 to 9 suddenly dilated into wide, flat expansions, which double the width; each of these expansions obtusely rounded anteriorly, and produced posteriorly at its hind angle into a broad, flat, triangular tooth. These expansions are dark brown, paler basally, where they abut on a black line on the lateral margin of the abdomen. On the pale dorsum there are submedian blackish ( )- marks on each segment, the marks increasing in size posteriorly, becoming streaks on segments 9 and 10 [pl. 2, fig. 2]. On the ventral surface there are corresponding small and distant paired dots as far as the 7th segment, diffuse on the 8th, and becoming elongate dashes on the 9th, and absent on the 10th. The 10th segment is short and cylindric, hardly surpassing the tip of the lateral teeth of the 9th. There is no ventral prolongation of the 9th sternite. Setae white, or slightly brownish at the extreme base.

A single female imago from Sacandaga Park, collected by C. P. Alexander, Johnstown, N. Y.

As the above description is going through the press, additional specimens representing both sexes, are received from Mr Alexander. These he collected at Sacandaga Park on June 6, 1909. Mr Alexander writes that they were abundant, and that they kept high in air where they were conspicuous by reason of the wide abdomen.

The male is of about the same size as the female, with white,

nearly bare setae 25 mm long, and brown fore legs whose tarsi are 9 mm long The enlarged and smoothly rounded eyes of the male just meet each other above the head. The face is black, with the vertical nasal carina yellow, and also a spot behind the ocelli and between the compound eyes. Otherwise the coloration is as in the female. The segments of the fore tarsus of the male are of nearly equal length, the 5th being perhaps a trifle shorter than the others: in middle and hind tarsi, the four basal segments are of approximately equal length, while the 5th is as long as any two other segments. Unlike the female, which has blunt and flabellate claws on the fore tarsi, those of the male are on all tarsi sharply hooked and similar. In several of the specimens the radial sector of the hind wing has its second forks less equal than in the female described above, the lower fork being deeper than the upper.

The appendages of the male abdomen are strongly chitinized, the forceps base is longer than the 9th segment, widened distally, broadly truncated on each hind angle to receive the much narrower base of the forceps, and angularly excavate on the wrinkled but strongly chitinized hind margin in a broadly triangular rear notch. The forceps limbs are long and strongly divaricate and conspicuous. Each consists of four segments, of which the first, third and fourth are short and of about equal length and are together about equal in length to the second segment. The apical half of the forceps is transversely wrinkled, and it is wholly dark brown in color.

After studying the male I conclude that the features which chiefly distinguish this genus from Siphlurus are in both sexes the onisciform abdomen, and the midventral thoracic spines.

While the foregoing is passing through the printer's hands another species of Mayfly of the genus Potamanthus has been sent me by Dr Felt, collected on June 29, 1909 at Schenectady. It is larger than P. diaphanus, described in the report of the State Entomologist for 1907 [p. 193–94, and pl. 10, fig. 5], and is readily distinguished therefrom by the abbreviated middle caudal seta and by the form of the appendages in the male.

Potamanthus inequalis sp. nov.

Length of body 11 mm, of fore leg about 10 mm, of lateral setae 26 mm, of middle seta 15 mm, expanse of wings 24 mm. Color white, with fuscous head, pale yellowish thorax and translucent white abdomen. Legs white except the slightly infuscated tips of

fore tarsi and tibiae, and the joinings of the segments of the same tarsi. Wings whitish hyaline, with pinkish iridescence. End segments of the abdomen of a dull satiny whiteness on the dorsal side. Setae white, with the joinings very faintly darker in color, the middle seta but little more than half as long as the laterals.

The male forceps is not remarkably different from that of P. diaphanus [loc. cit. fig. 5], but the inner appendages are very differently formed as shown in the drawing herewith presented.

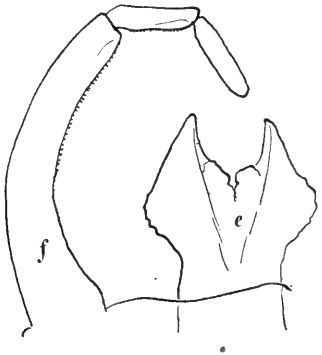

FIG. 22 Potamanthus inequalis n. sp.: *f*, forceps limb; *e*, inner appendages

The pinned submarginal skin of the same specimen is white: its fore femora are 10 mm long, and its setae (broken) are clothed with copious soft white pubescence.

Appendix B

CATALOGUE OF THE DESCRIBED SCOLYTIDAE OF AMERICA, NORTH OF MEXICO

BY J. M. SWAINE

The following catalogue is intended to include all names that have been proposed for species of Scolytidae occurring in America, north of Mexico, with citations of published articles referring thereto. The references were collected originally for our use, while working on the family Scolytidae. They include practically all the literature published on the North American species of the family.

Changes should, we believe, be made in the location of a few of the species here listed, and several of the genera may, with advantage, be divided. These changes require considerable discussion and illustration, and would perhaps be more effectively made in connection with the description of the large number of undescribed species of North American Scolytidae known to collectors. As a synonymic catalogue of the North American species of Scolytidae has been promised by the American authority on this family, I have reported the priority of the various genera and species just as found in the literature. The object of this paper is merely to present the references to that literature. The habitat and food plants have been compiled from the literature, the Cornell University collection and our own notes. References to several well known lists are not included. For convenience of reference the genera and species are arranged alphabetically.

As regards the conflicting names of Eichhoff, Zimmerman and Leconte, P. p u l l u s Zimm., described in the Transactions of the American Entomological Society, 1868, volume 2, undoubtedly has precedence over P. c r i b r i p e n n i s Eich., Berl. Ent. Zeit. March 1869. Though the contrary has been repeatedly stated, it seems perfectly clear to me that H. r u f i p e s Eich. and H. s a l e b r o s u s Eich. were described before H. o p a c u l u s Lec. and H. s c a b r i p e n n i s Zimm., as will appear from the following: H. r u f i p e s and H. t e n u i s were described by Eichhoff on page 147 of Berl. Ent. Zeit. for 1868, and H. s a l e b r o s u s on page 146 of the same article. In the Transactions of the

American Entomological Society, 1868, volume 2, where the descriptions of H. opaculus and H. scabripennis appear, Dr Zimmerman begins his description of H. tenuis as follows: "H. tenuis [Hylastes tenuis Eich. Berl. Ent. Zeit. 1868, 147]." Also Leconte, in the same paper [*see* p. 169, 173] refers to pages 147 and 149 of Eichhoff's article just mentioned. There is therefore no question but that both Dr Zimmerman and Dr Leconte had Dr Eichhoff's pages 146 and 147 before them when their descriptions of H. opaculus and H. scabripennis were written.

In regard to the use of the names Ips, Tomicus, and Hylastes, perhaps a few words will be pardoned. The genus Ips was erected in 1775 by De Geer, Dermestes typographus Linné being the first species described. All the other species included by De Geer in the genus Ips have since been removed to other genera, therefore leaving typographus as type.

In 1802 Latreille described the genus Tomicus, including the single species, Hylesinus piniperda Fabr., which would therefore be the type.

In 1807 Latreille referred Dermestes typographus Linné to the genus Tomicus, and gave a description of the genus.

In 1836 Erichson erected the genus Hylastes with Bostrichus ater (= Hylesinus piniperd'a Fabr.) as the type.

Until recently Ips De Geer, 1775, seems to have been disregarded, and the name Ips has been applied to a genus of beetles of the family Nitidulidae. Tomicus Latr., 1802, has also been disregarded. Tomicus Latr., 1807, has been used for the allies of typographus and Hylastes Er., 1836, for the allies of ater. Ips De Geer, 1775, has therefore priority over Tomicus Latr., 1807, and Tomicus Latr., 1802, has priority over Hylastes Er., 1836.

The name Ips Fabricius, of the family Nitidulidae, dates from the year 1776 [Fabricius, Gen. Ins. p. 23].

If the above synonymy is correct, and I believe it to be, it is better to adopt it at once, even at the risk of temporary confusion.

Following Bedel [Faun. Col. Bassin Seine, Rhyn, 1888], Hylastes is dropped in this paper and the terms Ips and Tomicus are used as indicated above.

Geoffroy's name Scolytus dates from 1762, and therefore can not be accepted. In 1776, O. F. Muller [Zool. Dan. Prodr. 57], described Scolytus punctatus which is certainly not a scolytid: "Niger, thorace fossulato, elytris lineis quatuor elevatis,

intervallo punctorum duplici serie." The name Scolytus should therefore give place to Eccoptogaster Herbst, 1793. The above is pointed out by C. L. Ganglbauer [Münch. Koleopt. Zeit. 1903, p. 311, footnote (sep.)] and has been followed by Trédl in his catalogue of the European Borkenkäfer. I have been unable to verify Dr Leconte's reference to Olivier, 1789 [Am. Phil. Soc. Proc. 1876. 15:371].

According to Gemminger and Harold, Cat. Col., the following names should be added to the synonymy:

Hylurgops glabratus *Zett.*
  crenatus *Panz.* Fn. Germ. 15, 7
  paykulli *Duftschm.* Fn Austr. 3:99
Hylastinus obscurus *Marsh*
  crenatulus *Duftschm.* Fn. Austr. 3:104
  fuscescens *Steph.* Ill. Brit. 3:365
  piceus *Steph.* Ill. Brit. 3:365
Crypturgus pusillus Gyll.
  aphodioides Villa. Col. Eur. duppl. Supl. 1833, p. 36
Hypothenemus eruditus West.
  ruficollis Fabr. Syst. El. 2:388. Ferr. Berl. Ent. Zeit. 1868. p. 255
Trypodendron lineatus Oliv.
  limbatum Payk. Fn. Suec. 3:144
  marginicolle Dahl.
  signatum Fabr. Ent. Syst. 1, 2:363
    Duftschm. Fn. Austr. 3:95
    Waringi Curtis, Ann. Nat. Hist. 1840. 5:279
Xyleborus dispar Fabr.
  rufipes Latr. Dej. Cat. ed. 3. p. 332
Dryocoetes autographus Ratz.
  var. micographus Oliv. Ent. 5, 78, p. 9, t. 2, f. 12
Ips pini Say.
  vicinus Dej. Cat. ed. 3, p. 332
Xylocleptes bispinus Duft.
  marginatus Megerle.
Eccoptogaster rugulosus Ratz.
  haemorrhous Schmidberger, Kollar. Naturg. schadl. Ins. 1837. p. 271.
    Meg. Sturm. Cat. 1826. p. 194
  flavicornis Géné. Dej. Cat. ed. 3, p. 332
  punctatus Mus. Berol.
Phloeotribus frontalis Oliv.
  dubius Eich., Berl. Ent. Zeit. 1868. p. 150
  setulosus Eich. *loc. cit.* 149

Gemminger and Harold list the following:

Phloeotribus americanus Dej. Cat. ed. 3. p. 331, Amer. bor.

Cryphalus asperulus Eich., Berl. Ent. Zeit., 1871. p. 133, was renamed by Eichhoff in Rat. Tom., 1878, p. 153, as Stephanoderes cassiae; habitat given as "Asia (?)."

I wish to acknowledge my indebtedness to Prof. J. H. Comstock for the material he so kindly furnished, to Dr E. P. Felt for helpful criticism, and my especial obligation to Prof. A. D. McGillivray for his frequent assistance and advice.

Entomological Laboratory,
Cornell University, July 1, 1907

KEYS FOR DETERMINING THE GENERA OF THE IPIDAE (SCOLYTINAE) AND PLATYPODIDAE (PLATYPODINAE) OF AMERICA NORTH OF MEXICO

The arrangement of family and subfamily names in the following keys seems the most natural at present. Published keys have been freely used.

Cactopinus Schwz. (which has been omitted from the generic key) is distinguished from all other described North American Scolytidae by the sculpture of the pronotum: "Disk in both sexes, with a longitudinal, tuberculated, and distinctly elevated, median area which projects beyond the base of the thorax as a triangular lobe," forming a "hoodlike projection over the scutellum." [E. A. Schwarz. Psyche, v. 8, sup. 1, p. 11]

Families

a Head narrower than the prothorax; 1st tarsal segment shorter than the others united; eyes oblong or divided [*see* pl. 4, fig. 6; pl. 5, fig. 10, 11; pl. 8, fig. 21; pl. 9, fig. 25; pl. 11, fig. 36, 37].....Ipidae[1]

aa Head broader than the prothorax; 1st tarsal segment as long as the others united; eyes round, subconvex [*see* pl. 3, fig. 1, 2].....
Platypodidae

The family Platypodidae is represented in America, north of Mexico, by one genus, Platypus Herbst.

Subfamilies of the Ipidae

a Anterior "tibiae produced at the upper apical angle beyond the tarsal insertion into a mucro or bifid process." (Blandford) [*see* pl. 3, fig. 5]

b Foretarsus with the 3d segment bilobed; upper or outer border of the foretibiae unarmed or with few very small teeth.....
Eccoptogasterinae (Scolytini)

bb Foretarsus with the 3d segment not bilobed; the outer border of the foretibiae strongly dentate [*see* pl. 3, fig. 3].....Erineophilinae

aa Foretibiae not produced at the upper or outer apical angle beyond the tarsal insertion into a mucro or bifid process [*see* pl. 4, fig. 6; pl. 5, fig. 10, 11]

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[1] Ganglbauer. Munchener Koleopterologische Zeitschrift. 1903, band 1, 311.

b Head suboblong and prominent; pronotum nearly equably punctured, not more strongly roughened in front; tarsi with the 4th segment much smaller than the 3d, which is usually dilated and heartshaped or bilobed [pl. 7, fig. 20, pl. 8, fig. 21; pl. 9, fig. 25; pl. 10, fig. 26; pl. 11, fig. 31, 32, 36, 37].....Hylesininae

bb Head globose, not visible from above, deeply immersed in the pronotum, which is prolonged and usually strongly roughened with stout, backward pointing spines in front, and smooth or punctured behind; 3d tarsal segment simple, 4th segment distinct [pl. 4, fig. 6, pl. 5, fig. 10–12; pl. 7, fig. 19].....Ipinae (Tomicini)

Genera of the Eccoptogasterinae

a Foretibiae with the outer apical angle produced into a curved spine, outer border unarmed

b Venter of abdomen with the caudal portion bent abruptly dorsad [pl. 3, fig. 4].....Eccoptogaster Herbst. (Scolytus Geoff.)

bb Venter of abdomen regularly curved, nearly horizontal..Loganius Chap.

aa Foretibiae with the outer apical angle produced into a bifid spine, outer border near the base of the spine armed with a small tooth

b "Prothorax with a defined side margin."..... Bothrosternus Eich.

bb "Prothorax with no defined side margin, but usually with a fold above the femoral impression

c "Sutures of the club curved; rostrum narrower than the front; body oval." . . . .Pagiocerus Eich.

cc "Sutures of the club straight; rostrum scarcely narrower than the front; body oblong." (Blandford).....Cnesinus Lec.

The subfamily Erineophilinae contains one genus, Erineophilus Hopk.

Genera of the Hylesininae

a Antennal funicle with less than 4 segments

b Antennal funicle with 2 segments; club not distinctly annulated..... Crypturgus Erich.

bb Antennal funicle with 3 segments; club annulated.....Dolurgus Eich.

aa Antennal funicle with more than 4 segments

b Antennal club not annulated, pubescent on both sides [pl. 9, fig. 24]

c Eyes completely divided.....Polygraphus Erich.

cc Eyes not divided [pl. 10, fig. 26].....Chramesus Lec.

bb Antennal club annulated [pl. 9, fig. 27; pl. 10, fig. 28–30]

c Antennal club lamellate, of 3 loosely adjoined segments [pl. 10, fig. 30] . . . .Phloeotribus Latr.

cc Antennal club not lamellate, segments closely connate [pl. 9, fig. 27; pl. 10, fig. 28, 29]

d Antennal club strongly compressed

e Antennal funicle with 7 segments.....Hylesinus Fabr.

ee Antennal funicle with 5 segments

f Front coxae not contiguous

g Antennal funicle with outer segments distinctly broader; coxae moderately distant [pl. 9, fig. 27]..... Phloeosinus Chap.

gg Antennal funicle with outer segments scarcely broader; coxae very narrowly separated.....Chaetophloeus Lec.

ff Front coxae contiguous

g Eyes emarginate or sinuate in front; prosternum in front of coxae very short or obsolete; antennal club oval-elongate

h Antennal club with 3 segments; eyes emarginate in front; foretibiae with very few teeth on the outer margin..... Carphoborus Eich.

hh Antennal club with 4 segments; eyes sinuate rather than emarginate in front; foretibiae with a row of stout teeth on the outer margin.....Renocis Casey

gg Eyes entire; prosternum distinct in front of the coxae; antennal club subcircular [pl. 7, fig. 20; pl. 10, fig. 28]..... Dendroctonus Erich.

dd Antennal club not strongly compressed, subglobular or conical

e 1st, 2d and 5th ventral segments of the abdomen subequal in length, 3d and 4th segments shorter; forecoxae widely separated [pl. 11, fig. 34]

f Antennal club with the 1st and 2d segments subequal in length, each as long as segments 3 and 4 united [pl. 12, fig. 39]..... Hylastinus Bedel

ff Antennal club with the 1st segment much longer than the 2d, nearly as long as segments 2, 3 and 4 united.....Scierus Lec.

ee 1st and 5th ventral segments distinctly longer than the others; forecoxae narrowly separated or contiguous [pl. 11, fig. 33]

f Mesosternum protuberant; 3d tarsal segment dilated and bilobed; elytra separately rounded at the base [pl. 8, fig. 23; pl. 11, fig. 31, 35, 36].....Hylurgops Lec.

ff Mesosternum not protuberant; 3d tarsal segment subequal in width to the 2d, emarginate rather than bilobed; bases of elytra in a nearly straight line not separately rounded [pl. 9, fig. 22; pl. 11, fig. 32, 37] Tomicus Latr., 1802..... (Hylastes Erich.)

Genera of the Ipinae

a Antennal funicle with less than 6 segments

b Antennal club pubescent on both sides

c Antennal club annulated on both sides; eyes not completely divided

d Antennal funicle with only one segment [pl. 4, fig. 8]

e Body robust; foretibiae without transverse ridges on outer side.. Corthylus Erich.

ee Body slender; foretibiae with transverse ridges on the outer side [pl. 5, fig. 11].....Pterocyclon Eich.

dd Antennal funicle with more than 1 segment

e Prothorax wider than long.....Hypothenemus Westw.

ee Prothorax longer than wide

f Maxillary lobe pilose, without radiating spines on outer edge; woodborers [pl. 6, fig. 15].....Gnathotrichus Eich.

ff Maxillary lobe, with radiating spines on the outer edge; bark borers [pl. 6, fig. 14]

g Base of prothorax bordered by a fine, raised line; elytral declivity of the two sexes alike..... Pityophthorus Eich.

gg Base of prothorax without a raised border; teeth of elytral declivity much larger in the male than in the female..... Pityogenes Bedel

cc Antennal club not annulated; eyes completely divided; elytral declivity oblique, not excavated and not toothed [pl. 5, fig. 12, 13] Trypodendron Steph. (Xyloterus Erich.)

bb Antennal club not pubescent on both sides, almost entirely corneous and usually not at all annulated on the inner face; at most, the outer segments of the club show from the inner side but slightly at the distal extremity

c Antennal club obliquely truncate at the distal end of the outer surface, with the distal segments of the club confined to the truncate surface and telescoped so that the flat, pubescent, truncate surface appears concentrically annulated [pl. 6, fig. 18, ant.; pl. 13, fig. 42]

d Antennal funicle with 4 segments; elytral pubescence scalelike.... Cryphalus Erich.

dd Antennal funicle with 5 segments; elytral pubescence not scalelike

e Elytral declivity excavated and toothed..... Ips DeG., in part (Tomicus Latr. 1807)

ee Elytral declivity not excavated, and without prominent teeth

f Caudal margin of prosternum extending into a long spinelike process which projects caudad between the forecoxae. Maxillary lobe with radiating spines on the outer edge, bark borers [pl. 6, fig. 14, 18].....Dryocoetes Eich.

ff Caudal margin of the extremely short prosternum at most but slightly produced on the median line; maxillary lobe pilose, without radiating spines on the outer edge, borers in wood and nuts [pl. 6, fig. 15, 17]

g Tibiae with the outer edge straight, spinose; dorsum of prothorax not more strongly roughened in front than behind.. Coccotrypes Eich.

gg Tibiae with the outer edge curved, finely serrate; dorsum of prothorax much more strongly roughened in front than behind .....Xyleborus Eich.

cc Antennal club with the distal segments not telescoped to form a flat, truncate surface, distinct, and not confined to the distal extremity of the outer surface [pl. 6, fig. 16]

d Elytral declivity not deeply excavated, at most only slightly concave; 2d segment of the antennal club surrounding the 1st, which is nearly oval [pl. 12, fig. 38].....Xylocleptes Ferr.

dd Elytral declivity deeply excavated and toothed; 2d segment of antennal club not nearly surrounding the 1st, the 1st suture being straight or angular [pl. 6, fig. 16]..... Ips DeG., in part (Tomicus Latr. 1807)

aa Antennal funicle with 6 segments

b Antennal club distinctly annulated on both sides; elytra aculeate at the tip .....Micracis Lec.

bb Antennal club distinctly annulated on only 1 side; elytra not aculeate at the tip .....Thysanoes Lec.

MacDonald College, Quebec
October 15, 1908

Family SCOLYTIDAE

1837 Ratzeburg. Forstins. 1:156–68
1837 Kirby. Fauna. Am. Bor. p. 191
1856 Nordlinger. Nachtr. f. Ratzeb. Forstins. p. 17–45
1856 Perris. Ann. Ent. Soc. France, p. 173–245, pl. 5, fig. 299–323
1866 Lacordaire. Hist. Nat. Ins. Col. 7:349–55
1869 Chapuis. Syn. Scol.
1872 Gemminger & Harold. Cat. Col. bd. IX: 2669
1875 Lindermann, Beitr. Kentniss Borkenk. Russl. Bul. Mosc. 49, pt 1, p. 131–46
1876 Leconte. Am. Phil. Soc. Proc. 15:341–91
1876 Lindemann. Mon. Borkenk. Russl. Bul. Mosc. 52, pt 1, p. 158–87
1877 Perris. Larves des Coleopteres, p. 413
1877 Provancher. Faun. Ent. Can. 1:563–64
1878 Eichhoff. Rat. Tom. p. 6
1881 Eichhoff. Die Europ. Borkenk. p. 1–33
1883 Leconte & Horn. Col. N. A. p. 512–13
1888 Bedel. Faun. Col. Seine, p. 385
1889 Cholodkovsky. Gänge Borkenk. Hor. Ent. Ross. 22:262
1895 Reitter. Bestimmung. der Borkenk.
1895 Judeich-Nitsche. Forstins. 1:435–41
1895 Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 81–88
1898 Lowendal. De Danske Barkbiller
1899 Sharp. Camb. Nat. Hist. Insects. pt II, p. 294–95
1901 Barbey. Scol. l'Europ. Cent. 15, 33
1903 Ganglbauer. Munch. Koleopt. Zeit. 1:309, 310
1904 Comstock. Manual for the Study of Insects, p. 596–98
1905 Kellogg. American Insects, p. 298–300
1905 Nüsslin, Leitfaden der Forstinsectenkunde
1907 Trédl. Nahrungs. Verbreit. Borkenk. Europ. [Ent. Blätter, Nr. 1 mit 6]

Subfamily PLATYPODINAE

References are given under Platypus.

PLATYPUS Herbst

1793 Herbst. Die Kaefer. 5:128, gen. 34
1807 Latreille. Gen. Crust. et Ins. 3:277
1836 Erichson. Wieg. Archiv. 2:64
1839 Ratzeburg. Forstins. 1:230
1864 Eichhoff. Berl. Ent. Zeit. p. 17, 42, 43, 46
1866 Chapuis. Mon. Plat.
1866 Lacordaire. Hist. Nat. Ins. Col. 7:356, 357
1868 Leconte. Am. Ent. Soc. Trans. 2:150–51
1876 Leconte. Am. Phil. Soc. Proc. 15:342–43

1881 Eichhoff. Die Europ. Borkenk. 54, 305–7
1883 Leconte & Horn, Col. N. A. p. 513–14
1888 Bedel. Faun. Col. Seine, p. 385, 404, 421
1895 Judeich-Nitsche. Forstins. 1:441–42
1895 Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 89–95
1897 Hubbard. U. S. Div. Ent. Bul. 7. n. s. p. 14, 15
1901 Barbey. Scol. l'Europ. Cent. 15, 115

CYLINDRA Ill.

1825 Illiger. Duftschmidt. Faun. Aust. 3:87
1866 Chapuis. Mon. Plat. p. 97
1888 Bedel. Faun. Col. Seine, p. 404

1 **compositus** Say

1828 Platypus. Say. Acad. Nat. Sci. Phila. Jour. 3:324; ed. Lec. 2:182
1836 Platypus. Erichson. Wieg. Archiv. 2:65
1866 Platypus. Chapuis. Mon. Plat. p. 163, fig. 75
1876 Platypus. Leconte. Am. Phil. Soc. Proc. 15:344
1878 Platypus. Schwarz. Am. Phil. Soc. Proc. 17:468
1889 Platypus. Schwarz. Ent. Soc. Wash. Proc. 1:149
1891 Platypus. Riley & Howard. Ins. Life, 3:418
1892 Platypus. Riley. Ins. Life, 5:17
1893 Platypus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 127; Bul. 32, p. 207
1894 Platypus. Hopkins. Can. Ent. 26:277
1895 Platypus. Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 93, 94, 106
1897 Platypus. Hubbard. U. S. Div. Ent. Bul. 7 n. s., p. 14
1904 Platypus. Hopkins. U. S. Div. Ent. Bul. 48, p. 39, 45
1904 Platypus. Hopkins. U. S. Dep't Agric. Yearbook, p. 384
1907 Platypus. Pierce. Neb. Zool. Lab. Studies No. 78, p. 289

parallelus Fabr.

1792 Bostrichus. Fabr. Syst. El. 2:384
1866 Platypus. Chapuis. Mon. Plat. p. 164, fig. 76
1876 (?)= compositus Say. Leconte. Am. Phil. Soc. Proc. 15:344

tremiferus Chap.

1866 Platypus. Chapuis. Mon. Plat. p. 176, fig. 85
1876 (?) = compositus Say. Leconte. Am. Phil. Soc. Proc. 15:344

perfossus Chap.

1866 Platypus. Chapuis. Mon. Plat. p. 176, fig. 86
1876 (?) = compositus Say. Leconte. Am. Phil. Soc. Proc. 15:344

rugosus Chap.

1866 Platypus. Chapuis. Mon. Plat. p. 176, fig. 87
1876 (?) = compositus Say. Leconte. Am. Phil. Soc. Proc. 15:344

Habitat. United States south of Delaware bay and Illinois.

Food plants. Quercus, Acer, Fagus, Castanea, Ulmus, Tilia, Magnolia, Taxodium and many others.

2 **cylindrus** Fabr.

1793 Bostrichus. Fabr. Ent. Syst. 2:364
1801 Bostrichus. Fabr. Syst. El. 384, tab. II
1837 Platypus. Ratzeburg. Forstins. 1:188, t. X, fig. 13
1866[1] Platypus. Chapuis. Mon. Plat. p. 246, fig. 147
1881 Platypus. Eichhoff. Borkenk. p. 305, fig. 108, 109
1895 Platypus. Judeich-Nitsche. Forstins. 1:547
1901 Platypus. Barbey. Scol. l'Europ. Cent. 115
1907 Trédl. Nahrungs. Verbreit. Borkenk. Europ. 19
Habitat. Europe, Asia, America.
Food plants. Quercus, Castanea, Fagus, Fraxinus.

3 **flavicornis** Fabr.

1776 Bostrichus. Fabr. Gen. Ins. Mant. p. 212
1781 Bostrichus. Fabr. Spec. Ins. 1:67
1787 Bostrichus. Fabr. Mant. Ins. p. 36
1793 Bostrichus. Herbst. Kafer, 5:118
1793 Bostrichus. Fabr. Ent. Syst. 2:364
1801 Bostrichus. Fabr. Syst. El. 2:384
1808 Scolytus. Olivier. Ent. gen. 78, p. 4, t. 1, fig. 1.a, b
1866 Platypus. Chapuis. Mon. Plat. p. 154–56
1876 Platypus. Leconte. Am. Phil. Soc. Proc. 15:343
1878 Platypus. Schwarz. Am. Phil. Soc. Proc. 17:468
1886 Platypus. Lugger. Ent. Soc. Wash. Proc. 1:36
1894 Platypus. Hopkins. Can. Ent. 26:277
1895 Platypus. Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 93, 95, 104
1897 Platypus. Hubbard. U. S. Div. Ent. Bul. 7. n. s. p. 15
1900 Platypus. Smith. Cat. Ins. N. J. p. 361

bidentatus Dej.

1837 Platypus. Dej. Cat. ed. 3, p. 333
1866 = flavicornis Fabr. Chapuis. Mon. Plat. p. 155

disciporus Chap.

1865 Platypus. Chapuis. Mon. Plat. p. 219, fig. 123
1876 = flavicornis Fabr. Leconte. Am. Phil. Soc. Proc. 15:343
Habitat. Southern United States, Mexico.
Food plants. Many deciduous and coniferous trees.

4 **punctulatus** Chap.

1866 Platypus. Chapuis. Mon. Plat. p. 199, fig. 110
1876 Platypus. Leconte. Am. Phil. Soc. Proc. 15:345
Habitat. Texas.
Food plants. (?)

5 **quadridentatus** Oliv.

1795 Scolytus. Olivier. Ent. 78. 3, pl. 1, fig. 3
1866 Platypus. Chapuis. Mon. Plat. p. 337

[1] For other references *see* Chapuis's Mon. Plat. p. 246.

1876 Platypus. Leconte. Am. Phil. Soc. Proc. 15:343, 344
1878 Platypus. Schwarz. Am. Phil. Soc. Proc. 17:468
1893 Platypus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 127; Bul. 32, p. 207
1894 Platypus. Hopkins. Can. Ent. 26:277
1897 Platypus. Hubbard. U. S. Div. Ent. Bul. 7. n. s. p. 15

blanchardi Chap.

1866 Platypus. Chapuis. Mon. Plat. p. 185, fig. 96
1876 = quadridentatus Oliv. Leconte. Am. Phil. Soc. Proc. 15:344
Habitat. West Virginia, Florida, Texas.
Food plants. Many deciduous and coniferous trees.

6 **rugulosus** Chap.

1866 Platypus. Chapuis. Mon. Plat. p. 192, fig. 103
1876 Platypus. Leconte. Am. Phil. Soc. Proc. 15:343, 344
1895 Platypus. Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 92, 95, 107
1905 Platypus. Hopkins. Ent. Soc. Wash. Proc. 7:71

reticulatus Chap.

1866 Platypus. Chapuis. Mon. Plat. p. 194, fig. 104
1896 = rugulosus Chap. Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 107

emarginatus Chap.

1866 Platypus. Chapuis. Mon. Plat. p. 199, fig. 109
1896 = rugulosus Chap. Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 107
Habitat. Lower California, Mexico, Guatemala, Panama.
Food plants. (?)

Subfamily **SCOLYTINAE**

1837 Ratzeburg. Forstins. 1:157–230
1866 Lacordaire. Hist. Nat. Ins. Col. 7:355, 356, 357
1868 Zimmerman. Am. Ent. Soc. Trans. 2:141
1869 Chapuis. Syn. Scol.
1876 Leconte. Am. Phil. Soc. Proc. 15:342, 345
1878 Eichhoff. Rat. Tom. p. 6
1881 Eichhoff. Die Europ. Borkenk. p. 33
1883 Leconte & Horn. Col. N. A. p. 513, 514, 515
1888 Bedel. Faun. Col. Seine, p. 385, 386
1895 Judeich-Nitsche Forstins. 1:442
1895 Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 81, 118–20

BOTHROSTERNUS Eich.

1868 Eichhoff. Berl. Ent. Zeit. p. 150
1869 Chapuis. Syn. Scol. p. 24
1873 Chapuis. Mem. Soc. Liège, p. 232
1883 Leconte & Horn. Col. N. A. p. 523
1895 Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 131, 132

7 **hubbardi** Sz.

1886 Bothrosternus. Schwarz. Ent. Am. 2:54
1896 (?) Bothrosternus. Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 131, 132
Habitat. Florida.
Food plant. (?) Hicoria.

CACTOPINUS Schwarz

1899 Schwarz. Psyche, vol. 8, sup. 1, p. 11

8 **hubbardi** Sz.

1899 Cactopinus. Schwarz. Psyche, vol. 8, sup. 1, p. 11
1899 Cactopinus. Schwarz. Ent. Soc. Wash. Proc. 4:368
Habitat. Arizona.
Food plant. Cereus giganteus.

CARPHOBORUS Eich.

1864 Eichhoff. Berl. Ent. Zeit. p. 27, 44, 46, tab. 1, fig. 8
1868 Leconte. Am. Ent. Soc. Trans. 2:172
1873 Chapuis. Mem. Soc. Liège, p. 248
1876 Leconte. Am. Phil. Soc. Proc. 15:383
1881 Eichhoff. Borkenk. p. 129
1883 Leconte & Horn. Col. N. A. p. 523
1895 Judeich-Nitsche. Forstins. 1:445, 446

9 **bicristatus** Chap.

1869 Carphoborus. Chapuis. Syn. Scol. p. 97
1873 Carphoborus. Chapuis. Mem. Soc. Liège, p. 249
1876 Carphoborus. Leconte. Am. Phil. Soc. Proc. 15:383, 384
1890 Carphoborus. Packard. U. S. Ent. Com'n, 5th Rep't, p. 726
1900 Carphoborus. Smith. Cat. Ins. N. J. p. 364
Habitat. Georgia ("Middle and Southern States," Chapuis).
Food plant. Pinus.

10 **bifurcus** Eich.

1868 Carphoborus. Eichhoff. Berl. Ent. Zeit. p. 147
1868 Dendroctonus. Zimmerman. Am. Ent. Soc. Trans. 2:148
1869 Dendroctonus. Chapuis. Syn. Scol. p. 97
1873 Carphoborus. Chapuis. Mem. Soc. Liège, p. 249
1876 Carphoborus. Leconte. Am. Phil. Soc. Proc. 15:383
1888 Carphoborus. Schwarz. Ent. Soc. Wash. Proc. 1:80
1890 Carphoborus. Packard. U. S. Ent. Com'n, 5th Rep't, p. 725, 726, fig. 255
1900 Carphoborus. Smith. Cat. Ins. N. J. p. 364
Habitat. District of Columbia, Tennessee, Gulf States.
Food plant. Pinus.

11 **simplex** Lec.

1876 Carphoborus. Leconte. Am. Phil. Soc. Proc. 15:383
1890 Carphoborus. Packard. U. S. Ent. Com'n, 5th Rep't, p. 725
Habitat. California.
Food plants. (?)

CHAETOPHLOEUS Leconte

1876 Leconte. Am. Phil. Soc. Proc. 15:382

12 **hystrix** Lec.

1858 Hylesinus. Leconte. Acad. Nat. Sci. Phila. Proc. p. 81
1868 Hylesinus. Leconte. Am. Ent. Soc. Trans. 2:171
1876 Chaetophloeus. Leconte. Am. Phil. Soc. Proc. 15:382
1892 Chaetophloeus. Blaisdell. Ins. Life, 5:36
Habitat. California.
Food plant. Rhus integrifolia.

CHRAMESUS Leconte

1868 Leconte. Am. Ent. Soc. Trans. 2:168
1876 Leconte. Am. Phil. Soc. Proc. 15:374
1883 Leconte & Horn. Col. N. A. p. 522
1895 Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 142, 169

RHOPALOPLEURUS Chapuis

1869 Chapuis. Syn. Scol. p. 46
1873 Chapuis. Mem. Soc. Liège, p. 254
1876 Leconte. Am. Phil. Soc. Proc. 15:374

13 **hicoriae** Lec.

1868 Chramesus. Leconte. Am. Ent. Soc. Trans. 2:168
1876 Chramesus. Leconte. Am. Phil. Soc. Proc. 15:375
1878 Chramesus. Hubbard & Schwarz. Am. Phil. Soc. Proc. 17:666
1886 Chramesus. Schwarz. Ent. Am. 2:54
1890 Chramesus. Packard. U. S. Ent. Com'n, 5th Rep't, p. 296
1890 Chramesus. Smith. Ent. Am. 6:53, fig.
1891 Chramesus. Hamilton. Can. Ent. 23:65
1892 Chramesus. Hamilton. Ins. Life, 4:268
1893 Chramesus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 140 etc.; Bul. 32, p. 212
1893 Chramesus. Smith. N. J. Agric. Rep't, p. 537, fig. 95
1894 Chramesus. Hopkins. Can. Ent. 26:280
1895 Chramesus. Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 170
1895 Chramesus. Hamilton. Am. Ent. Soc. Trans. 22:346, 378
1898 Chramesus. Chittenden. Ent. Soc. Wash. Proc. 4:78
1899 Chramesus. Lugger. Minn. Agric. Exp. Sta. Bul. 66, p. 316
1900 Chramesus. Smith. Cat. Ins. N. J. p. 364
1906 Chramesus. Felt. N. Y. State Mus. Mem. 8, 2:336, 448–49, 502

lecontei Chap.

1869 Rhopalopleurus. Chapuis. Syn. Scol. (?)
1873 Rhopalopleurus. Chapauis. Mem. Soc. Liège, p. 255
1876 =icoriae Lec. Leconte. Am. Phil. Soc. Proc. 15:375
Habitat. Canada, eastern, middle and western United States
Food plants. Hicoria, oak buds (?).

14 **chapuisii** Lec.

1876 Chramesus. Leconte. Am. Phil. Soc. Proc. 15:375
1886 Chramesus. Schwarz. Ent. Am. 2:54
Habitat. Louisiana.
Food plants. (?)

CNESINUS Leconte

1868 Leconte. Am. Ent. Soc. Trans. 2:171
1876 Leconte. Am. Phil. Soc. Proc. 15:378
1883 Leconte & Horn. Col. N. A. p. 523
1895 Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 132, 135

NEMOPHILUS Chapuis

1869 Chapuis. Syn. Scol. p. 27
1873 Chapuis. Mem. Soc. Liège, p. 235
1876 Leconte. Am. Phil. Soc. Proc. 15:378

15 **strigicollis** Lec.

1868 Cnesinus. Leconte. Am. Ent. Soc. Trans. 2:171
1876 Cnesinus. Leconte. Am. Phil. Soc. Proc. 15:378
1878 Cnesinus. Schwarz. Am. Phil. Soc. Proc. 17:468
1886 Cnesinus. Schwarz. Ent. Am. 2:54
1887 Cnesinus. Hamilton. Can. Ent. 19:66
1890 Cnesinus. Schwarz. Ins. Life, 3:87
1891 Cnesinus. Schwarz. Ent. Soc. Wash. Proc. 2:79
1895 Cnesinus. Hamilton. Am. Ent. Soc. Trans. 22:346, 378
1895 Cnesinus. Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 136, 139
1899 Cnesinus. Hopkins. Ent. Soc. Wash. Proc. 4:343
1900 Cnesinus. Smith. Cat. Ins. N. J. p. 365
1907 Cnesinus. Hopkins. Ent. Soc. Wash. Proc. 8:113

strigillatus Chap.

1869 Nemophilus. Chapuis. Syn. Scol. p. 27
1873 Nemophilus. Chapuis. Mem. Soc. Liège, p. 235
1878 =strigicollis Lec. Leconte. Am. Phil. Soc. Proc. 15:378
Habitat. Pennsylvania, Illinois, South Carolina, West Virginia, North Carolina, Texas, Mexico.
Food plants. Toxylon pomiferum, Liquidambar, Smilax, Hickoria (pith of twigs), Pyrus (?).

COCCOTRYPES Eich.

1878 Eichhoff. Rat. Tom. p. 57, 308
1881 Eichhoff. Borkenk. p. 52, 74, 267
1883 Leconte & Horn. Col. N. A. p. 518
1894 Blandford. Ent. Soc. Lond. Trans. p. 98

16 **dactyliperda** Fabr. (?)

1801 Bostrichus. Fabricius. Syst. El. 2:387, 14
(?) Bostrichus. Lucas. Expl. Alg. p. 464, tab. 39, fig. 1
1837 Bostrichus. Dej. Cat. p. 332
(?) Bostrichus. Duft. Fn. Aust. 3:95, 12
1842 Bostrichus. Hornung. Stett. Ent. Zeit. p. 116 (2)
1854 Bostrichus. Bach. Kaef. 2:123, 130
1862 Bostrichus. Doebner. Zool. 2:184
1866 Bostrichus. Eichhoff. Berl. Ent. Zeit. p. 277
1867 Anisandros. Ferrari. Borkenk. p. 26
1874 Dryocoetes. Redtenb. Fn. Aust. ed. 3. 2:381
1878 Coccotrypes. Eichhoff. Rat. Tom. p. 58, 309
1881 Coccotrypes. Eichhoff. Borkenk. p. 52, 74, 267
1886 Coccotrypes. Schwarz. Ent. Am. 2:42
1889 Coccotrypes. Hamilton. Am. Ent. Soc. Trans. 16:159
1894 Coccotrypes. Hamilton. Am. Ent. Soc. Trans. 21:406

palmicola Horn.

1846 Bostrichus. Hornung. Stett. Ent. Zeit. p. 116, (2)
1881 (?) = dactyliperda Fabr. Eichhoff. Borkenk. p. 268
Habitat. Europe, Africa, America (carried in nuts).
Food plants. Dates, betel.

CORTHYLUS Erichson

1836 Erichson. Wieg. Archiv. 1:64
1868 Eichhoff. Berl. Ent. Zeit. p. 279
1869 Eichhoff. Berl. Ent. Zeit. p. 297
1876 Leconte. Am. Phil. Soc. Proc. 15:347
1878 Eichhoff. Rat. Tom. p. 66, 421
1883 Leconte & Horn. Col. N. A. p. 517
1897 Hubbard. U. S. Div. Ent. Bul. 7. n. s. p. 16
1904 Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 251–54

MORIZUS Ferrari

1867 Ferrari. Borkenk. p. 59, 69
1904 Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 251

17 **columbianus** Hopk.

1894 Corthylus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 36, p. 313–36, fig. 27–30
1894 Corthylus. Hopkins. Can. Ent. 26:277
1894 Corthylus. Hopkins. Ins. Life, 6:281, 282; 7:146

1895 Corthylus. Hopkins. Ent. Soc. Wash. Proc. 3:104, 107
1897 Corthylus. Hubbard. U. S. Div. Ent. Bul. 7. n. s. p. 17–18
1904 Corthylus. Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 253, 254
1906 Corthylus. Felt. N. Y. State Mus. Mem. 8, 2:702

Habitat. Virginia, West Virginia, Michigan (?), Massachusetts.

Food plants. Quercus alba, Fagus americana, Tilia, Acer, Liriodendron tulipifera.

18 **punctatissimus** Zimm.

1868 Crypturgus. Zimmerman. Am Ent. Soc. Trans. 2:144
1868 Cryphalus. Leconte. Am. Ent. Soc. Trans. 2:154
1876 Corthylus. Leconte. Am. Phil. Soc. Proc. 15:347
1878 Crypturgus. Eichhoff. Rat. Tom. p. 460
1883 Corthylus. Merriam. Am. Nat. 17:84–86, fig. 1–5
1890 Corthylus. Packard. U. S. Ent. Com'n, 5th Rep't, p. 389, 390, fig. 144, 145
1890 Corthylus. Schwarz. Ins. Life, 3:178
1891 Corthylus. Schwarz. Ent. Soc. Wash. Proc. 2:109–15
1893 Corthylus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 127; Bul. 32, p. 207
1894 Corthylus. Hopkins. Ins. Life, 6:281; 7:145
1894 Corthylus. Hopkins. Can. Ent. 26:277
1895 Corthylus. Hamilton. Am. Ent. Soc. Trans. 22:346, 378
1895 Corthylus. Hopkins. Ent. Soc. Wash. Proc. 3:104
1897 Corthylus. Hubbard. U. S. Div. Ent. Bul. 7. n. s. p. 16–17
1900 Corthylus. Smith. Cat. Ins. N. J. p. 361
1904 Corthylus. Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 253, 254
1905 Corthylus. Felt. N. Y. State Mus. Mem. 8, 1:50, 65–67, fig. 7
1906 Corthylus. Felt. N. Y. State Mus. Mem. 8, 2:732

Habitat. Eastern, middle, southern and western United States.

Food plants. Acer saccharum, Sassafras, Cornus, Carpinus, Corylus, Ostrya, Gaylussacia resinosa.

19 **spinifer** Sz.

1891 Corthylus. Schwarz. Ent. Soc. Wash. Proc. 2:114
1895 Corthylus. Hopkins. Ent. Soc. Wash. Proc. 3:104

Habitat. South Florida.

Food plant. Quercus.

CRYPHALUS Erichson

1836 Erichson. Wieg. Archiv. 1:64
1864 Eichhoff. Berl. Ent. Zeit. p. 34, 45, 46
1868 Leconte. Am. Ent. Soc. Trans. 2:151, 153
1876 Leconte. Am. Phil. Soc. Proc. 15:361
1881 Eichhoff. Borkenk. p. 45, 172
1878 Eichhoff. Rat. Tom. p. 121
1883 Leconte & Horn. Col. N. A. p. 518
1885 Goz. Rev'd. Ent. 4:278
1888 Bedel. Faun. Col. Seine, 6:396, 397

1895 Judeich-Nitsche. Forstins. 1:448, 451, fig.
1901 Barbey. Scol. l'Europ. Cent. p. 69
1904 Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 225

ERNOPORUS Thomson

1866 Thomson. Skand. Col. i:147; vii:360
1904 Blandford. Biol. Centr. Am. Col. 4, pt 6. p. 226

20 jalappae Letz.

1844 Bostrichus. Letzner. Abh. Schles. Jahrb.
1848 Bostrichus. Letzner. Arb. Verand. Schles. Ges. p. 99
1867 Cryphalus (Ernoporus). Ferrari. Borkenk. p. 12, 14, 16, note 4
1878 Cryphalus. Eichhoff. Rat. Tom. p. 134
1881 Cryphalus. Eichhoff. Borkenk. p. 46, 74, 187
1883 Cryphalus. Schwarz. Ont. Ent. Soc. 14:30
1886 Cryphalus. Schwarz. Ent. Am. 2:42
1894 Cryphalus. Blandford. Ins. Life, 6:261
1894 Cryphalus. Hamilton. Am. Ent. Soc. Trans. 21:406
1901 Cryphalus. Schwarz. Ent. Soc. Wash. Proc. 4:432
Habitat. Mexico (?), exported to various countries, Europe; United States, etc.
Food plant. Jalap root.

21 miles Lec.

1878 Cryphalus. Leconte. Am. Phil. Soc. Proc. 17:433
1878 Cryphalus. Schwarz. Am. Phil. Soc. Proc. 17:468
Habitat. Florida.
Food plant. Pinus (?).

22 mucronatus Lec.

1879 Cryphalus. Leconte. U. S. Geol. Sur. Bul. 5:518
1886 Cryphalus. Schwarz. Ent. Am. 2:42
Habitat. Colorado.
Food plants.

23 piceae Ratz.

1837 Bostrichus. Ratzeburg. Forstins. 1:163
1854 Cryphalus. Bach. Kafer. 2:136
1862 Cryphalus. Doebner. Zool. 2:168
1874 Cryphalus. Redtb. Fn. Aust. ed. 3. 2:376
1878 Cryphalus. Eichhoff. Rat. Tom. p. 2, 122
1881 Cryphalus. Eichhoff. Borkenk. p. 45, 172–76, fig. 38, 39
1888 Cryphalus. Bedel. Faun. Col. Seine, 6:398, 414
1895 Tomicus. Judeich-Nitsche. Forstins. 1:492
1899 Cryphalus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 56, p. 444
1901 Cryphalus. Barbey. Scol. l'Europ. Cent. p. 69, pl. 2, fig. 15; pl. 8, fig. 5
1906 Cryphalus. Felt. N. Y. State Mus. Mem. 8, 2:753
1907 Cryphalus. Tredl. Nahrungs. Verbreit. Borkenk. Europ. p. 12

asperatus abietis Ferr.

1867 Cryphalus. Ferrari. Borkenk. p. 12, (7)
1878 =piceae Ratz. Eichhoff. Rat. Tom. p. 122
Habitat. France, Germany, Austria, Turkey, United States (West Virginia, New York), Canada.
Food plants. Pinaceae.

24 rigidus Lec.

1876 Cryphalus. Leconte. Am. Phil. Soc. Proc. 15:362
1878 Cryphalus. Hubbard & Schwarz. Am. Phil. Soc. Proc. 17:666
1886 Cryphalus. Schwarz. Ent. Am. 2:42
Habitat. Canada, Michigan.
Food plants.

25 (?)robustus Eich.

1871 Cryphalus. Eichhoff. Berl. Ent. Zeit. p. 131
1876 Cryphalus. Leconte. Am. Phil. Soc. Proc. 15:362
1878 Cryphalus. Eichhoff. Rat. Tom. p. 121
Habitat. "Am. Septent."
Food plants.

26 striatulus Mannh.

1853 Cryphalus. Mannerheim. Bul. Mosc. p. 235
1876 Cryphalus. Leconte. Am. Phil. Soc. Proc. 15:362
1878 Cryphalus. Eichhoff. Rat. Tom. p. 147
1894 Cryphalus. Schwarz. Ins. Life, 7:255
1894 Cryphalus. Hamilton. Am. Ent. Soc. Trans. 21:35
1901 Cryphalus. Felt. N. Y. Forest, Fish & Game Com'n Rept 7:516
1906 Cryphalus. Felt. N. Y. State Mus. Mem. 8, 2:376, 650, 673
Habitat. Alaska, Utah, New York.
Food plants. Picea engelmanni, Pinus, Abies, Tsuga.

27 (?)terminalis Mannh.

1843 Bostrichus. Mannerheim. Bul. Mosc. p. 298
1867 Ferrari. Borkenk. p. 75
1868 Bostrichus. Leconte. Am. Ent. Soc. Trans. 2:177
1885 Cryphalus (?) Henshaw. Col. N. A. p. 148
Habitat. California.
Food plants.

CRYPTURGUS Erichson

1836 Erichson. Wieg. Archiv. 1:60
1864 Eichhoff. Berl. Ent. Zeit. p. 33, 44, 46
1868 Zimmerman. Am. Ent. Soc. Trans. 2:142, 143
1876 Leconte. Am. Phil. Soc. Proc. 15:387
1877 Provancher. Faun. Ent. Can. 1:565
1878 Eichhoff. Rat. Tom. p. 72
1881 Eichhoff. Borkenk. p. 64, 165
1883 Leconte & Horn. Col. N. A. p. 523, 524
1888 Bedel. Faun. Col. Seine, 6:389, 395
1895 Judeich-Nitsche. Forstins. 1:448, 451
1901 Barbey. Scol. l'Europ. Cent. p. 68

28 alutaceus Sz.

1893 Crypturgus. Schwarz. Ins. Life. 5:288
1894 Crypturgus. Schwarz. Ent. Soc. Wash. Proc. 3:17
1899 Crypturgus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 56, p. 448
1906 Crypturgus. Felt. N. Y. State Mus. Mem. 8, 2:753
Habitat. Maryland, West Virginia, Florida.
Food plants. Picea, Pinus palustris, Pinus inops.

29 atomus Lec.

1868 Crypturgus. Leconte. Am. Ent. Soc. Trans. 2:152
1876 Crypturgus. Leconte. Am. Phil. Soc. Proc. 15:387
1877 Crypturgus. Provancher. Faun. Ent. Can. 1:565
1878 Crypturgus. Eichhoff. Rat. Tom. p. 75
1886 (?) = pusillus Gyll. Schwarz. Ent. Am. 2:56
1889 = pusillus Gyll. Hamilton. Am. Ent. Soc. Trans. 16:159
1889 Crypturgus. Hamilton. Am. Ent. Soc. Trans. 16:159
1890 Crypturgus. Packard. U. S. Ent. Com'n, 5th Rep't, p. 727, 825, 861, 872, fig. 256
1891 = pusillus Gyll. Hamilton. Ins. Life. 4:132
1894 = pusillus Gyll. Schwarz. Ent. Soc. Wash. Proc. 3:17
1898 Crypturgus. Blandford. Ent. News, 9:6
1900 = pusillus Gyll. Smith. Cat. Ins. N. J. p. 365
1904 Crypturgus. Hopkins. U. S. Div. Ent. Bul. 48, p. 26
1905 Crypturgus. Currie. U. S. Div. Ent. Bul. 53, p. 82
1906 Crypturgus. Felt. N. Y. State Mus. Mem. 8, 2:338, 359–60
Habitat. Canada, eastern United States.
Food plants. Pinus, Picea, Abies, Tsuga.

30 pusillus Gyll.

1813 Bostrichus. Gyllenhal. In. Suec. 3:371, (16)
1834 Bostrichus. Hartig. Convers. Lex. p. 110–12
1837 Bostrichus. Ratzeburg. Forstins. 1:162, t. 13, fig. 16
1839 Bostrichus. Ratzeburg. Forstins. 1:196–98, t. 13, fig. 16
1854 Crypturgus. Bach. Kaefer, 2:137
1856 Perris. Ann. Fr. p. 202
1862 Crypturgus. Doebner. Zool. 2:167
1864 Crypturgus. Eichhoff. Berl. Ent. Zeit. t. 1, fig. 12, (Ant.)
1867 Crypturgus. Eichhoff. Berl. Ent. Zeit. p. 404
1878 Crypturgus. Eichhoff. Rat. Tom. p. 73
1881 Crypturgus. Eichhoff. Borkenk. p. 165
1888 Crypturgus. Bedel. Faun. Col. Seine, 6:395, 412
1889 Crypturgus. Hamilton. Am. Ent. Soc. Trans. 16:159
1893 Crypturgus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 143 etc.; Bul. 32, p. 213
1894 Crypturgus. Schwarz. Ent. Soc. Wash. Proc. 3:17
1894 Crypturgus. Hamilton. Am. Ent. Soc. Trans. 21:407
1894 Crypturgus. Blandford. Ent. Soc. Lond. p. 82
1895 Tomicus. Judeich-Nitsche. Forstins. 1:527
1897 Crypturgus. Johnson. Penn. Agric. Rep't, p. 78–79, fig. 3

1898 Crypturgus. Blandford. Ent. News, 9:6
1899 Crypturgus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 56, p. 346, 448, fig. 96
1900 Crypturgus. Smith. Cat. Ins. N. J. p. 365
1901 Crypturgus. Barbey. Scol. l'Europ. Cent. p. 68, pl. 2, fig. 13; pl. 7, fig. 5
1907 Crypturgus. Trèdl. Nahrungs. Verbreit. Borkenk. Europ., 11. [Entomol. Blätter, Nr. 1. mit 6]

Habitat. Europe, Japan, eastern United States.

Food plant. Pinaceae.

[1] DENDROCTONUS Erichson

1836 Erichson. Wieg. Archiv. 1:52
1864 Eichhoff. Berl. Ent. Zeit. p. 26, 44, 46
1866 Lacordaire. Ins. Col. 7:360
1868 Zimmerman. Am. Ent. Soc. Trans. 2:148, 149
1869 Chapuis. Syn. Scol. p. 34
1873 Chapuis. Mem. Soc. Liège, p. 242
1876 Leconte. Am. Phil. Soc. Proc. 15:384
1877 Provancher. Faun. Ent. Can. 1:572
1881 Eichhoff. Borkenk. p. 125
1883 Leconte & Horn. Col. N. A. p. 523
1890 Dietz. Am. Ent. Soc. Trans. 17:27
1895 Judeich-Nitsche. Forstins. 1:445, 446
1895 Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 143, 146
1901 Barbey. Scol. l'Europ. Cent. p. 55
1906 Felt. N. Y. State Mus. Mem. 8, 2:337

31 **approximatus** Dietz

1890 Dendroctonus. Dietz. Am. Ent. Soc. Trans. 17:28, 31
1902 Dendroctonus. Schwarz. Ent. Soc. Wash. Proc. 5:32
1902 Dendroctonus. Hopkins. U. S. Dep't Agric. Yearbook, p. 281
1903 Dendroctonus. Hopkins. Can. Ent. 35:61
1904 Dendroctonus. Hopkins. U. S. Div. Ent. Bul. 48, p. 44
1904 Dendroctonus. Hopkins. U. S. Dep't Agric. Yearbook, p. 281
1905 Dendroctonus. Hopkins. U. S. Div. Ent. Bul. 56, p. 11
1905 Dendroctonus. Hopkins. Ent. Soc. Wash. Proc. 7:81
1907 Dendroctonus. Fall & Cockerell. Am. Ent. Soc. Trans. 33:218
1908 Dendroctonus. Burke. Ent. Soc. Wash. Proc. 9:115

Habitat. Arizona.

Food plant. Pinus ponderosa.

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[1] The recent work on the genus Dendroctonus by Dr A. D. Hopkins, entitled *The Genus Dendroctonus*, and published by the Bureau of Entomology of the United States Department of Agriculture, as Technical series no. 17, part 1, has been received too late to be inserted in this list.

The treatise referred to discusses the structure of these beetles in detail, giving a long series of very fine plates. Besides describing a number of new species and putting the synonymy of the various names in final shape, many new food plants are given, and the distribution of the various species is more exactly defined. Excellent figures of the various species are given.

The following new species are described from America north of Mexico: barberi Hopk., convexifrons, Hopk., arizonicus Hopk., jeffreyi Hopk., pseudotsugae Hopk., engelmanni Hopk., borealis Hopk., murrayana Hopk.

32 **brevicomis** Lec.

1876 Dendroctonus. Leconte. Am. Phil. Soc. Proc. 15:384, 386
1890 = frontalis Zimm. Dietz. Am. Ent. Soc. Trans. 17:28
1890 Dendroctonus. Packard. U. S. Ent. Com'n, 5th Rep't, p. 722
1899 Dendroctonus. Hopkins. U. S. Div. Ent. Bul. 21, p. 13
1902 Dendroctonus. Hopkins. Ent. Soc. Wash. Proc. 5:3
1902 Dendroctonus. Hopkins. U. S. Dep't Agric. Yearbook, p. 281
1904 Dendroctonus. Hopkins. U. S. Div. Ent. Bul. 48, p. 18
1904 Dendroctonus. Hopkins. U. S. Dep't Agric. Yearbook, p. 281
1905 Dendroctonus. Hopkins. Ent. Soc. Wash. Proc. 7:147, pl. 4
1905 Dendroctonus. Currie. U. S. Div. Ent. Bul. 53, p. 74
1906 Dendroctonus. Webb. U. S. Div. Ent. Bul. 58, pt 2, p. 20–22, 9 fig.

Habitat. Cascade and Rocky mountain region of United States.

Food plants. Pinus ponderosa, Pinus lambertiana.

33 **frontalis** Fabr.

1801 (?), Fabricius. Syst. El. 2:389
1868 Dendroctonus. Zimmerman. Am. Ent. Soc. Trans. 2:149
1868 Dendroctonus. Leconte. Am. Ent. Soc. Trans. 2:173
1876 Dendroctonus. Leconte. Am. Phil. Soc. Proc. 15:384, 386
1890 Dendroctonus. Dietz. Am. Ent. Soc. Trans. 17:28, 32
1890 Dendroctonus. Packard. U. S. Ent. Com'n, 5th Rep't, p. 722
1892 Dendroctonus. Hopkins. Ent. Soc. Wash. Proc. 2:353
1892 Dendroctonus. Hopkins. Science, July 29, 20:64
1893 Dendroctonus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 143; Bul. 32, p. 213
1893 Dendroctonus. Hopkins. Ins. Life, 5:187–89
1893 Dendroctonus. Riley. Ins. Life, 6:140
1893 Dendroctonus. Hopkins. Ins. Life, 6:126
1894 Dendroctonus. Hopkins. Can. Ent. 26:280
1896 Dendroctonus. Hopkins. Can. Ent. 28:250
1897 Dendroctonus. Chittenden. U. S. Div. Ent. Bul. 7. n. s. p. 72–75, fig. 43
1898 Dendroctonus. Schwarz. Ent. Soc. Wash. Proc. 4:81
1899 Dendroctonus. Hopkins. Ent. Soc. Wash. Proc. 4:343
1899 Dendroctonus. Lugger. Minn. Agric. Exp. Sta. Bul. 66, p. 315, 317, fig. 246
1899 Dendroctonus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 56, p. 395
1899 Dendroctonus. Hopkins. U. S. Div. Ent. Bul. 21, p. 13, 14
1901 Dendroctonus. Hopkins. U. S. Div. Ent. Bul. 28, pl. XII
1902 Dendroctonus. Hopkins. U. S. Dep't Agric. Yearbook, p. 270–75
1903 Dendroctonus. Hopkins. Can. Ent. 35:59
1904 Dendroctonus. Hopkins. U. S. Div. Ent. Bul. 48, p. 41, 44, pl. 1, fig. 2; pl. VI, VII
1904 Dendroctonus. Hopkins. U. S. Dep't Agric. Yearbook, p. 270–75
1905 Dendroctonus. Hopkins. Ent. Soc. Wash. Proc. 7:80
1905 Dendroctonus. Currie. U. S. Div. Ent. Bul. 53, p. 100
1905 Dendroctonus. Felt. N. Y. State Mus. Mem. 8, 1:6

1908 Dendroctonus. Fiske. Ent. Soc. Wash. Proc. 9:24, 25, 26
1908 Dendroctonus. Hopkins. Ent. Soc. Wash. Proc. 9:131
Habitat. Eastern and southern United States.
Food plants. Pinus, Picea.

34 **monticola** Hopk.

1905 Dendroctonus. Hopkins. U. S. Div. Ent. Bul. 56, p. 11
1908 Dendroctonus. Burke. Ent. Soc. Wash. Proc. 9:12, 115
Habitat. Western United States.
Food plants. Pinus lambertiana, P. monticola, P. murrayana, P. ponderosa, Picea engelmanni.

35 **obesus** Mannh.

1843 Hylurgus. Mannerheim. Bul. Mosc. p. 296
1852 Hylurgus. Mannerheim. Bul. Mosc. p. 356
1868 Dendroctonus. Leconte. Am. Ent. Soc. Trans. 2:173
1873 Dendroctonus. Chapuis. Mem. Soc. Liège, p. 243
1876 = rufipennis Kirby. Leconte. Am. Phil. Soc. Proc. 15:385
1877 Dendroctonus. Provancher. Faun. Ent. Can. 1:573
1877 Dendroctonus. Provancher. Faun. Ent. Can. v. 1, Add. et Cor. p. 13
1894 = rufipennis Kirby. Hamilton. Am. Ent. Soc. Trans. 21:35
1899 Dendroctonus. Hopkins. U. S. Div. Ent. Bul. 21, p. 15
1902 Dendroctonus. Hopkins. Ent. Soc. Wash. Proc. 5:3
1903 Dendroctonus. Hopkins. Can. Ent. 35:60

similis Lec.

1860 Dendroctonus. Leconte. Pac. R. R. Explor. Ins. p. 59
1868 =obesus Mannh. Leconte. Am. Ent. Soc. Trans. 2:173
1876 Dendroctonus. Leconte. Am. Phil. Soc. Proc. 15:384, 385
1877 = obesus Mannh. Provancher. Faun. Ent. Can. 1:373
1878 Dendroctonus. Hubbard & Schwarz. Am. Phil. Soc. Proc. 17:666
1878 = rufipennis Kirby. Provancher. Faun. Ent. Can. v. 1, Add. p. 13
1890 Dendroctonus. Dietz. Am. Ent. Soc. Trans. 17:28, 30
1890 Dendroctonus. Packard. U. S. Ent. Com'n, 5th Rep't, p. 721, 722
1891 Dendroctonus. Cook & Davis. Mich. Agric. Exp. Sta. Bul. 73, p. 15
1894 = rufipennis Kirby. Hamilton. Am. Ent. Soc. Trans. 21:35
1903 = obesus Mannh. Hopkins. Can. Ent. 35:60
1907 Dendroctonus. Fall & Cockerell. Am. Ent. Soc. Trans. 33:218
Habitat. Canada, Oregon, Colorado, Virginia, Texas, New Mexico.
Food plants.

36 **piceaperda** Hopk.

1901 Dendroctonus. Hopkins. U. S. Div. Ent. Bul. 28, p. 16, pl. ii
1902 Dendroctonus. Hopkins. U. S. Dep't Agric. Yearbook, p. 266–70, fig. 23, 24
1904 Dendroctonus. Hopkins. U. S. Div. Ent. Bul. 48, p. 26
1904 Dendroctonus. Hopkins. U. S. Dep't Agric. Yearbook, p. 266–70
1905 Dendroctonus. Currie. U. S. Div. Ent. Bul. 53, p. 82

1905 Dendroctonus. Hopkins. U. S. Div. Ent. Bul. 56, p. 10–11
1906 Dendroctonus. Felt. N. Y. State Mus. Mem. 8, 2:338, 379–85, 693, fig. 85
1906 Dendroctonus. Burke. Ent. Soc. Wash. Proc. 8:4, 5
1907 Dendroctonus. Fall & Cockerell. Am. Ent. Soc. Trans. 33:218

Habitat. New Brunswick to New York, New Mexico.

Food plants. Picea canadensis, Picea mariana.

37 ponderosae Hopk.

1902 Dendroctonus. Hopkins. U. S. Div. Ent. Bul. 32, p. 10
1902 Dendroctonus. Hopkins. U. S. Dep't Agric. Yearbook, p. 275–81, fig. 1, 28, 29, 30
1903 Dendroctonus. Gillette. Col. Agric. Rep't, 24:118
1904 Dendroctonus. Hopkins. U. S. Dep't Agric. Yearbook, p. 275, 281
1904 Dendroctonus. Hopkins. U. S. Div. Ent. Bul. 48, p. 44, pl. 1, fig. 1, pl. III, VIII, IX
1905 Dendroctonus. Hopkins. Ent. Soc. Wash. Proc. 7:147, pl. IV
1905 Dendroctonus. Hopkins. U. S. Div. Ent. Bul. 56, p. 10–22, fig. 1, 5, 6
1905 Dendroctonus. Currie. U. S. Div. Ent. Bul. 53, p. 100
1906 Dendroctonus. Burke. Ent. Soc. Wash. Proc. 7:4

Habitat. Rocky mountain region.

Food plants. Pinus, Picea.

38 punctatus Lec.

1868 Dendroctonus. Leconte. Am. Ent. Soc. Trans. 2:173
1876 Dendroctonus. Leconte. Am. Phil. Soc. Proc. 15:384, 385
1886 Dendroctonus. Schwarz. Ent. Am. 2:56
1890 = rufipennis Kirby. Dietz. Am. Ent. Soc. Trans. 17:28
1890 Dendroctonus. Packard. U. S. Ent. Com'n, 5th Rep't, p. 722
1894 = rufipennis Kirby. Hamilton. Am. Ent. Soc. Trans. 21:35
1897 = rufipennis Kirby. Johnson. Penn. Dep't Agric. An. Rep't, p. 73–77, fig. 2
1902 Dendroctonus. Hopkins. Ent. Soc. Wash. Proc. 5:3

Habitat. New York, Quebec.

Food plants.

39 rufipennis Kirby

1837 Hylurgus. Kirby. Faun. Bor. Am. 4:195
1853 Hylurgus. Mannh. Bul. Mosc. p. 238, (217)
1876 Dendroctonus. Leconte. Am. Phil. Soc. Proc. 15:384, 385
1877 Dendroctonus. Provancher. Faun. Ent. Can. 1:573
1878 Dendroctonus. Provancher. Faun. Ent. Can. v. 1, Add. et Cor. p. 13, 14
1886 Dendroctonus. Schwarz. Ent. Am. 2:56
1890 Dendroctonus. Dietz. Am. Ent. Soc. Trans. 17:28
1890 Hylurgus. Packard. U. S. Ent. Com'n, 5th Rep't, p. 814
1894 Dendroctonus. Schwarz. Ins. Life, 7:255
1894 Dendroctonus. Hamilton. Am. Ent. Soc. Trans. 21:36

1897 Dendroctonus. Johnson. Penn. Agric. Rep't, p. 73–77, fig. 2
1899 Dendroctonus. Hopkins. Ent. Soc. Wash. Proc. 4:343
1899 Dendroctonus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 56, p. 349, 393
1900 Dendroctonus. Smith. Cat. Ins. N. J. p. 364
1906 Dendroctonus. Felt. N. Y. State Mus. Mem. 8, 2:753
1907 Tredl. Nahrungs. Verbreit. Borkenk. Europ. 11 [Entomol. Blätter, Nr. 1 mit 6]

Habitat. Alaska, Canada, northern United States.

Food plants. Picea, Pinus.

40 **simplex** Lec.

1868 Dendroctonus. Leconte. Am. Ent. Soc. Trans. 2:173
1876 Dendroctonus. Leconte. Am. Phil. Soc. Proc. 15:384, 385
1878 Dendroctonus. Provancher. Faun. Ent. Can. v. 1, Add. et Cor. p. 13, 14
1886 Dendroctonus. Schwarz. Ent. Am. 2:56
1888 Dendroctonus. Schwarz. Ins. Life, 1:162
1889 = rufipennis Kirby. Schwarz. Ent. Soc. Wash. Proc. 1:175
1890 Dendroctonus. Dietz. Am. Ent. Soc. Trans. 17:28, 31
1890 Dendroctonus. Packard. U. S. Ent. Com'n, 5th Rep't, p. 722
1899 Dendroctonus. Hopkins. Ent. Soc. Wash. Proc. 4:343
1899 Dendroctonus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 56, p. 394
1906 Dendroctonus. Felt. N. Y. State Mus. Mem. 8, 2:752
1907 Dendroctonus. Fall & Cockerell. Am. Ent. Soc. Trans. 33:218

Habitat. Canada to West Virginia, Colorado, California, New Mexico.

Food plants. Picea, Larix.

41 **terebrans** Oliv.

1795 Scolytus. Olivier. Ent. 4:78, p. 6, pl. 1, fig. 6, a-b
1841 Hylurgus. Harris. Inj. Ins. Mass. p. 72
1852 Hylurgus. Harris. Rep. Ins. Inj. Veg. p. 75–76
1858 Hylurgus. Fitch. Nox. Ins. N. Y. 4th Rep't, p. 728
1868 Dendroctonus. Lacordaire. Gen. Col. 7:361
1868 Dendroctonus. Zimmerman. Am. Ent. Soc. Trans. 2:149
1868 Dendroctonus. Leconte. Am. Ent. Soc. Trans. 2:173
1869 Dendroctonus. Chapuis. Syn. Scol. p. 35
1873 Dendroctonus. Chapuis. Mem. Soc. Liège, p. 243
1876 Dendroctonus. Leconte. Am. Phil. Soc. Proc. 15:384, 385
1876 Dendroctonus. Thomas. Nox. Ins. Ill. 1st Rep't, p. 146
1877 Dendroctonus. Provancher. Faun. Ent. Can. 1:572
1878 Dendroctonus. Provancher. Faun. Ent. Can. v. 1, Add. et Cor. p. 13, 14
1878 Dendroctonus. Schwarz. Am. Phil. Soc. Proc. 17:469
1880 Hylurgus. Saunders. Ont. Ent. Soc. 10:5
1883 Hylurgus. Saunders. Ont. Ent. Soc. 14:55
1886 Dendroctonus. Schwarz. Ent. Am. 2:56
1888 Dendroctonus. Schwarz. Ent. Soc. Wash. Proc. 1:80

1890 Dendroctonus. Dietz. Am. Ent. Soc. Trans. 17:28, 29
1890 Dendroctonus. Packard. U. S. Ent. Com'n, 5th Rep't, p. 721, 858, fig. 250
1893 Dendroctonus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 143 etc.; Bul. 32, p. 213
1894 Dendroctonus. Hopkins. Can. Ent. 26:280
1895 Dendroctonus. Hamilton. Am. Ent. Soc. Trans. 22:346, 378
1897 Dendroctonus. Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 146
1899 Dendroctonus. Hopkins. Ent. Soc. Wash. Proc. 4:343
1899 Dendroctonus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 56, p. 392, 415, 421
1899 Dendroctonus. Lugger. Minn. Agric. Exp. Sta. Bul. 66, p. 317, fig. 247
1900 Dendroctonus. Smith. Cat. Ins. N. J. p. 364
1901 Dendroctonus. Felt. Forest, Fish & Game Com'n Rep't, 7:480–81, fig. 1, 2, 3
1901 Dendroctonus. Hopkins. U. S. Div. Ent. Bul. 28, pl. XII
1902 Dendroctonus. Felt. U. S. Div. Ent. Bul. 31, p. 64
1904 Dendroctonus. Hopkins. U. S. Div. Ent. Bul. 48, pl. VII
1905 Dendroctonus. Hopkins. Ent. Soc. Wash. Proc. 7:81, 145, 147, pl. IV
1906 Dendroctonus. Felt. N. Y. State Mus. Mem. 8, 2:333, 338, 342–45, 357, fig. 64, 65, 66
1907 Dendroctonus. Snow. Kan. Acad. Sci. Trans. 20, pt 2, p. 64
Habitat. Canada, United States.
Food plants. Pinus, Picea.

42 **valens** Lec.

1860 Dendroctonus. Leconte. Pac. R. R. Explor. Ins. v. 12, pt 2, p. 59
1868 = terebrans Oliv. Leconte. Am. Ent. Soc. Trans. 2:173
1873 Dendroctonus. Chapuis. Mem. Soc. Liège, p. 243
1876 = terebrans Oliv. Leconte. Am. Phil. Soc. Proc. 15:385
1877 = terebrans Oliv. Provancher. Faun. Ent. Can. 1:572
1895 = terebrans Oliv. Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 146
1902 Dendroctonus. Hopkins. U. S. Div. Ent. Bul. 32, p. 12
1903 Dendroctonus. Gillette. Col. Agric. Rep't, 24:118–19
1903 Dendroctonus. Hopkins. Can. Ent. 35:61
1904 Dendroctonus. Hopkins. U. S. Div. Ent. Bul. 48, p. 19
1904 Dendroctonus. Powell. N. Y. Ent. Soc. Jour. 12:237–43
1905 Dendroctonus. Hopkins. Ent. Soc. Wash. Proc. 7:81, 147, pl. IV
1905 Dendroctonus. Currie. U. S. Div. Ent. Bul. 53, p. 74
1905 Dendroctonus. Hopkins. U. S. Div. Ent. Bul. 56, p. 11, 17
1908 Dendroctonus. Burke. Ent. Soc. Wash. Proc. 9:115
Habitat. Southern Canada, United States, Mexico.
Food plants. Pinus, Picea.

DOLURGUS Eichhoff

1868 Eichhoff. Berl. Ent. Zeit. p. 147
1873 Chapuis. Mem. Soc. Liège, p. 232

1876 Leconte. Am. Phil. Soc. Proc. 15:387
1878 Eichhoff. Rat. Tom. p. 83
1883 Leconte & Horn. Col. N. A. p. 524

43 **pumilus** Mannh.

1843 Hylastes. Mannerheim. Bul. Mosc. p. 297, (259)
1852 Hylastes. Mannerheim. Bul. Mosc. p. 356, (146)
1868 Dolurgus. Eichhoff. Berl. Ent. Zeit. p. 147
1868 Aphanarthrum. Leconte. Am. Ent. Soc. Trans. 2:152
1869 Dolurgus. Chapuis. Syn. Scol. p. 88
1873 Dolurgus. Chapuis. Mem. Soc. Liège, p. 232
1876 Dolurgus. Leconte. Am. Phil. Soc. Proc. 15:387, 437
1878 Dolurgus. Eichhoff. Rat. Tom. p. 83
1894 Dolurgus. Hamilton. Am. Ent. Soc. Trans. 21:35
1904 Dolurgus. Hopkins. U. S. Div. Ent. Bul. 48, p. 18
1905 Dolurgus. Currie. U. S. Div. Ent. Bul. 53, p. 73
Habitat. Alaska, Oregon.
Food plant. Picea sitchensis.

DRYOCOETES Eichhoff

1864 Eichhoff. Berl. Ent. Zeit. p. 38, 45, 46
1876 Leconte. Am. Phil. Soc. Proc. 15:358, 361
1877 Provancher. Faun. Ent. Can. 1:568
1878 Eichhoff. Rat. Tom. p. 283
1881 Eichhoff. Borkenk. p. 52, 261
1883 Leconte & Horn. Col. N. A. p. 518
1888 Bedel. Faun. Col. Seine, p. 396, 400
1895 Judeich-Nitsche. Forstins. 1:449, 451, fig.
1898 Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 186, 189
1901 Barbey. Scol. l'Europ. Cent. p. 100
1906 Felt. N. Y. State Mus. Mem. 8, 2:337

44 **affaber** Mannh.

1852 Bostrichus. Mannerheim. Bul. Mosc. p. 359, (151)
1853 Bostrichus. Mannerheim. Bul. Mosc. 3:235, (212)
1868 Xyleborus. Leconte. Am. Ent. Soc. Trans. 2:162
1876 Dryocoetes. Leconte. Am. Phil. Soc. Proc. 15:361
1878 Dryocoetes. Hubbard & Schwarz. Am. Phil. Soc. Proc. 17:666
1888 Dryocoetes. Schwarz. Ent. Soc. Wash. Proc. 1:80
1890 Dryocoetes. Packard. U. S. Ent. Com'n, 5th Rep't, p. 810, 857, fig. 291
1893 Dryocoetes. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 138; Bul. 32, p. 212
1895 Dryocoetes. Schwarz. Ent. Soc. Wash. Proc. 3:143
1906 Dryocoetes. Felt. N. Y. State Mus. Mem. 8, 2:752
Habitat. Alaska, British Columbia, Colorado, Lake Superior to Virginia, Quebec.
Food plants. Pinus, Picea, Abies.

45 autographus Ratz.

1837 Bostrichus. Ratzeburg. Forstins. 1:160, t. 13, fig. 6
1839 Bostrichus. Ratzeburg. Forstins. 1:194–95, t. 13, fig. 6
1848 Nördling. Stet. Ent. Zeit. p. 240
Ulrich. Dej. Cat. ed. 3. p. 332
1854 Bostrichus. Bach. Kaefer. p. 124, 130
1862 Bostrichus. Doebn. Zool. 2:179
1864 Dryocoetes. Eichhoff. Berl. Ent. Zeit. p. 39, t. i, fig. 18.
1867 Dryocoetes. Ferrari. Borkenk. p. 27
1874 Dryocoetes. Redtenb. Fn. Aust. ed. 3, 2:380
1878 Dryocoetes. Eichhoff. Rat. Tom. p. 284
1881 Dryocoetes. Eichhoff. Borkenk. p. 261, 262
1888 Dryocoetes. Hamilton. Am. Ent. Soc. Trans. 16:159
1888 Dryocoetes. Bedel. Faun. Col. Seine, 6:400, 416
1890 Dryocoetes. Hamilton. Ent. Am. 6:44
1892 Dryocoetes. Hopkins. Ins. Life, 4:258
1893 Dryocoetes. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 137; Bul. 32, p. 211
1894 Dryocoetes. Hamilton. Am. Ent. Soc. Trans. 21:35, 406
1894 Dryocoetes. Hopkins. Can. Ent. 26:279
1895 Dryocoetes. Schwarz. Ent. Soc. Wash. Proc. 3:143
1895 Tomicus. Judeich–Nitsche. Forstins. 1:454
1899 Dryocoetes. Hopkins. W. Va. Agric. Exp. Sta. Bul. 56, p. 445
1900 Dryocoetes. Smith. Cat. Ins. N. J. p. 363
1901 Dryocoetes. Barbey. Scol. l'Europ. Cent. p. 101, pl. III, fig. 20; pl. 15, fig. 1
1904 Dryocoetes. Schwarz. Harriman Alaska Exp. 8, Ins. pt 1, p. 185
1906 Dryocoetes. Felt. N. Y. State Mus. Mem. 8, 2:336, 337, 469, 650, 672, fig. 118
1907 Dryocoetes. Trèdl. Nahrungs. Verbreit. Borkenk. Europ. p. 17 [Entomol. Blätter, Nr. 1 mit 6]

septentrionis Mannh.

1843 Bostrichus. Mannerheim. Bul. Mosc. p. 298, (261)
1853 Bostrichus. Mannerheim. Bul. Mosc. 3:325, (210)
1868 Xyleborus. Leconte. Am. Ent. Soc. Trans. 2: 161
1876 Dryocoetes. Leconte. Am. Phil. Soc. Proc. 15:361
1877 Dryocoetes. Provancher. Faun. Ent. Can. 1:568
1878 Dryocoetes. Hubbard & Schwarz. Am. Phil. Soc. Proc. 17:643
1878 = autographus Ratz. Eichhoff. Rat. Tom. p. 284
1881 = autographus Ratz. Eichhoff. Borkenk. p. 262
1886 = autographus Ratz. Schwarz. Ent. Am. 2:42
1888 = autographus Ratz. Bedel. Faun. Col. Seine, 6:416
1889 = autographus Ratz. Hamilton. Am. Ent. Soc. Trans. 16:159
1893 = autographus Ratz. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 137; Bul. 32, p. 211
1907 Dryocoetes. Fall & Cockerell. Am. Ent. Soc. Trans. 33:217

semicastaneus Mannh.

1852 Bostrichus. Mannerheim. Bul. Mosc. p. 358
1876 =septentrionis Mannh. Leconte. Am. Phil. Soc. Proc. 15:361
1878 =autographus Ratz. Eichhoff. Rat. Tom. p. 284
1888 =autographus Ratz. Hamilton. Am. Ent. Soc. Trans. 16:159
1888 =autographus Ratz. Bedel. Faun. Col. Seine, 6:416

villosus Herbst.

1793 Bostrichus. Herbst. Kaefer. 5:121 (?)
1813 Bostrichus. Gyllenhal. In. Suec. 3:361
1878 =autographus Ratz. Eichhoff. Rat. Tom. p. 284
1881 =autographus Ratz. Eichhoff. Borkenk. p. 262

Habitat. Alaska, Canada, northern United States, New Mexico, Europe, Japan.

Food plants. Pinus, Picea, Abies.

46 **eichhoffi** Hopk.

1894 Dryocoetes. Hopkins. Can. Ent. 26:279
1903 Dryocoetes. Hopkins. U. S. Dep't Agric. Yearbook, p. 320
1906 Dryocoetes. Felt. N. Y. State Mus. Mem. 8, 2:336, 337

Habitat. New York, Montreal Island.

Food plant. Betula lutea.

47 **granicollis** Lec.

1868 Xyleborus. Leconte. Am. Ent. Soc. Trans. 2:162
1876 Dryocoetes. Leconte. Am. Phil. Soc. Proc. 15:361
1878 Dryocoetes. Hubbard & Schwarz. Am. Phil. Soc. Proc. 17:643
1891 Dryocoetes. Schwarz. Ent. Soc. Wash. Proc. 2:79
1893 Dryocoetes. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 138; Bul. 32, p. 212
1894 Dryocoetes. Hopkins. Can. Ent. 26:279
1897 Dryocoetes. Chittenden. U. S. Div. Ent. Bul. 7. n. s. p. 72
1899 Dryocoetes. Hopkins. W. Va. Agric. Exp. Sta. Bul. 56, p. 251, 346, 445
1900 Dryocoetes. Smith. Cat. Ins. N. J. p. 363
1906 Dryocoetes. Felt. N. Y. State Mus. Mem. 8, 2:720, 753

Habitat. Pennsylvania, District of Columbia, Virginia, West Virginia, Colorado.

Food plants. Picea, Castanea, Juglans cinerea.

ECCOPTOGASTER Herbst.

1793 Herbst. Die Kafer. 5:124
1837 Ratzeburg. Forstins. 1:168
1839 Ratzeburg. Forstins. 1:225
1868 Zimmerman. Am. Ent. Soc. Trans. 2:142
1903 Ganglbauer. Munch. Koleopt. Zeit. 1:311, footnote
1907 Trèdl. Nahrungs. Verbreit. Borkenk. Europ. [Entomol. Blätter, Nr. 1 mit. 6:5]

COPTOGASTER Illiger

1807 Illiger. Mag. für Ins. 6:321
1888 Bedel. Faun. Col. Seine, 6:386

SCOLYTUS Geoffroy

1762 Scolytus. Geoffroy. Hist. Ins. Envir. Paris. 1:309
1864 Eichhoff. Berl. Ent. Zeit. p. 31, 44, 46
1866 Lacordaire. Col. 7:386, 387
1869 Chapuis. Syn. Scol. p. 53
1873 Chapuis. Mem. Soc. Liège, p. 261
1876 Leconte. Am. Phil. Soc. Proc. 15:370, 371
1881 Eichhoff. Borkenk. p. 39, 148
1883 Leconte & Horn. Col. N. A. p. 520
1888 Bedel. Faun. Col. Seine, 6:386
1895 Judeich–Nitsche. Forstins. 1:443
1895 Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 120
1901 Barbey. Scol. l'Europ. Cent. p. 34

48 californicus Lec.

1868 Scolytus. Leconte. Am. Ent. Soc. Trans. 2:165
1876 Scolytus. Leconte. Am. Phil. Soc. Proc. 15:371, 372
1886 Scolytus. Smith. Ent. Am. 2:127
1907 Scolytus. Fall & Cockerell. Am. Ent. Soc. Trans. 33:217
Habitat. California, New Mexico.
Food plants.

49 fagi Walsh

1867 Scolytus. Walsh. Pract. Ent. 2:58
1868 Scolytus. Leconte. Am. Ent. Soc. Trans. 2:166
1876 Scolytus. Leconte. Am. Phil. Soc. Proc. 15:371, 372
1886 Scolytus. Smith. Ent. Am. 2:127
1890 Scolytus. Packard. U. S. Ent. Com'n, 5th Rep't, p. 520, 611
1906 Scolytus. Felt. N. Y. State Mus. Mem. 8, 2:722
Habitat. Illinois, Texas.
Food plants. Celtis occidentalis, Fagus americana

50 muticus Say

1826 Scolytus. Say. Acad. Nat. Sci. Phila. Jour. 3:323; ed. Lec. 2:182
1867 Scolytus. Walsh. Prac. Ent. 2:58
1868 Scolytus. Leconte. Am. Ent. Soc. Trans. 2:166
1873 Scolytus. Riley. Ins. Inj. Mo. 5th Rep't, p. 105, 108
1876 Scolytus. Leconte. Am. Phil. Soc. Proc. 15:371, 372
1886 Scolytus. Smith. Ent. Am. 2:127
1890 Scolytus. Packard. U. S. Ent. Com'n, 5th Rep't, p. 612
1892 Scolytus. Hopkins. Ins. Life. 4:257, 259
1893 Scolytus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 140 etc.
Bul. 32, p. 212
1894 Scolytus. Hopkins. Can. Ent. 26:280
1896 Scolytus. Klages. Ent. News, 7:11, 12, 282

1897 Scolytus. Klages. Ent. News, 8:90
1903 Scolytus. Hopkins. U. S. Dep't Agric. Yearbook, p. 320
1905 Scolytus. Hopkins. Ent. Soc. Wash. Proc. 7:145, pl. 4
1906 Scolytus. Felt. N. Y. State Mus. Mem. 8, 2:725
Habitat. Pennsylvania, Missouri.
Food plant. Celtis americana.

51 **praeceps** Lec.

1876 Scolytus. Leconte. Am. Phil. Soc. Proc. 15:371, 373
1899 Scolytus. Hopkins. U. S. Div. Ent. Bul. 21, p. 16
1904 Scolytus. Hopkins. U. S. Div. Ent. Bul. 48, p. 21
1905 Scolytus. Currie. U. S. Div. Ent. Bul. 53, p. 76
1907 Scolytus. Fall & Cockerell. Am. Ent. Soc. Trans. 33:217
Habitat. California, Idaho.
Food plant. Abies.

52 **quadrispinosus** Say

1826 Scolytus. Say. Acad. Nat. Sci. Phila. Jour. 3:323; ed. Lec. 2:182
1867 Scolytus. Walsh. Prac. Ent. 2:58
1868 Scolytus. Leconte. Am. Ent. Soc. Trans. 2:165
1873 Scolytus. Riley. Inj. Ins. Mo. 5th Rep't, p. 105–7, sup. p. 54
1874 Scolytus. Le Baron. Nox. Ins. Ill. Rep't, p. 146
1876 Scolytus. Thomas. Nox. Ins. Ill. Rep't, p. 145
1876 Scolytus. Leconte. Am. Phil. Soc. Proc. 15:371
1883 Scolytus. Saunders. Ont. Ent. Soc. 14:51
1886 Scolytus. Smith. Ent. Am. 2:127
1890 Scolytus. Packard. U. S. Ent. Com'n, 5th Rep't, p. 294, 860
1891 Scolytus. Hamilton. Ins. Life. 4:130
1892 Scolytus. Hopkins. Ins. Life, 4:258
1893 Scolytus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 139 etc.; Bul. 32, p. 212
1894 Scolytus. Hopkins. Can. Ent. 26:280
1894 Scolytus. Smith. Ent. News, 6:294
1895 Scolytus. Hamilton. Am. Ent. Soc. Trans. 22:346, 378
1895 Scolytus. Smith. N. J. Agric. Exp. Sta. Rep't, p. 465–74
1896 Scolytus. Klages. Ent. News, 7:12
1896 Scolytus. Osborn. Iowa Agric. Exp. Sta. Bul. 33, p. 594, fig. 1
1899 Scolytus. Hopkins. Ent. Soc. Wash. Proc. 4:344
1899 Scolytus. Lugger. Minn. Agric. Exp. Sta. Bul. 66, p. 304, 315, fig. 245
1900 Scolytus. Smith. Cat. Ins. N. J. p. 363
1901 Scolytus. Britton. Ct. Dep't Agric. Rep't, p. 267, pl. 8, fig. 2
1905 Scolytus. Gossard. Fla. Agric. Exp. Sta. Bul. 79, p. 309, 311
1905 Scolytus. Currie. U. S. Div. Ent. Bul. 53, p. 101
1905 Scolytus. Felt. N. Y. State Mus. Mem. 8, 1:257, 275–79
1906 Scolytus. Felt. N. Y. State Mus. Mem. 8, 2:336, 446, 502, 504, 505

caryae Riley

1867 Scolytus. Riley. Prairie Farmer, Feb. 2, Aug. 10, 1872
1867 Scolytus. Walsh. Prac. Ent. 2:58

1868 Scolytus. Leconte. Am. Ent. Soc. Trans. 2:166
1873 Scolytus. Riley. Nox. Ins. Mo. 5:103–7, 108, fig. 38, 371; sup. p. 54
1876 =quadrispinosus Say. Leconte. Am. Phil. Soc. Proc. 15:371
1881 =quadrispinosus Say. Riley. U. S. Ent. Com'n Bul. 6, p. 54
Habitat. New York to Georgia and Missouri, Quebec.
Food plant. Hicoria.

53 **rugulosus** Ratz.

1837 Eccoptogaster. Ratzeburg. Forstins. 1:187, t. X, fig. 10
1839 Eccoptogaster. Ratzeburg. Forstins. 1:230, t. X, fig. 10
1869 Scolytus.* Chapuis. Syn. Scol. p. 60, 21
1878 Scolytus. Leconte. Am. Phil. Soc. Proc. 17:626
1880 Scolytus. Riley. Am. Ent. 3:298
1881 Scolytus. Eichhoff. Borkenk. p. 157–58
1882 Scolytus. Penhallow. Houghton Farm Exp. Sta. Pub. ser. 3. 5:38
1884 Scolytus. Hagen. Can. Ent. 16:161–63
1884 Scolytus. Garman. Georgia Crop. Rep't, Aug. 16
1885 Scolytus. Hamilton. Can. Ent. 17:48
1886 Scolytus. Scudder. Can. Ent. 18:195
1886 Scolytus. Smith. Ent. Am. 2:127
1888 Scolytus. Schwarz. Ent. Soc. Wash. Proc. 1:30
1888 Scolytus. Bedel. Faun. Col. Seine, 6:388, 406
1889 Scolytus. Atkinson. S. C. Exp. Sta. Bul. 4. n. s. p. 79, 80
1889 Scolytus. Howard. Ent. Soc. Wash. Proc. 1:129
1889 Scolytus. Forbes. Ill. Hort. Soc. Trans. 5:23, 245
1889 Scolytus. Lintner. 4th Rep't, p. 103–7, fig. 41
1889 Scolytus. Hamilton. Am. Ent. Soc. Trans. 16:159
1890 Scolytus. Packard. U. S. Ent. Com'n, 5th Rep't, p. 860
1891 Scolytus. Forbes. Ill. 6th Rep't, p. 1–20, pl. 1; Ill. Agric. Exp. Bul. 15, p. 469–78
1891 Scolytus. Riley & Howard. Ins. Life, 3:298
1893 Scolytus. Chittenden. Ins. Life, 5:250
1893 Scolytus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 140 etc.
1894 Scolytus. Hamilton. Am. Ent. Soc. Trans. 21:407
1894 Scolytus. Sturgis. Ct. Agric. Exp. Sta. Rep't, p. 142
1894 Scolytus. Murtfeldt. U. S. Div. Ent. Bul. 32. o. s. p. 40
1894 Scolytus. Smith. N. J. Agric. Exp. Sta. Rep't, p. 431, 565–72, fig. 43
1894 Scolytus. Troop. Ind. Agric. Exp. Sta. Bul. 53, p. 126–30, fig. 1–3
1894 Scolytus. Hopkins. Can. Ent. 26:280
1895 Scolytus. Ky. Dep't Agric. Rep't, p. 41
1895 Scolytus. Webster. Ohio Agric. Exp. Sta. Bul. 68, p. 23–25, fig. 3, 5, 6
1895 Scolytus. Sturgis. Ct. Dep't Agric. Rep't, p. 191
1895 Scolytus. Judeich–Nitsche. Forstins. 1:444, 486
1896 Scolytus. Klages. Ent. News, 7:12
1896 Scolytus. Lintner. 11th N. Y. Rep't, p. 270
1896 Scolytus. Ormerod. Rep't 1895, p. 76
1897 Scolytus. Britton. Ct. Exp. Rep't 1896, p. 240–44, 283, pl. 6
1897 Scolytus. Bogue. Okla. Agric. Exp. Sta. Bul. 26, p. 16–17, fig. 1–4
1897 Scolytus. Butz. Penn. Agric. Exp. Sta. Bul. 37, p. 26, fig. 6

1898 Scolytus. Ormerod. Hdbk. Ins. Orchard Fruits, p. 197–201, 2 fig.
1898 Scolytus. Chittenden. U. S. Div. Ent. Cir. 29
1898 Scolytus. Stedman. Mo. Agric. Exp. Sta. Bul. 44, p. 1–12, fig. 1–4
1898 Scolytus. Starnes. Ga. Agric. Exp. Sta. Bul. 42, p. 227, fig.
1898 Scolytus. Smith. N. J. Dep't Agric. Rep't, p. 385
1898 Scolytus. Baker. Ala. Agric. Exp. Sta. Bul. 90, p. 33–37, fig. 4–6
1899 Scolytus. Johnson. Ent. Soc. Wash. Proc. 4:344
1899 Scolytus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 56, p. 295
1899 Scolytus. Petit. Mich. Agric. Exp. Sta. Bul. 175, p. 363–65, fig. 19
1899 Scolytus. Fletcher. Ont. Ent. Soc. 30:110
1899 Scolytus. Chittenden. U. S. Div. Ent. Bul. 19, p. 96, 97
1899 Scolytus. Webster. Ohio Agric. Exp. Sta. Bul. 112, p. 143–49
1899 Scolytus. Hopkins. Ent. Soc. Wash. Proc. 4:344
1899 Scolytus. Lugger. Minn. Agric. Sta. Bul. 66, p. 313–15, fig. 243
1900 Scolytus. Smith. Cat. Ins. N. J. p. 364
1900 Scolytus. Sherman. N. C. Bd Agric. Rep't, p. 98
1900 Scolytus. Lochhead. Ont. Ent. Soc. 31:72
1900 Scolytus. Lowe. N. Y. Agric. Exp. Sta. Bul. 180, p. 122–28
1900 Scolytus. Johnson. N. Y. Agric. Exp. Sta. Bul. 195, p. 393
1901 Scolytus. Quaintance. Md. Agric. Exp. Sta. Rep't, p. 103, fig. 20
1901 Scolytus. Barbey. Scol. l'Europ. Cent. p. 39, pl. 1, fig. 14; pl. 3, fig. 2
1903 Scolytus. Sherman. N. C. Agric. Exp. Sta. Bul. 186, p. 5–6, 10, 21, fig. 1
1903 Scolytus. Washburn. Minn. Agric. Exp. Sta. Bul. 84, p. 57, 81, 91, fig. 30
1904 Scolytus. Titus & Pratt. U. S. Div. Ent. Bul. 47, p. 20.
1904 Scolytus. Petit. Mich. Agric. Exp. Sta. Bul. 24, p. 34, 53–55, 59, fig. 53
1904 Scolytus. Starnes. Ga. Agric. Exp. Sta. Bul. 67, p. 253–54, fig. 11
1905 Scolytus. Chittenden. U. S. Dep't Agric. Yearbook, p. 346, 347, fig. 88
1905 Scolytus. Smith. Ga. State Bd Ent. Bul. 17, p. 87–89, fig. 14
1905 Scolytus. Currie. U. S. Div. Ent. Bul. 53, p. 13, 19, 20
1905 Scolytus. Gossard. Ohio Agric. Exp. Sta. Bul. 164, p. 19, 22
1905 Scolytus. Symons. Md. Agric. Exp. Sta. Bul. 101, p. 129–30, 146, fig. 4
1906 Scolytus. Felt. N. Y. State Mus. Mem. 8, 2:336, 453, 503
1907 Eccoptogaster. Trèdl. Nahrungs. Verbreit. Borkenk. Europ. p. 6

Habitat. Europe, United States, Canada.

Food plants. Prunus, Pyrus, Crataegus.

54 subscaber Lec.

1876 Scolytus. Leconte. Am. Phil. Soc. Proc. 15:371, 373
1904 Scolytus. Hopkins. U. S. Div. Ent. Bul. 48, p. 21
1905 Scolytus. Currie. U. S. Div. Ent. Bul. 53, p. 76
1908 Scolytus. Burke. Ent. Soc. Wash. Proc. 9:115

Habitat. California to British Columbia, Utah.

Food plant. Abies.

55 sulcatus Lec.

1868 Scolytus. Leconte. Am. Ent. Soc. Trans. 2:167
1876 Scolytus. Leconte. Am. Phil. Soc. Proc. 15:371, 373

Habitat. New York.

Food plants.

56 **unispinosus** Lec.

1876 Scolytus. Leconte. Am. Phil. Soc. Proc. 15:371, 372
1878 Scolytus. Leconte. Am. Phil. Soc. Proc. 17:626
1886 Scolytus. Smith. Ent. Am. 2:125–27
1890 Scolytus. Packard. U. S. Ent. Com'n, 5th Rep't, p. 859, fig. 293
1894 Scolytus. Schwarz. Ins. Life, 7:255
1899 Scolytus. Hopkins. U. S. Div. Ent. Bul. 21, p. 16
1904 Scolytus. Hopkins. U. S. Div. Ent. Bul. 48, p. 20
1905 Scolytus. Currie. U. S. Div. Ent. Bul. 53, p. 76

Habitat. Pacific coast and Rocky mountain region of United States.

Food plants. Pseudotsuga mucronata, Larix occidentalis (?).

57 **ventralis Lec.**

1868 Scolytus. Leconte. Am. Ent. Soc. Trans. 2:167
1876 Scolytus. Leconte. Am. Phil. Soc. Proc. 15:371, 373

Habitat. Washington.

Food plants.

ERINEOPHILUS Hopkins

1902 Hopkins. Ent. Soc. Wash. Proc. 5:34

58 **schwarzi** Hopk.

1902 Erineophilus. Hopkins. Ent. Soc. Wash. Proc. 5:34–38, fig. 2

Habitat. Florida.

Food plant. Ficus.

GNATHOTRICHUS Eichhoff

1868 Eichhoff. Berl. Ent. Zeit. p. 275
1876 Leconte. Am. Phil. Soc. Proc. 15:350
1878 Eichhoff. Rat. Tom. p. 405
1883 Leconte & Horn. Col. N. A. p. 517
1904 Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 246

59 **asperulus** Lec.

1868 Cryphalus. Leconte. Am. Ent. Soc. Trans. 2:155
1876 Pityophthorus. Leconte. Am. Phil. Soc. Proc. 15:350
1878 Cryphalus. Eichhoff. Rat. Tom. p. 202
1886 Gnathotrichus. Schwarz. Ent. Am. 2:40
1888 Gnathotrichus. Schwarz. Ent. Soc. Wash. Proc. 1:80
1890 Gnathotrichus. Packard. U. S. Ent. Com'n, 5th Rep't, p. 720
1906 Gnathotrichus. Felt. N. Y. State Mus. Mem. 8, 2:726

Habitat. Washington, D. C., Virginia.

Food plant. Pinus.

60 **materiarius** Fitch

1858 Tomicus. Fitch. Nox. Ins. N. Y. 4th Rep't, p. 40–42
1868 Crypturgus. Zimmerman. Am. Ent. Soc. Trans. 2:143

1868 Gnathotrichus. Eichhoff. Berl. Ent. Zeit. p. 275
1876 Pityophthorus. Leconte. Am. Phil. Soc. Proc. 15:350
1877 Cryphalus. Provancher. Faun. Ent. Can. 1:566
1878 Gnathotrichus Eichhoff. Rat. Tom. p. 406
1886 Gnathotrichus. Schwarz. Ent. Am. 2:40
1888 Gnathotrichus. Schwarz. Ent. Soc. Wash. Proc. 1:44, 80
1890 Gnathotrichus. Packard. U. S. Ent. Com'n, 5th Rep't, p. 718–20, 816, fig. 249
1893 Gnathotrichus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 128; Bul. 32, p. 208
1894 Gnathotrichus. Hopkins. Can. Ent. 26:277
1895 Gnathotrichus. Hamilton. Am. Ent. Soc. Trans. 22:346, 378
1897 Gnathotrichus. Hubbard. U. S. Div. Ent. Bul. 7. n. s. p. 30
1899 Gnathotrichus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 56, p. 434, 442, fig. 11, 12
1901 Gnathotrichus. Felt. Forest, Fish & Game Com'n Rep't, 7:495–96
1904 Gnathotrichus. Hopkins. U. S. Div. Ent. Bul. 48, p. 15
1905 Gnathotrichus. Hopkins. Ent. Soc. Wash. Proc. 7:73
1905 Gnathotrichus. Garman. Ky. Agric. Exp. Sta. Bul. 120, p. 69
1905 Gnathotrichus. Currie. U. S. Div. Ent. Bul. 53, p. 70
1906 Gnathotrichus. Felt. N. Y. State Mus. Mem. 8, 2:339, 371–72, fig. 75
1907 Gnathotrichus. Fall & Cockerell. Am. Ent. Soc. Trans. 33:217

corthyloides Eich.

1868 Gnathotrichus. Eichhoff. Berl. Ent. Zeit. p. 273
1876 = materiarius Fitch. Leconte. Am. Phil. Soc. Proc. 15:350
1878 = materiarius Fitch. Eichhoff. Rat. Tom. p. 406
Habitat. Eastern United States and Canada to Texas.
Food plants. Pinus, Picea.

61 retusus Lec.

1868 Cryphalus. Leconte. Am. Ent. Soc. Trans. 2:155
1876 Pityophthorus. Leconte. Am. Phil. Soc. Proc. 15:350
1878 Gnathotrichus. Eichhoff. Rat. Tom. p. 406, 511
1893 Gnathotrichus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 128; Bul. 32, p. 208
1894 Gnathotrichus. Hopkins. Can. Ent. 26:277
1906 Gnathotrichus. Felt. N. Y. State Mus. Mem. 8, 2:752
1907 Gnathotrichus. Fall & Cockerell. Am. Ent. Soc. Trans. 33:217
Habitat. Nevada, Arizona, California.
Food plant. Pinus.

62 sulcatus Lec.

1868 Cryphalus. Leconte. Am. Ent. Soc. Trans. 2:155
1876 = retusus Lec. Leconte. Am. Phil. Soc. Proc. 15:350
1878 = retusus Lec. (?) Eichhoff. Rat. Tom. p. 408, 512
1904 Gnathotrichus. Hopkins. U. S. Div. Ent. Bul. 48, p. 15
1905 Gnathotrichus. Hopkins. Ent. Soc. Wash. Proc. 7:73

1905 Gnathotrichus. Currie. U. S. Div. Ent. Bul. 53, p. 70
1907 Gnathotrichus. Fall & Cockerell. Am. Ent. Soc. Trans. 33:217
Habitat. Pacific coast and Rocky mountain region, Mexico.
Food plants. Pinus, Tsuga, Pseudotsuga, Abies, Picea, Thuja, Sequoia.

HYLASTINUS Bedel

1888 Bedel. Faun. Col. Seine, 6:388

63 **obscurus** Marsh.

1802 Hylesinus. Marsham. Ent. Brit. p. 57
1869 Hylesinus. Chapman. Ent. M. Mag. 6:7
1888 Hylastinus. Bedel. Faun. Col. Seine, 6:388, 390, 408
1894 Hylastinus. Riley & Howard. Ins. Life, 7:273
1894 Hylastes. Davis. Mich. Agric. Exp. Sta. Bul. 116, p. 41, 47
1896 Hylastes. Hopk. & Rumsey. W. Va. Agric. Bul. 44, p. 264
1899 Hylastes. Webster. Ohio Agric. Exp. Sta. Bul. 112
1900 Hylastinus. Fletcher. Ont. Ent. Soc. 31:67
1901 Hylastes. Webster. Ont. Ent. Soc. 32:64
1907 Hylastinus. Webster. U. S. Div. Ent. Bul. 67
1907 = trifolii Müller. Trèdl. Nahrungs. Verbreit. Borkenk. Europ. p. 8, 20 [Entomol. Blätter, Nr 1 mit 6]

trifolii Müller

1807 Hylesinus. Müller. Mem. Soc. Deprtm. M. Tonerre, 1:47
1844 Hylastes. Schmitt. Stet. Ent. Zeit. p. 389–97
1864 Hylesinus. Taschenburg. Naturg. wirbell. Thiere, p. 272–73
1869 Hylastes. Chapuis. Syn. Scol. p. 22, 23, (79)
1873 Hylastes. Chapuis. Mem. Soc. Liege, p. 231
1878 Hylesinus. Riley. U. S. Dep't Agric. Rep't, p. 248
1880 Hylesinus. Riley. Am. Ent. 3:180
1881 Hylastes. Eichhoff. Borkenk. p. 97
1881 Hylastes. Saunders. Ont. Ent. Soc. p. 43–44, fig. 15
1881 Hylesinus. Lintner. N. Y. Agric. Soc. Rep't (1880), p. 16
1881 Hylesinus. Chase. Wis. Agric. Soc. Trans. 19:465
1882 Hylastes. Saunders. Ont. Ent. Soc. 12:43
1882 Hylastes. Lintner. 1st N. Y. Rep't, p. 247
1886 Hylesinus. Schwarz. Ent. Am. 2:55
1888 Hylesinus. Weed. Ohio Agric. Exp. Sta. Rep't, p. 133, fig. 1
1888 = obscurus Marsh. Bedel. Faun. Col. Seine, 6:391
1889 Hylastes. Hamilton. Am. Ent. Soc. Trans. 16:159
1889 Hylastes. Riley & Howard. Ins. Life, 1:218
1890 Hylesinus. Packard. U. S. Ent. Com'n, 5th Rep't, p. 227, fig. 72
1891 Hylastes. Weed. Ohio State Bul. 4, no. 2, ser. 2, p. 53–55
1891 Hylesinus. Fletcher. Can. Exp. Farm Rep't
1892 Hylesinus. Smith. Ins. Life, 5:99
1893 Hylesinus. Webster. Ohio Agric. Exp. Sta. Bul. 51, p. 120
1893 Hylesinus. Webster. Ind. Acad. Soc. Proc. p. 84
1894 Hylastes. McCarthy. N. C. State Bul. 98

1894 Hylesinus. Webster. Ohio An. Rep't, xxxi, xxxvii
1894 Hylastes. Hamilton. Am. Ent. Soc. Trans. 21:406
1895 Hylesinus. Judeich–Nitsche. Forstins. 1:454, 488
1896 Hylastes. Webster. Ohio Agric. Exp. Sta. Bul. 68, p. 31–33, pl. III, fig. 2
1899 Hylesinus. Lochhead. Ont. Ent. Soc. 30, p. 71
1899 Hylesinus. Lugger. Minn. Agric. Exp. Sta. Bul. 66, p. 317, fig. 248
1901 Hylastes. Barbey. Scol. l'Europ. Cent. p. 47, pl. 23, fig. 23
1907 =obscurus Marsh. Trèdl. Nahrungs. Verbreit. Borkenk. Europ. p. 8

Habitat. Europe, United States, Canada.

Food plants. Trifolium pratense, T. medium, T. hybridum, Spartium scoparium, Ononis natrix, Ulex europeus.

HYLESINUS Fabricius

1801 Fabricius. Syst. El. 2:390
1836 Erichson. Wieg. Archiv. 2:56
1864 Eichhoff. Berl. Ent. Zeit. p. 29, 44, 46
1866 Lacordaire. Col. 7:362
1868 Zimmermann. Am. Ent. Soc. Trans. 2:148
1869 Chapuis. Syn. Scol. p. 29
1873 Chapuis. Mem. Soc. Liège, p. 237
1876 Leconte. Am. Phil. Soc. Proc. 15:378
1877 Provancher. Faun. Ent. Can. 1:571
1881 Eichhoff. Borkenk. p. 133
1883 Leconte & Horn. Col. N. A. p. 523
1888 Bedel. Faun. Col. Seine, 6:389, 392. (Hylosinus)
1895 Judeich-Nitsche. Forstins. 1:444, 445, fig.
1895 Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 142, 154
1901 Barbey. Scol. l'Europ. Cent. p. 59

64 **aculeatus** Say

1826 Hylesinus. Say. Acad. Nat. Sci. Phila. Jour. 3:322; ed. Lec. 2:181
1868 Hylesinus. Zimmermann. Am. Ent. Soc. Trans. 2:148
1876 Hylesinus. Leconte. Am. Phil. Soc. Proc. 15:379, 437
1877 Hylesinus. Provancher. Faun. Ent. Can. 1:571
1878 Hylesinus. Hubbard & Schwarz. Am. Phil. Soc. Proc. 17:666
1886 Hylesinus. Knaus. Ent. Am. 2:76
1889 Hylesinus. Schwarz. Ent. Soc. Wash. Proc. 1:149
1890 Hylesinus. Packard. U. S. Ent. Com'n, 5th Rep't, p. 543
1891 Hylesinus. Davis. Ins. Life, 4:66
1893 Hylesinus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 142 etc.; Bul. 32, p. 213
1894 Hylesinus. Hopkins. Can. Ent. 26:280
1896 Hylesinus. Eichhoff & Schwarz. U. S. Nat. Mus. Proc. 18:607
1900 Hylesinus. Smith. Cat. Ins. N. J. p. 365
1903 Meliobius. Hopkins. U. S. Dep't Agric. Yearbook, p. 320
1904 Hylesinus. Hopkins. U. S. Div. Ent. Bul. 48, p. 20

1905 Hylesinus. Felt. N. Y. State Mus. Mem. 8, 1:257, 288
1905 Hylesinus. Currie. U. S. Div. Ent. Bul. 53, p. 75
1907 Hylesinus. Fall & Cockerell. Am. Ent. Soc. Trans. 33:218
1908 Hylesinus. Fiske. Ent. Soc. Wash. Proc. 9:24

pruinosus Eich.

1868 Hylesinus. Eichhoff. Berl. Ent. Zeit. p. 149
1868 (?) = aculeatus Say. Leconte. Am. Ent. Soc. Trans. 2:177
1869 Hylesinus. Chapuis. Syn. Scol. p. 32
1873 Hylesinus. Chapuis. Mem. Soc. Liege, p. 240
1876 = aculeatus Say. Leconte. Am. Phil. Soc. Proc. 15:379
1896 (?) = aculeatus Say. Eich. & Schwarz. U. S. Nat. Mus. Proc. 18:607

Habitat. Canada, United States (Atlantic to Pacific).
Food plant. Fraxinus.

65 aspericollis Lec.

1876 Hylesinus. Leconte. Am. Phil. Soc. Proc. 15:379, 380
1899 Hylesinus. Hopkins. U. S. Div. Ent. Bul. 21, p. 16
1904 Hylesinus. Hopkins. U. S. Div. Ent. Bul. 48, p. 20
1905 Hylesinus. Currie. U. S. Div. Ent. Bul. 53, p. 75

Habitat. California, Oregon, Washington.
Food plant. Alnus rhombifolia.

66 fasciatus Lec.

1868 Hylesinus. Leconte. Am. Ent. Soc. Trans. 2:170
1876 Hylesinus. Leconte. Am. Phil. Soc. Proc. 15:379, 380

Habitat. Pennsylvania.
Food plants.

67 granulatus Lec.

1868 Hylastes. Leconte. Am. Ent. Soc. Trans. 2:175
1876 Hylurgops. Leconte. Am. Phil. Soc. Proc. 15:390
1904 Hylesinus. Hopkins. U. S. Div. Ent. Bul. 48, p. 19
1905 Hylesinus. Currie. U. S. Div. Ent. Bul. 53, p. 75
1905 Hylesinus. Burke. Ent. Soc. Wash. Proc. 7:89

Habitat. Oregon, Washington, California.
Food plant. Grand fir (Abies grandis)?

68 imperialis Eich.

1868 Hylesinus. Eichhoff. Berl. Ent. Zeit. p. 149
1868 Hylesinus. Leconte. Am. Ent. Soc. Trans. 2:169
1869 Hylesinus. Chapuis. Syn. Scol. p. 32 (aculeatus)
1873 Hylesinus. Chapuis. Mem. Soc. Liege, p. 240
1876 Hylesinus. Leconte. Am. Phil. Soc. Proc. 15:379
1896 Hylesinus. Eich. & Schwarz. U. S. Nat. Mus. Proc. 18:607

Habitat. Dakota, Arizona, Wisconsin, Georgia, New York.
Food plants.

69 **nebulosus** Lec.

1859 Hylesinus. Leconte. Acad. Nat. Sci. Phila. Proc. p. 285
1876 Hylesinus. Leconte. Am. Phil. Soc. Proc. 15:380
1894 Hylesinus. Hamilton. Am. Ent. Soc. Trans. 21:35
1904 Hylesinus. Hopkins. U. S. Div. Ent. Bul. 48, p. 20
1905 Hylesinus. Currie. U. S. Div. Ent. Bul. 53, p. 75

Habitat. British Columbia to California, east to Idaho and Colorado.

Food plant. Pseudotsuga mucronata.

70 **sericeus** Mannh.

1843 Hylurgus. Mannerheim. Bul. Mosc. p. 296, (256)
1852 Hylurgus. Mannerheim. Bul. Mosc. p. 356, (144)
1852 Hylesinus. Mannerheim. Bul. Mosc. p. 385
1868 Hylesinus. Leconte. Am. Ent. Soc. Trans. 2:170
1876 Hylesinus. Leconte. Am. Phil. Soc. Proc. 15:379, 380
1892 Hylesinus. Schwarz. Ent. Soc. Wash. Proc. 2:239
1894 Hylesinus. Schwarz. Ins. Life, 7:254–56
1894 Hylesinus. Hamilton. Am. Ent. Soc. Trans. 21:35
1904 Hylesinus. Hopkins. U. S. Div. Ent. Bul. 48, p. 20
1905 Hylesinus. Currie. U. S. Div. Ent. Bul. 53, p. 75

Habitat. Alaska to California.

Food plant. Shore pine.

HYLURGOPS Leconte

1876 Leconte. Am. Phil. Soc. Proc. 15:389
1883 Leconte & Horn. Col. N. A. p. 525
1888 Bedel. Faun. Col. Seine, p. 389, 408

71 (?) **cristatus** Mannh.

1853 Hylastes. Mannerheim. Bul. Mosc. p. 239, (220)
1868 Hylastes. Leconte. Am. Ent. Soc. Trans. 2:177
1876 (?) Hylurgops. Leconte. Am. Phil. Soc. Proc. 15:390
1894 Hylastes. Hamilton. Am. Ent. Soc. Trans. 21:36

Habitat. Alaska.

Food plants.

72 (?) **glabratus** Zett.

1828 Hylurgus. Zetterstedt. Fn. Ins. Lapp. p. 343
1838 Hylurgus. Zetterstedt. Ins. Lapp. 192, 5
1871 Hylastes. Salb. Berl. Ent. Zeit. p. 206
1881 Hylastes. Eichhoff. Borkenk. p. 91
1886 Hylastes. Schwarz. Ent. Am. 2:56
1888 Hylurgops. Hamilton. Am. Ent. Soc. Trans. 16:159
1888 Tomicus. Bedel. Faun. Col. Bassin Seine, Rynch. p. 390
1891 Hylastes. Hamilton. Ins. Life, 4:132
1893 Hylurgops. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 144 etc.; Bul. 32, p. 213

1894 Hylastes. Hamilton. Am. Ent. Soc. Trans. 21:406
1894 Hylurgops. Hopkins. Can. Ent. 26:280
1894 Hylastes. Blandford. Ent. Soc. Lond. p. 58
1895 Hylastes. Judeich-Nitsche. Forstins. 1:447, 523
1899 Hylurgops. Hopkins. W. Va. Agric. Exp. Sta. Bul. 56, p. 449 etc.
1900 Hylurgops. Smith. Cat. Ins. N. J. p. 365
1901 = decumanus Er. Barbey. Scol. l'Europ. Cent. p. 45, pl. 1, fig. 21
1906 Hylurgops. Felt. N. Y. State Mus. Mem. 8, 2:649, 665–66, fig. 194
1907 Hylastes. Trèdl. Nahrungs. Verbreit. Borkenk. Europ. p. 9

decumanus Er.

1836 Hylastes. Erichson. Wieg. Archiv. 2:51, 10
1837 Hylesinus. Ratzeburg. Forstins. 1:182; 1839, p. 222
1869 Hylastes. Chapuis. Syn. Scol. p. 20, 14; 1873, p. 228
1881 = glabratus Zett. Eichhoff. Borkenk. p. 92
1894 = glabratus Zett. Hamilton. Am. Ent. Soc. Trans. 21:407
1901 Hylastes. Barbey. Scol. l'Europ. Cent. p. 45, pl. 1, fig. 21
Habitat. Europe, Siberia, United States (?).
Food plant. Picea.

73 **pinifex** Fitch

1851 Hylastes. Fitch. N. Y. Agric. Soc. Trans. p. 43
1858 Hylastes. Fitch. Nox. Ins. N. Y. p. 729
1868 Hylastes. Leconte. Am. Ent. Soc. Trans. 2:176
1876 Hylurgops. Leconte. Am. Phil. Soc. Proc. 15:390
1877 Hylastes. Provancher. Faun. Ent. Can. 1:574
1878 Hylurgops. Hubbard & Schwarz. Am. Phil. Soc. Proc. 17:643
1883 Hylurgops. Packard. U. S. Ent. Com'n, 3d Rep't, p. 280, pl. XXII
1886 = glabratus Zett. Schwarz. Ent. Am. 2:56
1888 Hylurgops. Schwarz. Ent. Soc. Wash. Proc. 1:80
1888 = glabratus Zett. Hamilton. Am. Ent. Soc. Trans. 16:159
1890 Hylurgops. Packard. U. S. Ent. Com'n, 5th Rep't, p. 709, 710, 722, 826, fig. 252, 254
1890 = glabratus Zett. Hamilton. Ent. Am. 6:44
1891 = glabratus Zett. Hamilton. Ins. Life, 4:132
1893 = glabratus Zett. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 144
1894 = glabratus Zett. Blandford. Ent. Soc. Lond. p. 58
1898 Hylastes. Blandford. Ent. News, 9:6
1900 Hylastes. Smith. Cat. Ins. N. J. p. 365
Habitat. Eastern United States and Canada.
Food plant. Pinus.

74 **rufipes** Eich.

1868 Hylastes. Eichhoff. Berl. Ent. Zeit. p. 147
1868 Hylastes. Leconte. Am. Ent. Soc. Trans. 2:177
1873 Hylastes. Chapuis. Mem. Soc. Liege, p. 231
1876 (?) Hylurgops. Leconte. Am. Phil. Soc. Proc. 15:390
1896 Hylastes. Eichhoff. U. S. Nat. Mus. Proc. 18:605, 606, 610

opaculus Lec.

1868 Hylesinus. Leconte. Am. Ent. Soc. Trans. 2:170
1876 Hylesinus. Leconte. Am. Phil. Soc. Proc. 15:379, 380
1878 Hylesinus. Hubbard & Schwarz. Am. Phil. Soc. Proc. 17:666
1879 Hylesinus. Riley. U. S. Dep't Agric. Ent. Rep't, p. 45
1884 Hylesinus. Harrington. Can. Ent. 16:218
1885 Hylesinus. Moffat. Ont. Ent. Soc. 15:23
1889 Hylesinus. Schwarz. Ent. Soc. Wash. Proc. 1:149, 176
1890 Hylesinus. Perkins. Vt. State Bd Agric. Rep't, p. 67, fig. 50
1890 Hylesinus. Packard. U. S. Ent. Com'n, 5th Rep't, p. 227, 544, fig. 2
1890 Hylesinus. Caulfield. Ont. Ent. Soc. 21:75
1893 Hylesinus. Hopkins. W. Va. Agric. Sta. Bul. 31, p. 142 etc.; Bul. 32, p. 213
1895 Hylesinus. Hamilton. Am. Ent. Soc. Trans. 22:346, 378
1896 = rufipes Eich. Eichhoff & Schwarz. U. S. Nat. Mus. Proc. 18:605, 606, 610
1898 Hylastes. Blandford. Ent. News, 9:5
1899 Hylesinus. Garman. Ky. Sta. Bul. 84, p. 60, 73–75
1900 Hylesinus. Smith. Cat. Ins. N. J. p. 365
1905 Hylesinus. Felt. N. Y. State Mus. Mem. 8, 1:257, 288

Habitat. New York, West Virginia and northward into Canada.
Food plants. Ulmus, Fraxinus.

75 **rugipennis** Mannh.

1843 Hylurgus. Mannerheim. Bul. Mosc. p. 297, (258)
1853 Hylastes. Mannerheim. Bul. Mosc. p. 238, (218)
1868 Hylastes. Leconte. Am. Ent. Soc. Trans. 2:176
1873 Hylastes. Chapuis. Mem. Soc. Liege, p. 228
1876 Hylurgops.. Leconte. Am. Phil. Soc. Proc. 15:390
1894 Hylurgops. Am. Ent. Soc. Trans. 21:36
1904 Hylurgops. Schwarz. Harriman Rep't, Alaska Exp. pt 8; Insects, pt 1, p. 185
1904 Hylurgops. Hopkins. U. S. Div. Ent. Bul. 48, p. 19
1905 Hylurgops. Currie. U. S. Div. Ent. Bul. 53, p. 74
1905 Hylurgops. Hopkins. Ent. Soc. Wash. Proc. 7:81

Habitat. Alaska to California and New Mexico.
Food plants. Pinus, Picea, Abies, Pseudotsuga.

76 **subcostulatus** Mannh.

1853 Hylastes. Mannerheim. Bul. Mosc. p. 239, (219)
1868 Hylastes. Leconte. Am. Ent. Soc. Trans. 2:176
1876 Hylurgops. Leconte. Am. Phil. Soc. Proc. 15:390
1894 Hylurgops. Hamilton. Am. Ent. Soc. Trans. 21:36
1895 Hylastes. Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 144, 146
1896 Hylurgus. Eichhoff & Schwarz. U. S. Nat. Mus. Proc. 18:606
1902 Hylurgops. Hopkins. U. S. Div. Ent. Bul. 32, p. 13
1905 Hylurgops. Currie. U. S. Div. Ent. Bul. 53, p. 74

alternans Chap.

1869 Hylastes. Chapuis. Syn. Scol. p. 22
1873 Hylastes. Chapuis. Mem. Soc. Liège, p. 230
1895 = subcostulatus Mannh. Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 146
1896 = subcostulatus Mannh. Eichhoff & Schwarz. U. S. Nat. Mus. Proc. 18:606

Habitat. Alaska to New Mexico, Pacific coast and Rocky Mountain region.

Food plant. Western pines.

HYPOTHENEMUS Westw.

1836 Westwood. Ent. Soc. Lond. Trans. 1:36
1836 Erichson. Wieg. Archiv. 1:61
1864 Eichhoff. Berl. Ent. Zeit. p. 34, 45, 56
1876 Leconte. Am. Phil. Soc. Proc. 15:355
1883 Leconte & Horn. Col. N. A. p. 517
1885 Gozman. Rev. d'Ent. 4:278
1896 Eichhoff & Schwarz. U. S. Nat. Mus. Proc. 18:608
1904 Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 226

STEPHANODERES Eichhoff

1871 Eichhoff. Berl. Ent. Zeit. p. 132
1878 Eichhoff. Rat. Tom. p. 142
1881 Eichhoff. Borkenk. p. 46, 190
1896 Eichhoff & Schwarz. U. S. Nat. Mus. Proc. 18:608

HOMOEOCRYPHALUS Lindeman

1876 Lindeman. Bul. Mosc. 2:168
1904 Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 226

77 **dissimilis** Zimm.

1868 Crypturgus. Zimmerman. Am. Ent. Soc. Trans. 2:144
1876 Hypothenemus. Leconte. Am. Phil. Soc. Proc. 15:356
1878 Crypturgus. Eichhoff. Rat. Tom. p. 144
1878 Hypothenemus. Schwarz. Am. Phil. Soc. Proc. 17:468
1888 Hypothenemus. Schwarz. Ent. Soc. Wash. Proc. 1:80
1890 Hypothenemus. Smith. Ent. Am. 6:54
1890 Hypothenemus. Smith. Cat. Ins. N. J. p. 267
1893 Hypothenemus. Chittenden. Ent. Soc. Wash. Proc. 2:393
1893 Hypothenemus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 133; Bul. 32, p. 210
1895 Hypothenemus. Hamilton. Am. Ent. Soc. Trans. 22:346, 378
1895 Hypothenemus. Chittenden. Ins. Life, 7:385
1896 Hypothenemus. Lintner. 11th N. Y. Rep't, p. 270
1899 Hypothenemus. Hopkins. Ent. Soc. Wash. Proc. 4:343
1900 Stephanoderes. Smith. Cat. Ins. N. J. p. 362
1905 Hypothenemus. Wenzel. Ent. News, 16:124

chapuisii Eich.

1871 Stephanoderes. Eichhoff. Berl. Ent. Zeit. p. 132
1876 (?)= erectus Lec. Leconte. Am. Phil. Soc. Proc. 15:356
1878 Stephanoderes. Eichhoff. Rat. Tom. p. 143
1896 =dissimilis Zimm. Eichhoff & Schwarz. U. S. Nat. Mus. Proc. 18:608, 610

Habitat. Lake Superior and Quebec to Georgia, West Virginia, New York, New Jersey.

Food plants. Quercus, Pinus, Hicoria, Vitis, Prunus (wild), Ficus (dead twigs), Pyrus.

78 **erectus** Lec.

1876 Hypothenemus. Leconte. Am. Phil. Soc. Proc. 15:356
1890 Hypothenemus. Smith. Ent. Am. 6:54
1890 Hypothenemus. Smith. Cat. Ins. N. J. p. 267
1893 Hypothenemus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31:133
1896 Hypothenemus. Lintner. 11th N. Y. Rep't, p. 270
1896 Hypothenemus. Eichhoff & Schwarz. U. S. Nat. Mus. Proc. 18:608, 610
1900 Hypothenemus. Smith. Cat. Ins. N. J. p. 362

sculpturatus Eich.

1878 Stephanoderes. Eichhoff. Rat. Tom. p. 146
1896 =erectus Lec. Eichhoff & Schwarz. U. S. Nat. Mus. Proc. 18:608, 610

Habitat. New Jersey, West Virginia, Texas.

Food plants. Quercus, Hicoria, Vitis, Lonicera, Ficus, Pyrus.

79 **eruditus** Westw.

1836 Tomicus (Hypothenemus). Westwood. Ent. Soc. Lond. Trans. 2:34, t. 7, fig. 1, a, g
1836 Erichson. Wieg. Archiv. p. 61
1863 Fairm. Gen. Col. p. 4, t. 33, fig. 161
1865 Tomicus. Scudder. Bost. Soc. Nat. Hist. Proc. 10:13–14
1867 Ferrari. Borkenk. p. 7
1878 =areccae Horn. Eichhoff. Rat. Tom. p. 165
1879 Hypothenemus. Sharp. Ent. Soc. Lond. Trans. p. 102
1884 Hypothenemus. Fauvel. Rev. d' Ent. 3:315, 390
1887 Hypothenemus. Hubbard. Ins. Orange, p. 173, pl. 14, fig. 1
1889 Hypothenemus. Hamilton. Am. Ent. Soc. Trans. 16:158
1889 Hypothenemus. Schwarz. Ent. Soc. Wash. Proc. 1:139
1890 Hypothenemus. Smith. Ent. Am. 6:54
1891 Hypothenemus. Schwarz. Ent. Soc. Wash. Proc. 2:74
1893 Hypothenemus. Chittenden. Ins. Life, 5:250
1893 Hypothenemus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 132
1894 Hypothenemus. Blandford. Ins. Life, 6:261–63
1894 Hypothenemus. Reitter. Bestim. Tab. 75
1894 Hypothenemus. Hamilton. Am. Ent. Soc. Trans. 21:406
1895 Hypothenemus. Hamilton. Am. Ent. Soc. Trans. 22:346, 378
1896 =crudiae Pan. (?) Eichhoff. U. S. Nat. Mus. Proc. 18:608

1896 Hypothenemus. Lintner. 11th N. Y. Rep't, p. 270
1900 = aveccae Horn. Smith. Cat. Ins. N. J. p. 362
1904 Hypothenemus. Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 229, 230
1905 = hispidulus Lec. Currie. U. S. Div. Ent. Bul. 53, p. 7

(?) **areccae** Horn

1842 Bostrichus. Hornung. Stet. Ent. Zeit. p. 117
1878 Stephanoderes. Eichhoff. Rat. Tom. p. 165, 166
1884 = eruditus Westw. Fauvel. Rev. d'Ent. 3:315, 390
1896 = eruditus Westw. Eichhoff & Schwarz. U. S. Nat. Mus. Proc. 18:608
1900 Hypothenemus. Smith. Cat. Ins. N. J. p. 362
1904 = eruditus Westw. Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 229, 230

boieldieui Perroud

1864 Bostrichus. Perroud. Ann. Soc. Linn. Lyon. p. 188
1878 = areccae Horn.(?). Eichhoff. Rat. Tom. p. 166
1904 = eruditus Westw. Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 229, 230

Habitat. Mexico, United States, Canada, Panama, Nevis, Europe, Guinea, Sandwich Islands, New Caledonia.

Food plants. Oak, orange, fig, grape, sugar cane, nuts, Lonicera, Pyrus, Robinia.

80 hispidulus Lec.

1868 Cryphalus. Leconte. Am. Ent. Soc. Trans. 2:156
1876 Hypothenemus. Leconte. Am. Phil. Soc. Proc. 15:355
1878 Cryphalus. Eichhoff. Rat. Tom. p. 156
1878 Hypothenemus. Schwarz. Am. Phil. Soc. Proc. 17:468
1888 Hypothenemus. Hamilton. Am. Ent. Soc. Trans. 16:158
1890 (?) = dissimilis Zimm. Smith Ent. Am. 6:54
1894 Hypothenemus. Blandford. Ins. Life, 6:263
1894 = eruditus Westw. Hamilton. Am. Ent. Soc. Trans. 21:406
1896 = crudiae Pan. Eichhoff & Schwarz. U. S. Nat. Mus. Proc. 18:608, 610
1900 = crudiae Pan. Smith. Cat. Ins. N. J. p. 362
1904 Hypothenemus. Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 230
1905 Stephanoderes. Currie. U. S. Div. Ent. Bul. 53, p. 7, 13

seriatus Eich.

1871 Stephanoderes. Eichhoff. Berl. Ent. Zeit. p. 133
1876 (?) = hispidulus Lec. Am. Phil. Soc. Proc. 15:356
1878 Stephanoderes. Eichhoff. Rat. Tom. p. 158 (New Orleans)

Habitat. Eastern, Middle and Southern States.

Food plants. Quercus, Hicoria.

81 rotundicollis Eich.

1878 Stephanoderes. Eichhoff. Rat. Tom. p. 145
1896 Stephanoderes. Eichhoff & Schwarz. U. S. Nat. Mus. Proc. 18:608

Habitat. Amer. Septent (Tennessee).

Food plants.

82 striatus Lec.

1868 Cryphalus. Leconte. Am. Ent. Soc. Trans. 2:156
1876 Hypothenemus. Leconte. Am. Phil. Soc. Proc. 15:356
Habitat. Lower and Upper California; Illinois.
Food plants. (?)

Degeer

1775 DeGeer. Mem. Ins. 5:190
1884 Bergroth. Berl. Ent. Zeit. 28:230
1888 Bedel. Faun. Col. Seine, 6:396, 400
1895 Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 185, 188

BOSTRICHUS Fabr.

1777 Fabricius. Syst. Ent. p. 59
1836 Erichson. Wieg. Archiv. 1, p. 62
1868 Zimmerman. Am. Ent. Soc. Trans. 2:142, 146

TOMICUS Latreille (1807)

1807 Latreille. Gen. Crust & Ins. 2:276
1868 Leconte. Am. Ent. Soc. Trans. 2:162–64
1869 Lacordaire. Gen. Col. 9:382
1876 Leconte. Am. Phil. Soc. Proc. 15:346, 362
1877 Provancher. Faun. Ent. Can. 1:569
1879 Eichhoff. Rat. Tom. p. 220
1881 Eichhoff. Borkenk. p. 48, 211
1883 Leconte & Horn. Col. N. A. p. 518, 519
1895 Judeich-Nitsche. Forstins. 1:448, 449, 451, fig.
1895 Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 185, 186
1901 Barbey. Scol. l'Europ. Cent. p. 81

83 avulsus Eich.

1867 Tomicus. Eichhoff. Berl. Ent. Zeit. p. 402
1868 Bostrichus. Zimmerman. Am. Ent. Soc. Trans. 2:147
1876 Tomicus. Leconte. Am. Phil. Soc. Proc. 15:363, 366
1878 Tomicus. Eichhoff. Rat. Tom. p. 255
1878 Tomicus. Schwarz. Am. Phil. Soc. Proc. 17:469
1893 Tomicus Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 139; Bul. 32, p. 212
1899 Tomicus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 56, p. 344, 422, 445
1904 Tomicus. Hopkins. U. S. Div. Ent. Bul. 48, p. 44
1905 Tomicus. Currie. U. S. Div. Ent. Bul. 53, p. 100
1906 Tomicus. Felt. N. Y. State Mus. Mem. 8, 2:752
Habitat. Southern United States.
Food plant. Pinus.

84 balsameus Lec.

1878 Tomicus. Leconte. Am. Phil. Soc. Proc. 17:625
1896 = punctipennis Lec. Eichhoff & Schwarz. U. S. Nat Mus. Proc. 18:609, 610

1901 Tomicus. Felt. N. Y. Forest, Fish and Game Com'n Rep't, 7:519–22, fig. 20
1902 Tomicus. Felt. U. S. Div. Ent. Bul. 31, p. 65
1904 Tomicus. Hopkins. U. S. Div. Ent. Bul. 48, p. 25
1905 Tomicus. Currie. U. S. Div. Ent. Bul. 53, p. 81
1906 Tomicus. Felt. N. Y. State Mus. Mem. 8, 2:338, 354, 374, 375–79, 386, 389, 673, fig. 80–84

Habitat. Maine and Quebec to Michigan and West Virginia.

Food plants. Abies, Picea, Pinus.

85 caelatus Eich.

1867 Tomicus. Eichhoff. Berl. Ent. Zeit. p. 402
1868 Xyleborus. Zimmerman. Am. Ent. Soc. Trans. 2:146
1876 Xyleborus. Leconte. Am. Phil. Soc. Proc. 15:359, 360
1877 Xyleborus. Provancher. Faun. Ent. Can. 1:568
1878 Tomicus. Eichhoff. Rat. Tom. p. 274, 370
1878 Xyleborus. Schwarz. Am. Phil. Soc. Proc. 17:468, 666
1886 Xyleborus. Schwarz. Ent. Am. 2:41
1888 Xyleborus. Schwarz. Ent. Soc. Wash. Proc. 1:47, 80
1890 Xyleborus. Packard. U. S. Ent. Com'n 5th Rep't, p. 706, 710, 812, 825, fig. 277, 278
1893 Tomicus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 139; Bul. 32, p. 212
1894 Xyleborus. Blandford. Ins. Life, 6:261
1894 Tomicus. Hopkins. Can. Ent. 26:280
1894 Tomicus. Schwarz. Ent. Soc. Wash. Proc. 3:16, 27
1895 Xyleborus. Hamilton. Am. Ent. Soc. Trans. 22:346, 378
1899 Tomicus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 56, p. 258, 342, 446
1900 Ips. Smith. Cat. Ins. N. J. p. 363
1901 Tomicus. Felt. N. Y. Forest, Fish & Game Com'n Rep't, 7:488–90, fig. 8
1902 Tomicus. Hopkins. U. S. Div. Ent. Bul. 32, p. 12
1906 Tomicus. Felt. N. Y. State Mus. Mem. 8, 2:338, 354–56, 374, 376, fig. 72

vicinus Lec.

1874 Xyleborus. Leconte. Am. Ent. Soc. Trans. 5:72
1876 = caelatus Eich. Leconte. Am. Phil. Soc. Proc. 15:360

xylographus Fitch

1858 Tomicus. Fitch. Nox. Ins. N. Y. 4th Rep't, p. 716
1886 = caelatus Eich. Schwarz. Ent. Am. 2:41
1906 = caelatus Eich. Felt. N. Y. State Mus. Mem. 8, 2:355

Habitat. Canada; United States, south to West Virginia.

Food plants. Pinus, Picea, Abies.

86 calligraphus Ger.

1824 Bostrichus. Germar. Ins. Nov. p. 461
1858 Tomicus. Fitch. Nox. Ins. N. Y. 4th Rep't, p. 721

1868 Tomicus. Leconte. Am. Ent. Soc. Trans. 2:162
1876 Tomicus. Leconte. Am. Phil. Soc. Proc. 15:363
1877 Tomicus. Provancher. Faun. Ent. Can. 1:570
1878 Tomicus. Schwarz. Am. Phil. Soc. Proc. 17:469, 643
1888 Tomicus. Schwarz. Ent. Soc. Wash. Proc. 1:80
1890 Tomicus. Packard. U. S. Ent. Com'n 5th Rep't, p. 711, 712, fig. 244, 245
1893 Tomicus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 138; Bul 32, p. 212
1893 Tomicus. Garman. Ky. Agric. Exp. Sta. Bul. 47, p. 50–52
1894 Tomicus. Hopkins. Can. Ent. 26:279
1894 Tomicus. Garman. Ky. Agric. Rep't 1893, p. 127
1897 Tomicus. Johnson. Penn. Agric. Rep't, p. 109–10
1899 Tomicus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 56, p. 422
1900 Ips. Smith. Cat. Ins. N. J. p. 363
1901 Tomicus. Felt. N. Y. Forest, Fish & Game Com'n Rep't, 7:482–85, fig. 4, 5
1902 Tomicus. Felt. U. S. Div. Ent. Bul. 31, p. 64
1902 Tomicus. Hopkins. U. S. Div. Ent. Bul. 32, p. 11
1903 Tomicus. Gillette. Col. Agric. Exp. Sta. Rep't 15, p. 116–17
1906 Tomicus. Felt. N. Y. State Mus. Mem. 8, 2:334, 338, 342, 345–51, 354, 356, 358, fig. 67, 68, 69

chloroticus Dej.

1837 Bostrichus. Dej. Cat. p. 332
1878 = calligraphus Ger. Eichhoff. Rat. Tom. p. 224

conformis Dej.

1837 Bostrichus. Dej. Cat. p. 332
1878 = calligraphus Ger. Eichhoff. Rat. Tom. p. 224

exesus Say

1826 Bostrichus. Say. Acad. Nat. Sci. Phila. Jour. 5:255; ed. Lec. 2:317
1841 Bostrichus. Harris. Ins. Mass. p. 74
1868 Bostrichus. Zimmerman. Am. Ent. Soc. Trans. 2:147
1876 = calligraphus Ger. Leconte. Am. Phil. Soc. Proc. 15:363
1878 = calligraphus Ger. Eichhoff. Rat. Tom. p. 224

praemorsus Eich.

1867 Tomicus. Eichhoff. Berl. Ent. Zeit. p. 401
1876 (?) = calligraphus Ger. Leconte. Am. Phil. Soc. Proc. 15:363
1876 = calligraphus Ger. Eichhoff. Stett. Ent. Zeit. 37:378
1878 = calligraphus Ger. Eichhoff. Rat. Tom. p. 224
Habitat. Atlantic region of United States to New Mexico, Canada.
Food plant. Pinus.

87 **concinnus** Mannh.

1852 Bostrichus. Mannerheim. Bul. Mosc. 2:358, (149)
1853 Bostrichus. Mannerheim. Bul. Mosc. 3:234, (209)

1868 Tomicus. Leconte. Am. Ent. Soc. Trans. 2:164
1876 Tomicus. Leconte. Am. Phil. Soc. Proc. 15:363, 367
1878 Xylocleptes. Leconte. Am. Phil. Soc. Proc. 17:625
1878 Tomicus. Eichhoff. Rat. Tom. p. 232
1886 Xylocleptes. Schwarz. Ent. Am. 2:42
1894 Xylocleptes. Hamilton. Am. Ent. Soc. Trans. 21:35
1895 Tomicus. Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 186, 188
1898 Tomicus. Blandford. Ent. News, 9:6
1904 Tomicus. Hopkins. U. S. Div. Ent. Bul. 48, p. 17
1905 Tomicus. Currie. U. S. Div. Ent. Bul. 53, p. 73
1905 Tomicus. Hopkins. Ent. Soc. Wash. Proc. 7:75

hirsutus Eich.

1867 Tomicus. Eichhoff. Berl. Ent. Zeit. p. 402
1878 = concinnus Mannh. Eichhoff. Rat. Tom. p. 233
1895 = concinnus Mannh. Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 188
Habitat. Alaska to middle California.
Food plants. Pinus, Picea sitchensis.

88 **confusus** Lec.

1876 Tomicus. Leconte. Am. Phil. Soc. Proc. 15:362, 364
1886 Tomicus. Schwarz. Ent. Am. 2:42
1890 Tomicus. Packard. U. S. Ent. Com'n, 5th Rep't, p. 713
1904 Tomicus. Hopkins. U. S. Div. Ent. Bul. 48, p. 18
1905 Tomicus. Hopkins. Ent. Soc. Wash. Proc. 7:77
1905 Tomicus. Currie. U. S. Div. Ent. Bul. 53, p. 73

montanus Eich.

1881 Tomicus. Eichhoff. Borkenk. p. 219
1886 = confusus Lec. Schwarz. Ent. Am. 2:42
Habitat. Oregon, California, Arizona.
Food plants. Pinus edulis, P. monophylla.

89 **decretus** Eich.

1867 Tomicus. Eichhoff. Berl. Ent. Zeit. p. 402
1868 Tomicus. Leconte. Am. Ent. Soc. Trans. 2:177
1878 Tomicus. Eichhoff. Rat. Tom. p. 272
Habitat. America Borealis.
Food plants.

90 **emarginatus** Lec.

1876 Tomicus. Leconte. Am. Phil. Soc. Proc. 15:363, 364
Habitat. Oregon.
Food plants.

91 **grandicollis** Eich.

1867 Tomicus. Eichhoff. Berl. Ent. Zeit. p. 402
1878 Tomicus. Eichhoff. Rat. Tom. p. 231
1898 Tomicus. Blandford. Ent. News, 9:6
1905 Tomicus. Hopkins. Ent. Soc. Wash. Proc. 7:77

cacographus Lec.

1868 Tomicus. Leconte. Am. Ent. Soc. Trans. 2:162
1876 Tomicus. Leconte. Am. Phil. Soc. Proc. 15:362, 364
1878 =grandicollis Eich. (?) Eichhoff. Rat. Tom. p. 231
1878 Tomicus. Schwarz. Am. Phil. Soc. Proc. 17:469
1888 Tomicus. Schwarz. Ent. Soc. Wash. Proc. 1:80
1890 Tomicus. Packard. U. S. Ent. Com'n, 5th Rep't, p. 713, fig. 246
1893 Tomicus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 138; Bul. 32, p. 212
1893 Tomicus. Bruner. Neb. Hort. Rep't, p. 199, fig. 38
1893 Tomicus. Hopkins. Ins. Life, 6:129
1894 Tomicus. Bruner. Neb. Hort. Rep't, p. 187, fig. 38
1894 Tomicus. Hopkins. Can. Ent. 26:279
1894 Tomicus. Schwarz. Ent. Soc. Wash. Proc. 3:16, 27
1897 Tomicus. Johnson. Penn. Agric. Rep't, p. 79–80, 110
1898 =grandicollis Eich. Blandford. Ent. News, 9:6
1899 Tomicus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 56, p. 422
1900 Ips. Smith. Cat. Ins. N. J. p. 363
1901 Tomicus. Felt. N. Y. Forest, Fish & Game Com'n Rep't, 7:485
1906 Tomicus. Felt. N. Y. State Mus. Mem. 8, 2:334, 338, 342, 354, 356–359, 374, fig. 73

pini (Say) Zimm.

1868 Bostrichus. Zimmerman. Am. Ent. Soc. Trans. 2:147
1876 =cacographus Lec. Leconte. Am. Phil. Soc. Proc. 15:364
1878 =grandicollis Eich. Eichhoff. Rat. Tom. p. 231
Habitat. Middle Atlantic, Southern and Western States; Quebec.
Food plants. Pinus, Picea.

92 hudsonicus Lec.

1876 Tomicus. Leconte. Am. Phil. Soc. Proc. 15:363, 366
1878 Tomicus. Hubbard & Schwarz. Am. Phil. Soc. Proc. 17:643
1894 Tomicus. Schwarz. Ins. Life, 7:255
Habitat. Hudson Bay region, Utah.
Food plant. Picea.

93 integer Eich.

1869 Tomicus. Eichhoff. Berl. Ent. Zeit. p. 273
1878 Tomicus. Eichhoff. Rat. Tom. p. 226
1898 =plastographus Lec. Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 186, 187
1903 Tomicus. Gillette. Col. Agric. Exp. Sta. Rep't 15, p. 117
1904 Tomicus. Hopkins. U. S. Div. Ent. Bul. 48, p. 18
1905 Tomicus. Hopkins. Ent. Soc. Wash. Proc. 7:75, 76, 77
1905 Tomicus. Currie. U. S. Div. Ent. Bul. 53, p. 73
Habitat. Rocky mountain region of United States, Mexico.
Food plants. Pinus ponderosa, P. monticola.

94 **interruptus** Mannh.

1852 Bostrichus. Mannerheim. Bul. Mosc. p. 357, (147)
1853 Bostrichus. Mannerheim. Bul. Mosc. 234, (208)
1868 Tomicus. Leconte. Am. Ent. Soc. Trans. 2:164
1868 Tomicus. Eichhoff. Berl. Ent. Zeit. p. 274
1876 Tomicus. Leconte. Am. Phil. Soc. Proc. 15:363, 366
1878 Tomicus. Eichhoff. Rat. Tom. p. 238
1878 Tomicus. Hubbard & Schwarz. Am. Phil. Soc. Proc. 17:643
Habitat. Alaska, Hudson Bay region, Colorado.
Food plants.

95 (?) **interpunctus** Eich.

1878 Tomicus. Eichhoff. Rat. Tom. p. 241
1878 Tomicus. Eichhoff. Stett. Ent. Zeit. 39:390

tridens Eich.

1868 Tomicus. Eichhoff. Berl. Ent. Zeit. p. 274
1878 = interpunctus Eich. Eichhoff. Rat. Tom. p. 241
Habitat. American Borealis (Sitka).
Food plants.

96 **latidens** Lec.

1874 Tomicus. Leconte. Am. Ent. Soc. Trans. 5:72
1876 Tomicus. Leconte. Am. Phil. Soc. Proc. 15:363, 367
1904 Tomicus. Hopkins. U. S. Div. Ent. Bul. 48, p. 17
1905 Tomicus. Currie. U. S. Div. Ent. Bul. 53, p. 72
Habitat. Oregon, California, Colorado.
Food plant. Pinus lambertiana.

97 **oregoni** Eich.

1868 Tomicus. Eichhoff. Berl. Ent. Zeit. p. 274
1876 Tomicus. Leconte. Am. Phil. Soc. Proc. 15:435
1878 Tomicus. Eichhoff. Rat. Tom. p. 250
1903 Tomicus. Hopkins. U. S. Div. Ent. Bul. 32, p. 10
1903 Tomicus. Gillette. Col. Agric. Exp. Sta. Rep't 15, p. 117
1904 Tomicus. Hopkins. U. S. Div. Ent. Bul. 48, p. 17, 44
1905 Tomicus. Hopkins. Ent. Soc. Wash. Proc. 7:77
1905 Tomicus. Currie. U. S. Div. Ent. Bul. 53, p. 73, 100
Habitat. Western United States.
Food plant. Pinus.

98 **perturbatus** Eich.

1868 Tomicus. Eichhoff. Berl. Ent. Zeit. p. 274
1876 Tomicus. Leconte. Am. Phil. Soc. Proc. 15:435
1878 Tomicus. Eichhoff. Rat. Tom. p. 248
Habitat. American Borealis.
Food plants.

99 pini Say

1826 Bostrichus. Say. Acad. Nat. Sci. Phila. Jour. 5:257; ed. Lec. 2:319
1837 Tomicus. Kirby. Faun. Bor. Am. 4:191
1841 Tomicus. Harris. Ins. N. E. p. 74
1852 Tomicus. Harris. Rep't Ins. Inj. Veg. p. 78
1858 Tomicus. Fitch. Nox. Ins. N. Y. 4th Rep't, p. 722, 751
1868 Bostrichus. Zimmerman. Am. Ent. Soc. Trans. 2:147
1868 Tomicus. Leconte. Am. Ent. Soc. Trans. 2:163
1876 Tomicus. Leconte. Am. Phil. Soc. Proc. 15:363, 365
1877 Tomicus. Provancher. Faun. Ent. Can. 1:570
1878 Tomicus. Hubbard & Schwarz. Am. Phil. Soc. Proc. 17:666
1888 Tomicus. Schwarz. Ent. Soc. Wash. Proc. 1:80, 149, 175
1890 Tomicus. Packard. U. S. Ent. Com'n, 5th Rep't, p. 713–14, 858, fig. 247
1893 Tomicus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 139; Bul. 32, p. 212
1894 Tomicus. Hopkins. Can. Ent. 26:280
1899 Tomicus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 56, p. 342, 343, 422, 445
1899 Tomicus. Hopkins. U. S. Div. Ent. Bul. 21, p. 16
1900 Ips. Smith. Cat. Ins. N. J. p. 363
1901 Tomicus. Felt. N. Y. Forest, Fish & Game Com'n Rep't, 7:487–88, fig. 7
1903 Tomicus. Gillette. Col. Agric. Rep't, 24:117
1906 Tomicus. Felt. N. Y. State Mus. Mem. 8, 2:334, 338, 351–54, 359, 376, fig. 70, 71

dentatus Sturm.

1826 Tomicus. Sturm. Cat. p. 76, t. 4, fig. 30
1876 =pini Say. Leconte. Am. Phil. Soc. Proc. 15:426

pallipes Sturm.

1826 Tomicus. Sturm. Cat. p. 76
1876 =pini Say. Leconte. Am. Phil. Soc. Proc. 15:426

praefrictus Eich.

1867 Tomicus. Eichhoff. Berl. Ent. Zeit. p. 401
1876 =pini Say. Leconte. Am. Phil. Soc. Proc. 15:365

Habitat. Eastern United States and Canada, Montana (?), Colorado (?).

Food plants. Pinus, Picea, Larix.

100 plastographus Lec.

1868 Tomicus. Leconte. Am. Ent. Soc. Trans. 2:163
1876 Tomicus. Leconte. Am. Phil. Soc. Proc. 15:362, 364
1895 Tomicus. Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 186, 187
1898 Tomicus. Blandford. Ent. News, 9:6
1903 Tomicus. Gillette. Col. Agric. Exp. Sta. Rep't 15, p. 117
1904 Tomicus. Powell. N. Y. Ent. Soc. 12:237–43

1905 Tomicus. Hopkins. Ent. Soc. Wash. Proc. 7:75, 76
1907 Tomicus. Fall & Cockerell. Am. Ent. Soc. Trans. 33:217
Habitat. California, New Mexico.
Food plant. Pinus radiata.

101 **rectus** Lec.

1876 Tomicus. Leconte. Am. Phil. Soc. Proc. 15:363, 365
Habitat. Oregon, Arizona, New Mexico.
Food plants.

102 **(?) spinifer** Eich.

1878 Tomicus. Eichhoff. Rat. Tom. p. 499
1878 Tomicus. Eichhoff. Stet. Ent. Zeit. 39:390
Habitat. America Borealis (California) (?)
Food plants.

103 **(?) terminatus** Mannh.

1885 Tomicus (?). Henshaw. Col. N. A. p. 148

104 **tridens** Mannh.

1852 Bostrichus. Mannerheim. Bul. Mosc. p. 357, (148)
1853 Bostrichus. Mannerheim. Bul. Mosc. p. 273
1868 Tomicus. Leconte. Am. Ent. Soc. Trans. 2:164
1876 Tomicus. Leconte. Am. Phil. Soc. Proc. 15:363, 366
1878 Tomicus. Eichhoff. Rat. Tom. p. 240
1894 Tomicus. Hamilton. Am. Ent. Soc. Trans. 21:36
Habitat. Alaska.
Food plants.

LOGANIUS Chapuis

1869 Chapuis. Syn. Scol. p. 52
1873 Chapuis. Mem. Soc. Liège, p. 260
1894 Schwarz. Ent. Soc. Wash. Proc. 3:44
1896 Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 128

105 **ficus** Sz.

1894 Loganius. Schwarz. Ent. Soc. Wash. Proc. 3:44
1894 Loganius. Ashmead. Ent. Soc. Wash. Proc. 3:33
Habitat. Florida.
Food plant. Ficus aurea.

MICRACIS Leconte

1868 Leconte. Am. Ent. Soc. Trans. 2:164–65
1876 Leconte. Am. Phil. Soc. Proc. 15:367–68
1878 Eichhoff. Rat. Tom. p. 302
1883 Leconte & Horn. Col. N. A. p. 519

106 asperulus Lec.

1878 Micracis. Leconte. Am. Phil. Soc. Proc. 17:626
1878 Micracis. Hubbard & Schwarz. Am. Phil. Soc. Proc. 17:666
1900 Micracis. Smith. Cat. Ins. N. J. p. 363
Habitat. Pennsylvania, New York, Virginia.
Food plant. Quercus.

107 hirtellus Lec.

1876 Micracis. Leconte. Am. Phil. Soc. Proc. 15:368, 369
1890 Micracis. Packard. U. S. Ent. Com'n, 5th Rep't, p. 671
1892 Micracis. Blaisdell. Ins. Life, 5:36
Habitat. California.
Food plants. Umbellularia californica, Salix.

108 nanula Lec.

1876 Micracis. Leconte. Am. Phil. Soc. Proc. 15:368, 369
1878 Micracis. Schwarz. Am. Phil. Soc. Proc. 17:469
Habitat. Florida.
Food plants. (?).

109 rudis Lec.

1876 Micracis. Leconte. Am. Phil. Soc. Proc. 15:368, 369
1878 Micracis. Hubbard & Schwarz. Am. Phil. Soc. Proc. 17:666
1890 Micracis. Packard. U. S. Ent. Com'n, 5th Rep't, p. 612
1891 Micracis. Schwarz. Ent. Soc. Wash. Proc. 2:74
1895 Micracis. Hamilton. Am. Ent. Soc. Trans. 22:346, 378
1906 Micracis. Felt. N. Y. State Mus. Mem. 8, 2:725
Habitat. Michigan.
Food plants. Celtis occidentalis, Robinia pseudacacia, Hicoria.

110 opacicollis Lec.

1878 Micracis. Leconte. Am. Phil. Soc. Proc. 17:625
1878 Micracis. Hubbard & Schwarz. Am. Phil. Soc. Proc. 17:666
1900 (?) = asperula Lec. Smith. Cat. Ins. N. J. p. 363
1906 Micracis. Felt. N. Y. State Mus. Mem. 8, 2:702
Habitat. New Jersey, New York.
Food plants. Castanea dentata, Quercus, Hamamelis.

111 suturalis Lec.

1868 Micracis. Leconte. Am. Ent. Soc. Trans. 2:165
1868 Micracis. Shimer. Am. Ent. Soc. Trans. 2:viii
1876 Micracis. Leconte. Am. Phil. Soc. Proc. 15:368
1878 Micracis. Eichhoff. Rat. Tom. p. 303
1878 Micracis. Hubbard & Schwarz. Am. Phil. Soc. Proc. 17:666
1890 Micracis. Packard. U. S. Ent. Com'n, 5th Rep't, p. 660
1891 Micracis. Hamilton. Can. Ent. 23:65
1891 Micracis. Hamilton. Ins. Life, 4:131
1891 Micracis. Riley & Howard. Ins. Life, 4:94

1892 Micracis. Hamilton. Ins. Life, 4:268
1893 Micracis. Chittenden. Ent. Soc. Wash. Proc. 2:394
1895 Micracis. Hamilton. Am. Ent. Soc. Trans. 22:346, 378
1900 Micracis. Smith. Cat. Ins. N. J. p. 363
1906 Micracis. Felt. N. Y. State Mus. Mem. 8, 2:715

aculeatus Lec.

1868 Micracis. Leconte. Am. Ent. Soc. Trans. 2:165
1878 Micracis. Eichhoff. Rat. Tom. p. 304
1881 Micracis. Leconte. Am. Ent. Soc. Trans. 9:xxii
1891 Micracis. Hamilton. Can. Ent. 23:65
1891 Micracis. Riley. Ins. Life, 4:94
1892 Micracis. Hamilton. Ins. Life, 4:268
1893 = suturalis Lec. Chittenden. Ent. Soc. Wash. Proc. 2:394
1906 Micracis. Felt. N. Y. State Mus. Mem. 8, 2:715

Habitat. Massachusetts and New York to Michigan, Kansas and Louisiana.

Food plants. Zanthoxylum clava-herculis, Hicoria, Cercis canadensis, Fraxinus, Quercus, Juglans nigra, Benzoin aestivale, Salix Sassafras, Robinia, Corylus.

PAGIOCERUS Eich.

1868 Eichhoff. Berl. Ent. Zeit. p. 148
1869 Chapuis. Syn. Scol. p. 26
1873 Chapuis. Mem. Soc. Liège, p. 234
Blandford. Biol. Centr. Am. Col. pt 6, p. 49
1907 Hopkins. Ent. Soc. Wash. Proc. 8:112

112 rimosus Eich.

1868 Pagiocerus. Eichhoff. Berl. Ent. Zeit. p. 148
1869 Pagiocerus. Chapuis. Syn. Scol. p. 26
1873 Pagiocerus. Chapuis. Mem. Soc. Liège, p. 234
Pagiocerus. Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 49
1907 Pagiocerus. Hopkins. Ent. Soc. Wash. Proc. 8:113

Habitat. Cuba, Columbia, Brazil, Chile, Mexico, Guatemala, Panama, Florida.

Food plants. Anona glabra, A. cherimolia (Mexico), "coru" (Columbia, S. A.), Persea barbonia (Florida).

PHLOEOSINUS Chapuis

1869 Chapuis. Syn. Scol. p. 37
1873 Chapuis. Mem. Soc. Liege, p. 245
1876 Leconte. Am. Phil. Soc. Proc. 15:381
1881 Eichhoff. Borkenk. p. 131
1883 Leconte & Horn. Col. N. A. p. 523
1888 Bedel. Faun. Col. Seine, 6:389, 393
1894 Blandford. Ent. Soc. Lond. p. 68
1897 Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 143, 160
1901 Barbey. Scol. l'Europ. Cent. p. 58

113 **cristatus** Lec.

1868 Phloeosinus. Leconte. Am. Ent. Soc. Trans. 2:170
1876 Phloeosinus. Leconte. Am. Phil. Soc. Proc. 15:381
1893 Phloeosinus. Riley & Howard. Ins. Life, 5:262
1897 Phloeosinus. Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 160
1903 Phloeosinus. Hopkins. U. S. Bur. For. Bul. 38, p. 39, 40, fig. 4
Habitat. California.
Food plants. Cupressus, Sequoia sempervirens(?).

114 **cupressi** Hopk.

1903 Phloeosinus. Hopkins. U. S. Bur. For. Bul. 38, p. 35–38, fig. 2, 3
1904 Phloeosinus. Hopkins. U. S. Div. Ent. Bul. 48, p. 45
1905 Phloeosinus. Currie. U. S. Div. Ent. Bul. 53, p. 100
Habitat. California.
Food plants. Cupressus, Sequoia sempervirens.

115 **dentatus** Say

1825 Hylurgus. Say. Acad. Nat. Sci. Phila. Jour. 3:258; ed. Lec. 2:319
1852 Hylurgus. Harris. Rep't Ins. Inj. Veg. p. 77
1858 Fitch. Nox. Ins. 4th Rep't, p. 750; N. Y. Agric. Soc. Trans. 1857
1876 Phloeosinus. Leconte. Am. Phil. Soc. Proc. 15:381
1886 Phloeosinus. Knaus. Ent. Am. 2:77
1886 Phloeosinus. Schwarz. Ent. Am. 2:56
1890 Phloeosinus. Packard. U. S. Ent. Com'n, 5th Rep't, p. 904–6, fig. 299
1890 Phloeosinus. Riley & Howard. Ins. Life, 2:350
1893 Phloeosinus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 142; Bul. 32, p. 213
1894 Phloeosinus. Hopkins. Can. Ent. 26:280
1896 Phloeosinus. Eichhoff & Schwarz. U. S. Nat. Mus. Proc. 18:608, 610
1897 Phloeosinus. Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 160
1900 Phloeosinus. Smith. Cat. Ins. N. J. p. 365
1901 Phloeosinus. Felt. N. Y. Forest, Fish & Game Com'n Rep't, 7:522–23, fig. 25, 26
1904 Phloeosinus. Hopkins. U. S. Div. Ent. Bul. 48, p. 25
1905 Phloeosinus. Currie. U. S. Div. Ent. Bul. 53, p. 81
1906 Phloeosinus. Felt. N. Y. State Mus. Mem. 8, 2:336, 337, 338, 391–93, fig. 90, 91, 92

graniger Eich.

1868 (?) Dendroctonus. Eichhoff. Berl. Ent. Zeit. p. 147
1868 (?) Dendroctonus. Leconte. Am. Ent. Soc. Trans. 2:177
1869 Phloeosinus. Chapuis. Syn. Scol. p. 39, 95
1873 Phloeosinus. Chapuis. Mem. Soc. Liège, p. 247
1876 Phloeosinus. Leconte. Am. Phil. Soc. Proc. 15:382, 436, 437
1886 Phloeosinus. Schwarz. Ent. Am. 2:56
1892 Phloesosinus. Hopkins. Ins. Life, 4:258
1896 = dentatus Say. Eichhoff & Schwarz. U. S. Nat. Mus. Proc. 18:608, 610
1897 Phloeosinus. Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 160

haagii Eich.

1868 (?) Dendroctonus. Eichhoff. Berl. Ent. Zeit. p. 148
1868 (?) Dendroctonus. Leconte. Am. Ent. Soc. Trans. 2:177
1869 Phloeosinus. Chapuis. Syn. Scol. p. 38
1873 Phloeosinus. Chapuis. Mem. Soc. Liège, p. 247
1876 Phloeosinus. Leconte. Am. Phil. Soc. Proc. 15:382, 436, 437
1886 (?)= dentatus Say. Schwarz. Ent. Am. 2:56
1896 = dentatus Say. Eichhoff & Schwarz. U. S. Nat. Mus. Proc. 18:610
1896 (?) = punctatus Lec. Eichhoff & Schwarz. U. S. Nat. Mus. Proc. 18:608
1897 Phloeosinus. Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 160

serratus Lec.

1868 Phloeosinus. Leconte. Am. Ent. Soc. Trans. 2:170
1876 Phloeosinus. Leconte. Am. Phil. Soc. Proc. 15:381
1886 (?) = dentatus Say. Schwarz. Ent. Am. 2:56
1889 Phloeosinus. Schwarz. Ent. Soc. Wash. Proc. 1:176
1897 Phloeosinus. Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 160
1900 = dentatus Say. Smith. Cat. Ins. N. J. p. 365
1907 Phloeosinus. Fall & Cockerell. Am. Ent. Soc. Trans. 33:218

Habitat. Eastern and middle United States and Canada, New Mexico.

Food plants. Juniperus, Thuja.

116 **punctatus** Lec.

1876 Phloeosinus. Leconte. Am. Phil. Soc. Proc. 15:381, 382
1886 Phloeosinus. Schwarz. Ent. Am. 2:55
1902 Phloeosinus. Fowler. Cal. Rep't Agric. Exp. Sta. p. 80
1903 Phloeosinus. Hopkins. Can. Ent. 35:60
1903 Phloeosinus. Hopkins. U. S. Bur. For. Bul. 38, p. 35
1904 Phloeosinus. Hopkins. U. S. Div. Ent. Bul. 48, p. 18
1905 Phloeosinus. Currie. U. S. Div. Ent. Bul. 53, p. 73

Habitat. Lake Superior and Rocky mountain regions.

Food plants. Libocedrus decurrens, Chamaecyparis lawsoniana (Giant arbor-vitae).

117 **sequoiae** Hopk.

1903 Phloeosinus. Hopkins. U. S. Bur. For. Bul. 38, p. 33–35, fig. 1, pl. 12
1904 Phloeosinus. Hopkins. U. S. Div. Ent. Bul. 48, p. 18, 45
1905 Phloeosinus. Currie. U. S. Div. Ent. Bul. 53, p. 74

Habitat. California, Washington.

Food plants. Sequoia sempervirens, Giant arbor-vitae.

PHLOEOTRIBUS Latreille

1796 Latreille. Prec. car. gener. Ins. 50
1836 Erichson. Wieg. Archiv. 1:56
1864 Eichhoff. Berl. Ent. Zeit. p. 29, 44, 46

1868 Zimmerman. Am. Ent. Soc. Trans. 2: 147, 148
1868 Leconte. Am. Ent. Soc. Trans. 2:168
1869 Chapuis. Syn. Scol. p. 43
1873 Chapuis. Mem. Soc. Liège, p. 251
1876 Leconte. Am. Phil. Soc. Proc. 15:376
1881 Eichhoff. Borkenk. p. 39, 147
1883 Leconte & Horn. Col. N. A. p. 522
1888 Bedel. Faun. Col. Seine, 6:389, 394
1901 Barbey. Scol. l'Europ. Cent. p. 65

118 frontalis Oliv.

1795 Scolytus. Olivier. Ent. 4, no. 78, p. 13, pl. 2, fig. 20
1801 Bostrichus. Fabricius. Syst. El. 2:389
1868 Phloeotribus. Zimmerman. Am. Ent. Soc. Trans. 2:148
1876 Phloeotribus. Leconte. Am. Phil. Soc. Proc. 15:377
1890 Phloeotribus. Packard. U. S. Ent. Com'n 5th Rep't p. 612
1893 Phloeotribus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 142; Bul. 32, p. 213
1893 Phloeotribus. Chittenden. Ins. Life, 5:249
1894 Phloeotribus. Riley. Ins. Life, 6:227
1894 Phloeotribus. Hopkins. Can. Ent. 26:280
1895 Phloeotribus. Schwarz. Ent. Soc. Wash. Proc. 3:146
1896 Phloeotribus. Ashmead. Am. Ent. Soc. Trans. 23:233
1898 Phloeotribus. Chittenden. Ent. Soc. Wash. Proc. 4:78
1900 Phloeotribus. Smith. Cat. Ins. N. J. p. 364
1903 Phloeophthorus. Hopkins. U. S. Dep't Agric. Yearbook, p. 320
1905 Phloeophthorus. Hopkins. Ent. Soc. Wash. Proc. 7:78
1906 Phloeotribus. Felt. N. Y. State Mus. Mem. 8, 2:336, 725

granicollis Eich.

1868 Phloeophthorus. Eichhoff. Berl. Ent. Zeit. p. 149
1868 Phloeophthorus. Leconte. Am. Ent. Soc. Trans. 2:177
1873 Phloeotribus. Chapuis. Mem. Soc. Liège, p. 251
1876 =frontalis Fabr. Leconte. Am. Phil. Soc. Proc. 15:377

Habitat. Atlantic States to Iowa and Tennessee.

Food plants. Morus, Celtis occidentalis, Broussonetia papyrifera.

119 liminaris Harris

1852 Tomicus. Harris. Rep't Inj. Ins. Veg. p. 78
1863 Tomicus. Harris. Inj. Ins. ed. ult. 88
1868 Phloeotribus. Leconte. Am. Ent. Soc. Trans. 2:148
1873 Phloeosinus. Chapuis. Mem. Soc. Liège, p. 247
1876 Phloeotribus. Leconte. Am. Phil. Soc. Proc. 15:377
1878 Phloeotribus. Hubbard & Schwarz. Am. Phil. Soc. Proc. 17 666
1882 Phloeosinus. Linden. Buf. Soc. Bul. 4:61
1888 Phloeotribus. Schwarz. Ent. Soc. Wash. Proc. 1:113, 149
1890 Phloeotribus. Packard. U. S. Ent. Com'n, 5th Rep't, p. 227, 530

1890 Phloeotribus. Caulfield. Ont. Soc. Ent. 21:75
1891 Phloeotribus. Webster. Ins. Life, 3:452
1893 Phloeotribus. Lintner. 9th N. Y. Rep't, p. 365–68
1893 Phloeotribus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 141 etc.; Bul. 32, p. 213
1894 Phloeotribus. Fletcher. Ottawa House Com'n, p. 7
1895 Phloeotribus. Cockerell. N. M. Agric. Exp. Bul. 15, p. 69
1896 Phloeotribus. Lintner. 11th N. Y. Rep't, p. 270
1896 Phloeotribus. Fletcher. Ottawa House Com'n, p. 18
1900 Phloeotribus. Smith. Cat. Ins. N. J. p. 364
1903 Phloeophthorus. Hopkins. U. S. Dep't Agric. Yearbook, p. 320
1905 Phloeophthorus. Currie. U. S. Div. Ent. Bul. 53, p. 19
1906 Phloeotribus. Felt. N. Y. Mus. Mem. 8, 2:336, 428, 452
1907 Phloeotribus. Fall & Cockerell. Am. Ent. Soc. Trans. 33:217
Habitat. New York to Tennessee, eastern Canada, New Mexico.
Food plants. Prunus persica, P. armeniaca, P. cerasus, P. serotina, Pyrus malus.

120 **puberulus** Lec.

1879 Phloeotribus. Leconte. U. S. Geol. Sur. Bul. 5:519
Habitat.
Food plants.

PITYOGENES Bedel

1888 Bedel. Faun. Col. Seine, 6:397, 401

121 **carinulatus** Lec.

1874 Cryphalus Leconte. Am. Ent. Soc. Trans. 5:70
1876 Pityophthorus. Leconte. Am. Phil. Soc. Proc. 15:352
1878 Pityophthorus. Leconte. Am. Phil. Soc. Proc. 17:624
1892 Pityophthorus. Schwarz. Ent. Soc. Wash. Proc. 2:168
1894 Pityogenes. Schwarz. Ins. Life, 7:255
1904 Pityogenes. Hopkins. U. S. Div. Ent. Bul. 48, p. 17, 44

hamatus Lec.

1874 Xyleborus. Lec. Am. Ent. Soc. Trans. 5:72
1876 Xyleborus. Leconte. Am. Phil. Soc. Proc. 15:359, 361
1878 = carinulatus Lec. Leconte. Am. Phil. Soc. Proc. 17:624
1907 Pityophthorus. Fall & Cockerell. Am. Ent. Soc. Trans. 33:217
Habitat. California to Washington, South Dakota and Colorado.
Food plants. Pinus ponderosa, Picea engelmanni, (Jeffrey pine).

122 **fossifrons** Lec.

1876 Pityophthorus. Leconte. Am. Phil. Soc. Proc. 15:353
1896 Pityogenes. Schwarz. U. S. Nat. Mus. Proc. 18:609
Habitat. Vancouver island.
Food plants.

123 **plagiatus** Lec.

1868 Xyleborus. Leconte. Am. Ent. Soc. Trans. 2:161
1876 Xyleborus. Leconte. Am. Phil. Soc. Proc. 15:361
1878 Xyleborus. Eichhoff. Rat. Tom. p. 280
1878 Pityophthorus. Leconte. Am. Phil. Soc. Proc. 17:623
1892 Pityophthorus. Schwarz. Ent. Soc. Wash. Proc. 2:168
1893 Pityophthorus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 129; Bul. 32, p. 208
1894 Pityophthorus. Hopkins. Can. Ent. 26:278
1899 Pityogenes. Hopkins. W. Va. Agric. Exp. Sta. Bul. 56, p. 342, 427, 429
1906 Pityogenes. Felt. N. Y. State Mus. Mem. 8, 2:752
Habitat. Maryland, New York, West Virginia.
Food plant. Pinus.

124 **punctipennis** Lec.

1878 Xyleborus. Leconte. Am. Phil. Soc. Proc. 17:624, 666
1886 Xyleborus. Schwarz. Ent. Am. 2:42
1896 Pityogenes. Eichhoff & Schwarz. U. S. Nat. Mus. Proc. 18:609, 610
Habitat. Michigan.
Food plants.

125 **sparsus** Lec.

1868 Xyleborus. Leconte. Am. Ent. Soc. Trans. 2:160
1876 Xyleborus. Leconte. Am. Phil. Soc. Proc. 15:360
1878 Pityophthorus. Leconte. Am. Phil. Soc. Proc. 17:624
1878 Pityophthorus. Hubbard & Schwarz. Am. Phil. Soc. Proc. 17:643
1888 Pityophthorus. Schwarz. Ent. Soc. Wash. Proc. 1:80
1890 Pityophthorus. Packard. U. S. Ent. Com'n, 5th Rep't, p. 720
1891 Pityophthorus. Hamilton. Ins. Life, 4:132
1893 Pityophthorus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 130; Bul. 32, p. 208
1894 Pityophthorus. Hamilton. Am. Ent. Soc. Trans. 21:406
1895 Pityophthorus. Hamilton. Am. Ent. Soc. Trans. 22:346, 378
1896 Pityogenes. Eichhoff & Schwarz. U. S. Nat. Mus. Proc. 18:609
1899 Pityogenes. Hopkins. W. Va. Agric. Exp. Sta. Bul. 56, p. 446
1900 Pityophthorus. Smith. Cat. Ins. N. J. p. 362
1905 Pityogenes. Currie. U. S. Div. Ent. Bul. 53, p. 80
1906 Pityogenes. Felt. N. Y. State Mus. Mem. 8, 2:752
Habitat. Eastern United States and Canada.
Food plant. Pinus.

PITYOPHTHORUS Eich.

1864 Eichhoff. Berl. Ent. Zeit. 8:39, 45, 46
1871 Eichhoff. Berl. Ent. Zeit. 15:137
1876 Leconte. Am. Phil. Soc. Proc. 15:347, 349, 350
1878 Eichhoff. Rat. Tom. p. 173
1881 Eichhoff. Borkenk. p. 49, 192
1883 Leconte & Horn. Col. N. A. p. 517

1888 Bedel. Faun. Col. Seine, 6:396, 398
1891 Blandford. Ent. Mo. Mag. 2:15–17
1895 Judeich-Nitsche. Forstins. 1:448, 451, fig.
1901 Barbey. Scol. l'Europ. Cent. p. 74

126 annectens Lec.

1878 Pityophthorus. Leconte. Am. Phil. Soc. Proc. 17:622
1889 Pityophthorus. Schwarz. Ent. Soc. Wash. Proc. 1:164
1890 Pityophthorus. Packard. U. S. Ent. Com'n, 5th Rep't, p. 715
1892 Pityophthorus. Schwarz. Ent. Soc. Wash. Proc. 2:167
1906 Pityophthorus. Felt. N. Y. State Mus. Mem. 8, 2:751
Habitat. Florida.
Food plant. Pinus echinata.

127 cariniceps Lec.

1876 Pityophthorus. Leconte. Am. Phil. Soc. Proc. 15:353
1893 Pityophthorus. Chittenden. Ent. Soc. Wash. Proc. 2:393
1893 Pityophthorus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 130; Bul. 32, p. 209
1899 Pityophthorus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 56, p. 443
1901 Pityophthorus. Hopkins. U. S. Div. Ent. Bul. 28, pl. 8
1904 Pityophthorus. Hopkins. U. S. Div. Ent. Bul. 48, p. 24
1905 Pityophthorus. Currie. U. S. Div. Ent. Bul. 53, p. 80
1906 Pityophthorus. Felt. N. Y. State Mus. Mem. 8, 2:650, 674
Habitat. Maine to Michigan and West Virginia, Quebec.
Food plants. Picea, Pinus strobus.

128 comatus Zimm.

1868 Crypturgus. Zimmerman. Am. Ent. Soc. Trans. 2:143
1876 Pityophthorus. Leconte. Am. Phil. Soc. Proc. 15:355
1878 Cryphalus. Eichhoff. Rat. Tom. p. 136
Habitat. South Carolina.
Food plants.

129 concentralis Eich.

1878 Pityophthorus. Eichhoff. Rat. Tom. p. 188
1889 Pityophthorus. Schwarz. Ent. Soc. Wash. Proc. 1:163
1899 Pityophthorus. Henshaw. Ent. Am. 5:132
1891 Pityophthorus. Beutenmüller. N. Y. Micro. Soc. Jour. 7:50
Habitat. Florida, Cuba.
Food plant. Rhus metopium.

130 coniperda Sz.

1895 Pityophthorus. Schwarz. Ent. Soc. Wash. Proc. 3:144–45
1902 Pityophthorus. Harrington. Ont. Ent. Soc. 3:117
1906 Pityophthorus. Felt. N. Y. State Mus. Mem. 8, 2:751
Habitat. Ontario, Michigan, New York, Pennsylvania, Virginia.
Food plant. Pinus, in cones.

131 confinus Lec.

1876 Pityophthorus. Leconte. Am. Phil. Soc. Proc. 15:354
1893 Pityophthorus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 130; Bul. 32, p. 209
1894 Pityophthorus. Hopkins. Can. Ent. 26:278
1899 (?) = bisulcatus Eich. Hopkins. W. Va. Agric. Exp. Sta. Bul. 56, p. 284, 344, 443
1904 Pityophthorus. Hopkins. U. S. Div. Ent. Bul. 48, p. 16
1905 Pityophthorus. Currie. U. S. Div. Ent. Bul. 53, p. 71
1906 Pityophthorus. Felt. N. Y. State Mus. Mem. 8, 2:751

Habitat. California, Washington, Idaho, New Mexico, West Virginia.

Food plant. Pinus.

132 consimilis Lec.

1878 Pityophthorus. Leconte. Am. Phil. Soc. Proc. 17:622, 665
1889 Pityophthorus. Schwarz. Ent. Soc. Wash. Proc. 1:164
1891 Pityophthorus. Schwarz. Ins. Life, 3:357
1891 Pityophthorus. Riley & Howard. Ins. Life, 4:123
1891 Pityophthorus. Beutenmüller. N. Y. Micro. Soc. Jour. 7:50
1892 Pityophthorus. Schwarz. Ent. Soc. Wash. Proc. 2:167
1893 Pityophthorus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 130; Bul. 32, p. 209
1894 Pityophthorus. Ashmead. Ent. Soc. Wash. Proc. 3:33
1906 Pityophthorus. Felt. N. Y. State Mus. Mem. 8, 2:503, 737; Pityogenes, p. 482

Habitat. Florida; Washington, D. C.; New York (Ithaca); Michigan (Detroit, Marquette); Quebec.

Food plants. All species of the genus Rhus; Nyssa sylvatica.

133 deletus Lec.

1879 Pityophthorus. Leconte. U. S. Geol. Sur. Bul. 5:519

Habitat. Colorado.

Food plants.

134 digestus Lec.

1874 Cryphalus. Leconte. Am. Ent. Soc. Trans. 5:71
1876 Pityophthorus. Leconte. Am. Phil. Soc. Proc. 15:355
1892 Pityophthorus. Blaisdell. Ins. Life, 5:36

Habitat. California (Mojave desert).

Food plant. Rhus integrifolia.

135 lautus Eich.

1871 Pityophthorus. Eichhoff. Berl. Ent. Zeit. p. 135
1876 Pityophthorus. Leconte. Am. Phil. Soc. Proc. 15:354
1878 Pityophthorus. Eichhoff. Rat. Tom. p. 190
1893 Pityophthorus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 131; Bul. 32, p. 209

1898 Pityophthorus. Blandford. Ent. News, 9:6
1906 Pityophthorus. Felt. N. Y. State Mus. Mem. 8, 2:751
Habitat. Texas, West Virginia.
Food plant. Pinus.

136 **nitidulus** Mannh.

1843 Bostrichus. Mannh. Bul. Mosc. p. 298, (263)
1852 Bostrichus. Mannh. Bul. Mosc. p. 359, (152)
1853 Bostrichus. Mannh. Bul. Mosc. p. 273
1868 Cryphalus. Leconte. Am. Ent. Soc. Trans. 2:157
1876 Pityophthorus. Leconte. Am. Phil. Soc. Proc. 15:354
1878 Pityophthorus. Eichhoff. Rat. Tom. p. 173
1894 Pityophthorus. Schwarz. Ins. Life, 7:255
1894 Pityophthorus. Hamilton. Am. Ent. Soc. Trans. 21:35
1903 Pityophthorus. Gillette. Col. Exp. Sta. Rep't, 15:118
1904 Pityophthorus. Hopkins. U. S. Div. Ent. Bul. 48, p. 17
1905 Pityophthorus. Currie. U. S. Div. Ent. Bul. 53, p. 72
1905 Pityophthorus. Schwarz. Harriman Alaska Exped. Rep't, Insects, pt 1, p. 185
1907 Pityophthorus. Fall & Cockerell. Am. Ent. Soc. Trans. 33:217

atratulus Lec.

1868 Cryphalus. Leconte. Am. Ent. Soc. Trans. 2:156
1876 = nitidulus Mannh. Leconte. Am. Phil. Soc. Proc. 15:354
1878 = cribripennis Eich. Eichhoff. Rat. Tom. p. 175
Habitat. Coast and Cascade region, Alaska to California; Utah; New Mexico.
Food plants. Picea sitchensis, Pseudotsuga mucronata, Pinus flexilis (shore pine), Picea engelmanni.

137 **obliquus** Lec.

1878 Pityophthorus. Leconte. Am. Phil. Soc. Proc. 17:432–33, 468
Habitat. Michigan (Marquette).
Food plants.

138 **opaculus** Lec.

1878 Pityophthorus. Leconte. Am. Phil. Soc. Proc. 17:623
Habitat. Michigan.
Food plants.

139 **pilosus** Lec.

1868 Cryphalus. Leconte. Am. Ent. Soc. Trans. 2:154
1876 Pityophthorus. Leconte. Am. Phil. Soc. Proc. 15:351
1878 Pityophthorus. Eichhoff. Rat. Tom. p. 199

pilosulus Lec.

1868 Cryphalus. Leconte. Am. Ent. Soc. Trans. 2:156
Habitat. Middle California.
Food plants.

140 **pruinosus** Eich.

1878 Pityophthorus. Eichhoff. Stet. Ent. Zeit. 39:390
1878 Pityophthorus. Eichhoff. Rat. Tom. p. 198
1896 Pityophthorus. Eichhoff & Schwarz. U. S. Nat. Mus. Proc. 18:609, 610
1903 Pityophthorus. Hopkins. U. S. Dep't Agric. Yearbook, p. 318

querciperda Sz.

1888 Pityophthorus. Schwarz. Ent. Soc. Wash. Proc. 1:56
1890 Pityophthorus. Packard. U. S. Ent. Com'n, 5th Rep't, p. 93
1896 = pruinosus Eich. Eichhoff & Schwarz. U. S. Nat. Mus. Proc. 18:609, 610
1900 Pityophthorus. Smith. Cat. Ins. N. J. p. 362
1906 Pityophthorus. Felt. N. Y. State Mus. Mem. 8, 2:702

Habitat. New York to Florida.

Food plant. Quercus.

141 **puberulus** Lec.

1868 Cryphalus. Leconte. Am. Ent. Soc. Trans. 2:157
1876 Pityophthorus. Leconte. Am. Phil. Soc. Proc. 15:354
1878 Pityophthorus. Leconte. Am. Phil. Soc. Proc. 17:665
1878 Pityophthorus. Eichhoff. Rat. Tom. p. 202
1888 Pityophthorus. Schwarz. Ent. Soc. Wash. Proc. 1:80
1890 Pityophthorus. Packard. U. S. Ent. Com'n, 5th Rep't, p. 812
1890 Pityophthorus. Smith. Cat. Ins. N. J. p. 267
1891 Pityophthorus. Schwarz. Ent. Soc. Wash. Proc. 2:65
1893 Pityophthorus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 131; Bul. 32, p. 209
1895 Pityophthorus. Hamilton. Am. Ent. Soc. Trans. 22:346, 378
1896 Pityophthorus. Eichhoff & Schwarz. U. S. Nat. Mus. Proc. 18:609, 610
1899 Pityophthorus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 56, p. 443
1900 Pityophthorus. Smith. Cat. Ins. N. J. p. 362
1906 Pityophthorus. Felt. N. Y. State Mus. Mem. 8, 2:752

infans Eich.

1871 Pityophthorus. Eichhoff. Berl. Ent. Zeit. p. 135
1878 Pityophthorus. Eichhoff. Rat. Tom. p. 187
1896 = puberulus Lec. Eichhoff & Schwarz. U. S. Nat. Mus. Proc. 18:609, 610

Habitat. District of Columbia, Michigan, New York, West Virginia.

Food plant. Pinus.

142 **pubipennis** Lec.

1857 Tomicus. Leconte. Pac. R. R. Expl. Sur. Ins. p. 59
1868 Cryphalus. Leconte. Am. Ent. Soc. Trans. 2:154, 156
1876 Pityophthorus. Leconte. Am. Phil. Soc. Proc. 15:351
1878 Pityophthorus. Eichhoff. Rat. Tom. p. 197
1890 Pityophthorus. Packard. U. S. Ent. Com'n, 5th Rep't, p. 93

1904 Pityophthorus. Hopkins. U. S. Div. Ent. Bul. 48, p. 16
1904 Pityophthorus. Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 243
1905 Pityophthorus. Currie. U. S. Div. Ent. Bul. 53, p. 71

Habitat. Pacific coast, California to Oregon; Guatemala (San Geronimo).

Food plant. Quercus.

143 pulchellus Eich.

1868 Pityophthorus. Eichhoff. Berl. Ent. Zeit. p. 275
1876 Pityophthorus. Leconte. Am. Phil. Soc. Proc. 15:352, 435
1878 Pityophthorus. Eichhoff. Rat. Tom. p. 181
1896 Pityophthorus. Eichhoff & Schwarz. U. S. Nat. Mus. Proc. 18:609, 610
1899 Pityophthorus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 56, p. 442
1906 Pityophthorus. Felt. N. Y. State Mus. Mem. 8, 2:752

hirticeps Lec.

1878 Pityophthorus. Leconte. Am. Phil. Soc. Proc. 17:623, 665
1888 Pityophthorus. Schwarz. Ent. Soc. Wash. Proc. 1:80
1893 Pityophthorus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 131; Bul. 32, p. 209
1896 (?)= pulchellus. Eichhoff & Schwarz. U. S. Nat. Mus. Proc. 18:609, 610
1899 Pityophthorus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 56, p. 442
1906 Pityophthorus. Felt. N. Y. State Mus. Mem. 8, 2:751

Habitat. Michigan (Marquette), Pennsylvania, West Virginia, Virginia.

Food plants. Pinus, Picea mariana (?).

144 pulicarius Zimm.

1868 Crypturgus. Zimmerman. Am. Ent. Soc. Trans. 2:144
1868 Cryphalus. Leconte. Am. Ent. Soc. Trans. 2:155, 157
1876 Pityophthorus. Leconte. Am. Phil. Soc. Proc. 15:353
1878 Pityophthorus. Eichhoff. Rat. Tom. p. 195
1878 Pityophthorus. Schwarz. Am. Phil. Soc. Proc. 17:468
1889 Pityophthorus. Schwarz. Ent. Soc. Wash. Proc. 1:163
1890 Pityophthorus. Schwarz. Ent. Soc. Wash. Proc. 1:231
1890 Pityophthorus. Smith. Cat. Ins. N. J. p. 267
1899 Pityophthorus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 56, p. 442
1900 Pityophthorus. Smith. Cat. Ins. N. J. p. 362
1906 Pityophthorus. Felt. N. Y. State Mus. Mem. 8, 2:751

Habitat. New Jersey, West Virginia, South Carolina, Florida, Illinois.

Food plant. Pinus.

145 pullus Zimm.

1868 Crypturgus. Zimmerman. Am. Ent. Soc. Trans. 2:143
1868 Cryphalus. Leconte. Am. Ent. Soc. Trans. 2:155
1876 Pityophthorus. Leconte. Am. Phil. Soc. Proc. 15:352

1878 =bisulcatus Eich. Eichhoff. Rat. Tom. p. 186
1878 Pityophthorus. Hubbard & Schwarz. Am. Phil. Soc. Proc. 17:643
1887 Pityophthorus. Schwarz. Ent. Am. 3:20
1888 Pityophthorus. Schwarz. Ent. Soc. Wash. Proc. 1:80
1890 Pityophthorus. Smith. Cat. Ins. N. J. p. 267
1892 Pityophthorus. Schwarz. Ent. Soc. Wash. Proc. 2:168
1893 Pityophthorus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 129; Bul. 32, p. 208
1898 Pityophthorus. Blandford. Ent. News, 9:5
1899 Pityophthorus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 56, p. 344, 442
1900 Pityophthorus. Smith. Cat. Ins. N. J. p. 362
1906 Pityophthorus. Felt. N. Y. State Mus. Mem. 8, 2:751

bisulcatus Eich.

1868 Pityophthorus. Eichhoff. Berl. Ent. Zeit. p. 274
1876 (?)=pullus. Leconte. Am. Phil. Soc. Proc. 15:352, 435
1878 Pityophthorus. Eichhoff. Rat. Tom. p. 185

cribripennis Eich.

1868 Pityophthorus. Eichhoff. Berl. Ent. Zeit. p. 274
1871 Pityophthorus. Eichhoff. Berl. Ent. Zeit. p. 137
1876 =nitidulus Mannh. Leconte. Am. Phil. Soc. Proc. 15:354, 435
1878 Pityophthorus. Eichhoff. Rat. Tom. p. 175
1896 =pullus Zimm. Eichhoff & Schwarz. U. S. Nat. Mus. Proc. 18:609, 610
1899 Pityophthorus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 56, p. 437, 442
1906 Pityophthorus. Felt. N. Y. State Mus. Mem. 8, 2:751
Habitat. Michigan, West Virginia, New York.
Food plant. Pinus.

146 **puncticollis** Lec.

1874 Cryphalus. Leconte. Am. Ent. Soc. Trans. 5:71
1876 Pityophthorus. Leconte. Am. Phil. Soc. Proc. 15:354
1904 Pityophthorus. Hopkins. U. S. Div. Ent. Bul. 48, p. 16
1905 Pityophthorus. Currie. U. S. Div. Ent. Bul. 53, p. 72
1907 Pityophthorus. Fall & Cockerell. Am. Ent. Soc. Trans. 33:217
Habitat. New Mexico to northern Washington.
Food plants. Pinus, Picea sitchensis.

147 **minutissimus** Zimm.

1868 Crypturgus. Zimmerman. Am. Ent. Soc. Trans. 2:143
1868 Cryphalus. Leconte. Am. Ent. Soc. Trans. 2:154
1876 Pityophthorus. Leconte. Am. Phil. Soc. Proc. 15:351
1878 Pityophthorus. Leconte. Am. Phil. Soc. Proc. 17:665
1878 =pusillus Harr. Eichhoff. Rat. Tom. p. 200
1888 Pityophthorus. Schwarz. Ent. Soc. Wash. Proc. 1:56, 113
1890 Pityophthorus. Packard. U. S. Ent. Com'n, 5th Rep't, p. 93, 221
1892 Pityophthorus. Schwarz. Ent. Soc. Wash. Proc. 2:168

1893 Pityophthorus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 129; Bul. 32, p. 208
1894 Pityophthorus. Hopkins. Can. Ent. 26:277
1898 Pityophthorus. Chittenden. Ent. Soc. Wash. Proc. 4:78
1900 Pityophthorus. Smith. Cat. Ins. N. J. p. 362
1904 Pityophthorus. Hopkins. U. S. Div. Ent. Bul. 48, p. 24
1905 Pityophthorus. Felt. N. Y. State Mus. Mem. 8, 1:257, 295
1905 Pityophthorus. Currie. U. S. Div. Ent. Bul. 53, p. 80

pusillus Harris.

1837 Tomicus. Harris. Nat. Hist. Soc. Hartford Trans. p. 82
1876 = minutissimus Zimm. Leconte. Am. Phil. Soc. Proc. 15:351
1878 Pityophthorus. Eichhoff. Rat. Tom. p. 200
Habitat. New England, North Atlantic, Middle and Southern States, Quebec.
Food plants. Quercus, Cornus, Hamamelis virginiana.

148 **pusio** Lec.

1878 Pityophthorus. Leconte. Am. Phil. Soc. Proc. 17:623
1878 Pityophthorus. Hubbard & Schwarz. Am. Phil .Soc. Proc. 17:643
Habitat. Michigan.
Food plants.

149 **seriatus** Lec.

1878 Pityophthorus. Leconte. Am. Phil. Soc. Proc. 17:433
1878 Pityophthorus. Schwarz. Am. Phil. Soc. Proc. 17:468
Habitat. Florida.
Food plant. Pinus.

150 **tomentosus** Eich.

1878 Pityophthorus. Eichhoff. Rat. Tom. p. 201
1878 Pityophthorus. Eichhoff. Stet. Ent. Zeit. 39:390
Habitat. America Borealis.

151 **tuberculatus** Eich.

1878 Pityophthorus. Eichhoff. Mem. Soc. Liege, 8:498
1893 Pityophthorus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 132; Bul. 32, p. 209
1899 Pityophthorus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 56, p. 443
1906 Pityophthorus. Felt. N. Y. State Mus. Mem. 8, 2:753
Habitat. West Virginia (?), California.
Food plant. Picea mariana (?).

POLYGRAPHUS Erichson

1836 Erichson. Wieg. Archiv. 1:57
1864 Eichhoff. Berl. Ent. Zeit. p. 32, 45, 46
1866 Lacordaire. Hist. Nat. Ins. Col. 7:365
1868 Leconte. Am. Ent. Soc. Trans. 2:169
1876 Leconte. Am. Phil. Soc. Proc. 15:374, 375, 376
1877 Provancher. Faun. Ent. Can. 1:570

1881 Eichhoff. Borkenk. p. 37, 122
1883 Leconte & Horn. Col. N. A. p. 521
1895 Judeich-Nitsche. Forstins. 1:445, 446
1896 Blandford. Ent. Soc. Lond. p. 74
1901 Barbey. Scol. l'Europ. Cent. p. 55

152 (?) **brevicornis** Kirby

1837 Apate (Lepisomus). Kirby. Faun. Bor. Am. 4:194
1868 Apate (Lepisomus). Leconte. Am. Ent. Soc. Trans. 2:177
1876 Polygraphus (?). Leconte. Am. Phil. Soc. Proc. 15:376
1885 Polygraphus. Henshaw. Col. N. A. p. 149
Habitat. Hudson bay region.
Food plants.

153 **rufipennis** Kirby

1837 Apate (Lepisomus). Kirby. Faun. Bor. Am. 4:193, tab. 8, fig. 2
1853 Hylesinus. Mannerheim. Bul. Mosc. p. 237
1868 Polygraphus. Leconte. Am. Ent. Soc. Trans. 2:169
1876 Polygraphus. Leconte. Am. Phil. Soc. Proc. 15:376
1877 Polygraphus. Provancher. Faun. Ent. Can. 1:570
1889 Polygraphus. Schwarz. Ent. Soc. Wash. Proc. 1:149, 176
1890 Polygraphus. Packard. U. S. Ent. Com'n, 5th Rep't, p. 721–22, 814, fig. 251
1892 Polygraphus. Hopkins. Ins. Life, 4:257
1893 Polygraphus. Hopkins. Ins. Life, 5:188; 6:129
1893 Polygraphus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 141 etc.; Bul. 32, p. 212
1894 Polygraphus. Hamilton. Am. Ent. Soc. Trans. 21:35
1894 Polygraphus. Hopkins. Can. Ent. 26:280
1897 Polygraphus. Johnson. Penn. Agric. Rep't, pt 2, p. 72–73, fig. 1
1907 Polygraphus. Fall & Cockerell. Am. Ent. Soc. Trans. 33:217

nigriceps Kirby

1837 Apate (Lepisomus). Kirby. Faun. Bor. Am. 4:194
1876 = rufipennis Kirby. Leconte. Am. Phil. Soc. Proc. 15:376

saginatus Mannh.

1853 Polygraphus. Mannerheim. Bul. Mosc. p. 237
1876 = rufipennis Kirby. Leconte. Am. Phil. Soc. Proc. 15:376
Habitat. Northern and eastern United States, Canada.
Food plants. Pinus, Picea, Abies.

PTEROCYCLON Eich.

1868 Eichhoff. Berl. Ent. Zeit. 12:276, 277
1869 Eichhoff. Berl. Ent. Zeit. p. 299
1878 Eichhoff. Rat. Tom. p. 437
1898 Blandford. Ent. News, 9:6
1904 Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 270, 288

MONARTHRUM Kirsch

1866 Kirsch. Berl. Ent. Zeit. 9:213. (Description referred to Corthylus)
1868 Kirsch. Berl. Ent. Zeit. p. 214
1876 Leconte. Am. Phil. Soc. Proc. 15:347, 348
1883 Leconte & Horn. Col. N. A. p. 517

154 **dentiger** Lec.

1868 Cryphalus. Leconte. Am. Ent. Soc. Trans. 2:154
1876 Monarthrum. Leconte. Am. Phil. Soc. Proc. 15:348–49
1878 Cryphalus. Eichhoff. Rat. Tom. p. 449
1893 Monarthrum. Chittenden. Ent. Soc. Wash. Proc. 2:393
Habitat. Middle California.
Food plant. Quercus agrifolia

155 **fasciatus** Say

1825 Bostrichus. Say. Acad. Nat. Sci. Phila. Jour. 5:255, ed. Lec. 2:318
1836 Corthylus. Erichson. Wieg. Archiv. 2:64, 79
1867 Corthylominus. Ferrari. Tomicides, p. 48
1868 Crypturgus. Zimmerman. Am. Ent. Soc. Trans. 2:143
1869 Pterocyclon. Eichhoff. Berl. Ent. Zeit. p. 298, 299
1876 Monarthrum. Leconte. Am. Phil. Soc. Proc. 15:348
1878 Monarthrum. Leconte. Am. Phil. Soc. Proc. 17:665
1878 Pterocyclon. Eichhoff. Rat. Tom. p. 442
1880 Monarthrum. Comstock. U. S. Agric. Rep't, p. 274–75
1890 Monarthrum. Packard. U. S. Ent. Com'n. 5th Rep't, p. 328, 520
1893 Monarthrum. Chittenden. Ent. Soc. Wash. Proc. 2:391
1893 Monarthrum. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 128; Bul. 32, p. 208
1894 Monarthrum. Hopkins. Can. Ent. 26:277
1895 Monarthrum. Hamilton. Am. Ent. Soc. Trans. 22:346, 378
1897 Monarthrum. Howard. U. S. Div. Ent. Bul. 7, p. 85
1897 Monarthrum. Hubbard. U. S. Div. Ent. Bul. 7, p. 26–28
1899 Monarthrum. Lugger. Minn. Agric. Exp. Sta. Bul. 66, p. 308, fig. 238
1899 Monarthrum. Hopkins. W. Va. Agric. Exp. Sta. Bul. 56, p. 347, 442
1900 Monarthrum. Smith. Cat. Ins. N. J. p. 361
1904 Pterocyclon. Hopkins. U. S. Div. Ent. Bul. 48, p. 45
1905 Monarthrum. Garman. Ky. Agric. Exp. Sta. Bul. 120, p. 68–74, fig. 3
1906 Monarthrum. Felt. N. Y. State Mus. Mem. 8, 2:751

simile Eich.

1868 Pterocyclon. Eichhoff. Berl. Ent. Zeit. p. 277
1876 = fasciatum Say. Leconte. Am. Phil. Soc. Proc. 15:348
Habitat. Lake Superior and Quebec to Florida.
Food plants. Many trees, both deciduous and coniferous. (Bores in wine casks.)

156 **gracile** Eich.

1878 Pterocyclon. Eichhoff. Rat. Tom. p. 444

fasciatus Say (var.)

1828 Bostrichus. Say. Acad. Nat. Sci. Phila. Jour. 5:253
1868 Cryphalus. Zimmerman. Am. Ent. Soc. Trans. 2:143
1878 = gracile Eich. Eichhoff. Rat. Tom. p. 444
Habitat. America Borealis (Tennessee, Pennsylvania, Carolina).
Food plants. (?)

157 **mali** Fitch

1855 Tomicus. Fitch. N. Y. Rep't Nox. Ins. 2: no. 5
1856 Tomicus. Fitch. N. Y. Rep't Nox. Ins. 3: no. 5, 8–9
1868 Crypturgus. Zimmerman. Am. Ent. Soc. Trans. 2:143
1876 Monarthrum. Leconte. Am. Phil. Soc. Proc. 15:349
1878 Monarthrum. Leconte. Am. Phil. Soc. Proc. 17:665
1878 Pterocyclon. Eichhoff. Rat. Tom. p. 447–49
1878 Monarthrum. Schwarz. Am. Phil. Soc. Proc. 17:468
1888 Monarthrum. Schwarz. Ent. Soc. Wash. Proc. 1:48
1888 Monarthrum. Fletcher. Ont. Ent. Soc. 18:15
1890 Monarthrum. Packard. U. S. Ent. Com'n, 5th Rep't, p. 94
1893 Monarthrum. Chittenden. Ent. Soc. Wash. Proc. 2:392
1893 Monarthrum. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 128; Bul. 32, p. 208
1894 Monarthrum. Hopkins. W. Va. Agric. Exp. Sta. Bul. 35, p. 295, fig. 8
1894 Monarthrum. Hopkins. Can. Ent. 26:277
1896 Monarthrum. Lintner. 11th N. Y. Rep't, p. 270
1897 Monarthrum. Howard. U. S. Div. Ent. Bul. 7. n. s. p. 85
1897 Monarthrum. Hubbard. U. S. Div. Ent. Bul. 7. n. s. p. 27, 28
1897 Monarthrum. Chittenden. U. S. Div. Ent. Bul. 7. n. s. p. 79
1899 Monarthrum. Hopkins. W. Va. Agric. Exp. Sta. Bul. 56, p. 347, 442
1899 Monarthrum. Lugger. Minn. Agric. Exp. Sta. Bul. 66, p. 306–10, fig. 239
1900 Monarthrum. Smith. Cat. Ins. N. J. p. 361
1901 Monarthrum. Felt. N. Y. Forest, Fish & Game Com'n Rep't, 7:517–18, fig. 17
1904 Pterocyclon. Hopkins. U. S. Div. Ent. Bul. 48, p. 45
1904 Monarthrum. Hopkins. U. S. Dep't Agric. Yearbook, p. 384
1905 Monarthrum. Felt. N. Y. State Mus. Mem. 8, 1:257, 289–92
1905 Monarthrum. Garman. Ky. Agric. Exp. Sta. Bul. 120, p. 68, fig. 4
1906 Monarthrum. Felt. N. Y. State Mus. Mem. 8, 2:336, pl. 67, fig. 1
1906 Pterocyclon. Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 269, 270, 271, 279

longulum Eich.

1868 Pterocyclon. Eichhoff. Berl. Ent. Zeit. p. 278
1876 = mali Fitch. Eichhoff. Stet. Ent. Zeit. 36:378
1876 = mali Fitch. Leconte. Am. Phil. Soc. Proc. 15:349
1878 = mali Fitch. Eichhoff. Rat. Tom. p. 448
1904 = mali Fitch. Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 279
Habitat. Eastern United States and Canada.
Food plants. Many trees, both deciduous and coniferous.

158 **scutellare** Lec.

1860 Corthylus. Leconte. Pac. R. R. Expl. & Sur. 12, pt 2, p. 59, (35)
1867 Corthylominus. Ferrari. Rat. Tom. p. 49
1876 Monarthrum. Leconte. Am. Phil. Soc. Proc. 15:348
1878 Corthylus. Eichhoff. Rat. Tom. p. 447
1893 Monarthrum. Chittenden. Ent. Soc. Wash. Proc. 2:392

cavus Lec.

1868 Cryphalus. Leconte. Am. Ent. Soc. Trans. 2:153
1876 = scutellare Lec. Leconte. Am. Phil. Soc. Proc. 15:348
1878 Cryphalus. Eichhoff. Rat. Tom. p. 451
Habitat. California.
Food plant. Quercus agrifolia.

RENOCIS Casey

1886 Casey. Cal. Acad. Sci. Bul. 2:257

159 **heterodoxus** Casey

1886 Renocis. Casey. Cal. Acad. Sci. Bul. 2, p. 258, pl. 7, fig. 20.

SCIERUS Leconte

1876 Leconte. Am. Phil. Soc. Proc. 15:390
1883 Leconte & Horn. Col. N. A. p. 525

160 **annectens** Lec.

1876 Leconte. Am. Phil. Soc. Proc. 15:390
1888 Scierus. Bedel. Faun. Col. Seine, 6:388
1901 Scierus. Hopkins. U. S. Div. Ent. Bul. 28, p. 33
Habitat. Anticosti, British Columbia, Maine.
Food plant. Picea.

TOMICUS Latr.

1802 Latreille. Hist. Nat. Crust. & Ins. 3:203
1887 Bedel. Faun. Col. Seine, 6:388, 389
1896 Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 143

HYLASTES Erichson

1836 Erichson. Wieg. Archiv. 2:47
1856 Perris. Ann. Soc. Ent. France, p. 223–30, pl. 5, fig. 321–23
1864 Eichhoff. Berl. Ent. Zeit. p. 23, 44, 46
1868 Leconte. Am. Ent. Soc. Trans. 2:174
1869 Chapuis. Syn. Scol. p. 16
1873 Chapuis. Mem. Soc. Liege, p. 224
1876 Leconte. Am. Phil. Soc. Proc. 15:387–88
1877 Provancher. Faun. Ent. Can. 1:574
1881 Eichhoff. Borkenk. p. 35, 76
1883 Leconte & Horn. Col. N. A. p. 521
1887 Bedel. Faun. Col. Seine, 6:388, 389, (Tomicus Latr.)

1895 Judeich-Nitsche. Forstins. 1:445, 446, fig.
1896 Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 143
1901 Barbey. Scol. l'Europ. Cent. p. 41

161 **exilis** Chap.

1869 Hylastes. Chapuis. Syn. Scol. p. 76
1873 Hylastes. Chapuis. Mem. Soc. Liège, p. 228
1876 Hylastes. Leconte. Am. Phil. Soc. Proc. 15:388, 389
Habitat. Florida.
Food plants. (?)

162 **longus** Lec.

1870 Hylastes. Leconte. Am. Phil. Soc. Proc. 15:388, 389
1907 Hylastes. Fall & Cockerell. Am. Ent. Soc. Trans. 33:218
Habitat. Colorado, New Mexico.
Food plants. (?)

163 **macer** Lec.

1868 Hylastes. Leconte. Am. Ent. Soc. Trans. 2:175
1876 Hylastes. Leconte. Am. Phil. Soc. Proc. 15:388
1894 Hylastes. Schwarz. Ins. Life, 7:255
Habitat. California, Utah, Nebraska.
Food plant. Picea engelmanni

164 **nigrinus** Mannh.

1852 Hylurgus. Mannerheim. Bul. Mosc. 356, 385, (143)
1868 Hylastes. Leconte. Am. Ent. Soc. Trans. 2:174
1873 Hylastes. Chapuis. Mem. Soc. Liège, p. 226
1876 Hylastes. Leconte. Am. Phil. Soc. Proc. 15:388
1894 Hylastes. Hamilton. Am. Ent. Soc. Trans. 21:36
Habitat. Alaska to California.
Food plants. (?)

165 **porculus** Er.

1836 Hylastes. Erichson. Wieg. Archiv. 2:49
1868 Hylastes. Leconte. Am. Ent. Soc. Trans. 2:149, 174
1876 Hylastes. Leconte. Am. Phil. Soc. Proc. 15:388, 389
1877 Hylastes. Provancher. Faun. Ent. Can. 1, Add. et cor. p. 28
1878 Hylastes. Hubbard & Schwarz. Am. Phil. Soc. Proc. 17:643
1878 Hylastes. Schwarz. Am. Phil. Soc. Proc. 17:469
1888 Hylastes. Schwarz. Ent. Soc. Wash. Proc. 1:80
1890 Hylastes. Packard. U. S. Ent. Com'n, 5th Rep't, p. 724
1896 Hylastes. Eichhoff & Schwarz. U. S. Nat. Mus. Proc. 18:605, 606, 610
1898 Hylastes. Blandford. Ent. News, 9:5
1899 Hylastes. Hopkins. W. Va. Agric. Exp. Sta. Bul. 56, p. 448
1900 Hylastes. Smith. Cat. Ins. N. J. p. 365
1905 Hylastes. Skinner. Ent. News, 16:248
1906 Hylastes. Felt. N. Y. State Mus. Mem. 8, 2:752

carbonarius Fitch

1851 Hylastes. Fitch. Nox. Ins. N. Y. 4th Rep't, p. 730
1876 =porculus Er. Leconte. Am. Phil. Soc. Proc. 15:389

cavernosus Zimm.

1868 Hylastes. Zimmerman. Am. Ent. Soc. Trans. 2:149, 174
1876 Hylastes. Leconte. Am. Phil. Soc. Proc. 15:388, 389
1877 Hylastes. Provancher. Faun. Ent. Can. 1:574, Add. et cor. p. 28
1878 Hylastes. Hubbard & Schwarz. Am. Phil. Soc. Proc. 17:643
1894 Hylastes. Hamilton. Am. Ent. Soc. Trans. 21:36
1896 =porculus Er. Eichhoff & Schwarz. U. S. Nat. Mus. Proc. 18:606, 610
1899 Hylastes. Hopkins. W. Va. Agric. Exp. Sta. Bul. 56, p. 345, 347, 356
1900 =porculus Er. Smith. Cat. Ins. N. J. p. 365

granosus Chap.

1869 Hylastes. Chapuis. Syn. Scol. p. 73
1873 Hylastes. Chapuis. Mem. Soc. Liège, p. 225
1876 =porculus Er. Leconte. Am. Phil. Soc. Proc. 15:389
1896 =porculus Er. Eichhoff & Schwarz. U. S. Nat. Mus. Proc. 18:606, 610

Habitat. Atlantic states, Colorado, Michigan, eastern Canada, Alaska.

Food plant. Pinus.

166 **porosus** Lec.

1868 Hylastes. Leconte. Am. Ent. Soc. Trans. 2:175
1876 Hylastes. Leconte. Am. Phil. Soc. Proc. 15:388
1902 Hylastes. Hopkins. U. S. Div. Ent. Bul. 32, p. 13

Habitat. Nevada, California.

Food plants. Roots of pines.

167 **salebrosus** Eich.

1868 Hylastes. Eichhoff. Berl. Ent. Zeit. p. 146
1868 Hylastes. Leconte. Am. Ent. Soc. Trans. 2:177
1876 (?) =porculus Er. Leconte. Am. Phil. Soc. Proc. 15:389
1896 Hylastes. Eichhoff & Schwarz. U. S. Nat. Mus. Proc. 18:606, 607, 610
1898 =scabripennis Zimm. Blandford. Ent. News, 9:5

scabripennis Zimm.

1868 Hylastes. Zimmerman. Am. Ent. Soc. Trans. 2:149
1876 =porculus Er. Leconte. Am. Phil. Soc. Proc. 15:389
1896 =salebrosus Eich. Eichhoff & Schwarz. U. S. Nat. Mus. Proc. 18:606, 607, 610
1898 Hylastes. Blandford. Ent. News, 9:5

Habitat. Atlantic states and eastern Canada.

Food plants.

168 scobinosus Eich.

1868 Hylastes. Eichhoff. Berl. Ent. Zeit. p. 146
1869 Hylastes. Chapuis. Syn. Scol. p. 73
1873 Hylastes. Chapuis. Mem. Soc. Liège, p. 225
1876 =cavernosus Zimm. Leconte. Am. Phil. Soc. Proc. 15:389
1896 Hylastes. Eichhoff & Schwarz. U. S. Nat. Mus. Proc. 18:606, 607, 610

Habitat. Carolina, Norfolk sound.

Food plants. (?)

169 tenuis Eich.

1868 Hylastes. Eichhoff. Berl. Ent. Zeit. p. 147
1868 Hylurgus. Zimmerman. Am. Ent. Soc. Trans. 2:149
1873 Hylastes. Chapuis. Mem. Soc. Liège, p. 227
1876 Hylastes. Leconte. Am. Phil. Soc. Proc. 15:388, 389
1878 Hylastes. Hubbard & Schwarz. Am. Phil. Soc. Proc. 15:469
1888 Hylastes. Schwarz. Ent. Soc. Wash. Proc. 1:80
1895 Hylastes. Hamilton. Am. Ent. Soc. Trans. 22:346, 378
1899 Hylastes. Hopkins. W. Va. Agric. Exp. Sta. Bul. 56, p. 345, 449
1906 Hylastes. Felt. N. Y. State Mus. Mem. 8, 2:752

gracilis Lec.

1868 Hylastes. Leconte. Am. Ent. Soc. Trans. 2:174
1876 Hylastes. Leconte. Am. Phil. Soc. Proc. 15:388
1899 =tenuis Zimm. Hopkins. W. Va. Agric. Exp. Sta. Bul. 56, p. 449
1907 Hylastes. Fall & Cockerell. Am. Ent. Soc. Trans. 33:218

Habitat. Atlantic states, California, Quebec.

Food plant. Pinus.

THYSANOES Leconte

1876 Leconte. Am. Phil. Soc. Proc. 15:369
1883 Leconte & Horn. Col. N. A. p. 519, 520

170 fimbricornis Lec.

1876 Thysanoes. Leconte. Am. Phil. Soc. Proc. 15:370
1889 Thysanoes. Schwarz. Ent. Soc. Wash. Proc. 1:165
1890 Thysanoes. Packard. U. S. Ent. Com'n, 5th Rep't, p. 293
1894 Thysanoes. Schwarz. Ent. Soc. Wash. Proc. 3:45
1906 Thysanoes. Felt. N. Y. State Mus. Mem. 8, 2:716

Habitat. Pennsylvania.

Food plant. Hicoria.

TRYPODENDRON Stephens

1830 Stephens. Ill. Brit. Ent. 3:353
1864 Eichhoff. Berl. Ent. Zeit. p. 36, 45, 46
1877 Provancher. Faun. Ent. Can. 1:566
1878 Eichhoff. Rat. Tom. p. 412
1881 Eichhoff. Borkenk. p. 291
1888 Bedel. Faun. Col. Seine, 6:396, 403
1895 Judeich-Nitsche. Forstins. 1:449–51
1901 Barbey. Scol. l'Europ. Cent. p. 110

XYLOTERUS Erichson

1836 Erichson. Wieg. Archiv. 1:60
1876 Leconte. Am. Phil. Soc. Proc. 15:357
1883 Leconte & Horn. Col. N. A. p. 517–18

171 lineatus Oliv.

1795 Bostrichus. Olivier. Ent. 4:77, p. 18, tab. 3, fig. 23, a, b
1813 Bostrichus. Gyllenhal. In. Suec. 3:367
1834 Bostrichus Hartig. Forstl. Convers. Lexicon, p. 13, 110
1839 Xyloterus. Ratzeburg. Forstins. 1:199–202, t. 13, fig. 11
1864 Xyloterus. Eichhoff. Berl. Ent. Zeit. tab. 1, fig. 11
1871 Xyloterus. Eichhoff. Berl. Ent. Zeit. p. 137
1876 Xyloterus. Eichhoff. Stet. Ent. Zeit. 36:378
1881 Trypodendron. Eichhoff. Borkenk. p. 298–305
1888 Trypodendron. Bedel. Faun. Col. Seine, 6:404, 421
1894 Xyloterus. Hamilton. Am. Ent. Soc. Trans. 21:36, 406
1899 Trypodendron. Ormerod. Rep't, 1898, p. 92
1901 Trypodendron. Barbey. Scol. l'Europ. Cent. p. 112, pl. 3, fig. 35; pl. 15, fig. 6
1907 Xyloterus. Fall & Cockerell. Am. Ent. Soc. Trans. 33:217
1907 Xyloterus Trèdl. Nahrungs. Verbreit. Borkenk. Europ. p. 19

bivittata Kirby

1837 Apate. Kirby. Faun. Bor. Am. 4:192, pl. 8, fig. 5
1853 Xyloterus. Mannerheim. Bul. Mosc. p. 236
1871 = lineatus Oliv. Eichhoff. Berl. Ent. Zeit. p. 137
1876 Xyloterus. Leconte. Am. Phil. Soc. Proc. 15:357, 426
1876 = lineatus Ratz. (?) Oliv. Eichhoff. Stet. Ent. Zeit. 36:378
1877 Trypodendron. Provancher. Faun. Ent. Can. 1:567
1878 Xyloterus. Hubbard & Schwarz. Am. Phil. Soc. Proc. 17:643
1881 = lineatus Ratz. (?) Oliv. Eichhoff. Borkenk. p. 299
1888 Xyloterus. Schwarz. Ent. Soc. Wash. Proc. 1:80
1889 Xyloterus. Hamilton. Am. Ent. Soc. Trans. 16:158
1890 Xyloterus. Packard. U. S. Ent. Com'n, 5th Rep't, p. 720, 812, 823, fig. 276
1891 Xyloterus. Riley & Howard. Ins. Life, 3:435.
1893 Xyloterus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 134; Bul. 32, p. 210
1894 Xyloterus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 35, p. 295, fig. 10
1894 Xyloterus. Hopkins. Can. Ent. 26:278
1894 = lineatus Oliv. Hamilton. Am. Ent. Soc. Trans. 21:35, 406
1895 = lineatus Oliv. Riley & Howard. Ins. Life, 7:419
1897 Xyloterus. Hubbard. U. S. Div. Ent. Bul. 7:28
1899 = lineatus Oliv. Hopkins. W. Va. Agric. Exp. Sta. Bul. 56, p. 444, 449
1901 Xyloterus. Felt. Forest, Fish & Game Com'n Rep't, 7:495, fig. 10
1904 Trypodendron. Hopkins. U. S. Div. Ent. Bul. 48, p. 16
1905 Trypodendron. Currie. U. S. Div. Ent. Bul. 53, p. 71

1905 Xyloterus. Schwarz. Harriman Alaska Exped. Rep't 8, Insects, pt 1, p. 185
1906 Xyloterus. Felt. N. Y. State Mus. Mem. 8, 2:335, 339, 369–70, pl. 70, fig. 2

cavifrons Mannh.

1843 Bostrichus. Mannerheim. Bul. Mosc. p. 297, (260)
1852 Bostrichus. Mannerheim. Bul. Mosc. p. 359, (153)
1852 Xyloterus. Mannerheim. Bul. Mosc. p. 385
1853 Xyloterus. Mannerheim. Bul. Mosc. p. 236
1868 = bivittatus Kirby. Leconte. Am. Ent. Soc. Trans. 2:158
1876 = bivittatus Kirby. Leconte. Am. Phil. Soc. Proc. 15:357
1878 = bivittatus Kirby. Eichhoff. Rat. Tom. p. 417
1881 = lineatus Oliv. Eichhoff. Borkenk. p. 299

melanocephalus Fabr.

1793 Bostrichus. Fabricius. Ent. Syst. 2:368
1801 Bostrichus. Fabricius. Syst. El. 2:21, 394
1881 = lineatus Oliv. Eichhoff. Borkenk. p. 299

rufitarsus Kirby

1837 Apate. Kirby. Faun. Bor. Am. 4:193
1868 Apate. Leconte. Am. Ent. Soc. Trans. 2:177
1876 = bivittatus. Kirby. Leconte. Am. Phil. Soc. Proc. 15:426
1878 (?) = lineatus Ratz. Eichhoff. Rat. Tom. p. 417
1888 = lineatus Oliv. Hamilton. Am. Ent. Soc. Trans. 16:158

vittiger Eich.

1881 Trypodendron. Eichhoff. Borkenk. p. 299
1886 = lineatus Oliv. Schwarz. Ent. Am. 2:41

Habitat. Central and Northern Europe, Siberia, Canada, Eastern, Northern and Western United States, New Mexico.

Food plants. Pinus, Picea, Abies, Tsuga, Juniperus, Larix, Betula.

172 politus Say

1828 Bostrichus. Say. Acad. Nat. Sci. Jour. 5:256; ed. Lec. 2:318
1868 Xyloterus. Leconte. Am. Ent. Soc. Trans. 2:159
1876 Xyloterus. Leconte. Am. Phil. Soc. Proc. 15:357, 358
1878 Xyloterus. Eichhoff. Rat. Tom. p. 420
1878 Xyloterus. Hubbard & Schwarz.. Am. Phil. Soc. Proc. 17:666
1886 Xyloterus. Fletcher. Ont. Ent. Soc. 17:32
1889 Xyloterus. Schwarz. Ent. Soc. Wash. Proc. 1:149
1890 Xyloterus. Packard. U. S. Ent. Com'n, 5th Rep't, p. 387
1890 Xyloterus. Schwarz. Ins. Life, 3:87
1891 Xyloterus. Schwarz. Ent. Soc. Wash. Proc. 2:77
1893 Xyloperus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 134; Bul. 32, p. 210
1894 Xyloterus. Hopkins. Can. Ent. 26:278
1895 Xyloperus. Hamilton. Am. Ent. Soc. Trans. 22:346, 378

1897 Xyloterus. Hubbard. U. S. Div. Ent. Bul. 7, p. 28
1899 Xyloterus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 56, p. 444
1900 Xyloteres. Smith. Cat. Ins. N. J. p. 362.
1901 Xyloterus. Felt. N. Y. Forest, Fish & Game Com'n Rep't, 7:516–17, fig. 16
1905 Xyloterus. Felt. N. Y. State Mus. Mem. 8, 1:257, 292–293
1906 Xyloterus. Felt. N. Y. State Mus. Mem. 8, v. 2, pl. 70, fig. 4, 5
Habitat. Eastern United States and Canada.
Food plants. Quercus, Fagus, Acer, Betula, Hicoria, Fraxinus, Castanea, Magnolia, Alnus, Picea, Pinus.

173 retusus Lec.

1868 Xyloterus. Leconte. Am. Ent. Soc. Trans. 2:158
1876 Xyloterus. Leconte. Am. Phil. Soc. Proc. 15:357
1878 Xyloterus. Eichhoff. Rat. Tom. p. 420
1893 Xyloterus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 134; Bul. 32, p. 210
1894 Xyloterus. Hopkins. Can. Ent. 26:278
1897 Xyloterus. Hubbard. U. S. Div. Ent. Bul. 7, p. 29
Habitat. Canada, West Virginia.
Food plant. Populus grandidentata.

174 scabricollis Lec.

1868 Xyloterus. Leconte. Am. Ent. Soc. Trans. 2:158
1876 Xyloterus. Leconte. Am. Phil. Soc. Proc. 15:357, 358
1878 Trypodendron. Provancher. Faun. Ent. Can. 1, Add. et cor. p. 13
1878 =unicolor Eich. (?) Eichhoff. Rat. Tom. p. 419
1893 Xyloterus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 134; Bul. 32, p. 210
1897 Xyloterus. Hubbard. U. S. Div. Ent. Bul. 7, p. 29
1899 Xyloterus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 56, p. 444
1900 Xyloteres. Smith. Cat. Ins. N. J. p. 362
1905 Xyloterus. Skinner. Ent. News, 16:248
1906 Xyloterus. Felt. N. Y. Mus. Mem. 8, 2:752
1907 Xyloterus. Fall & Cockerell. Am. Ent. Soc. Trans. 33:217
Habitat. District of Columbia, West Virginia, New York, New Mexico, Quebec.
Food plants. Pinus, Hamamelis virginiana, Tsuga.

175 unicolor Eich.

1871 Xyloterus. Eichhoff. Berl. Ent. Zeit. p. 136
1876 Xyloterus. Leconte. Am. Phil. Soc. Proc. 15:358
1878 Trypodendron. Eichhoff. Rat. Tom. p. 419
1893 =politus Say. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 134; Bul. 32, p. 210
1894 (?) =politus Say. Hopkins. Can. Ent. 26:278
1900 Xyloteres. Smith. Cat. Ins. N. J. p. 362
Habitat.
Food plants.

XYLEBORUS Eich.

1864 Eichhoff. Berl. Ent. Zeit. p. 37, 45, 56
1868 Zimmerman. Am. Ent. Soc. Trans. 2:142, 144
1868 Leconte. Am. Ent. Soc. Trans. 2:151, 159–62
1876 Leconte. Am. Phil. Soc. Proc. 15:358
1877 Provancher. Faun. Ent. Can. 1:567
1878 Eichhoff. Rat. Tom. p. 315, 316
1881 Eichhoff. Borkenk. p. 53, 268
1883 Leconte & Horn. Col. N. A. p. 518
1888 Bedel. Faun. Col. Seine, 6:397, 402
1894 Blandford. Ent. Soc. Lond. p. 100
1895 Judeich-Nitsche. Forstins. 1:449, 451
1895 Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 192–97
1901 Barbey. Scol. l'Europ. Cent. p. 104

176 (?) affinis Eich.

1867 Xyleborus. Eichhoff. Berl. Ent. Zeit. p. 401
1878 Xyleborus. Eichhoff. Rat. Tom. p. 372–74
1893 Xyleborus. Blandford. Kew Bul. p. 1–46
1894 Xyleborus. Riley. Ins. Life, 6:227
1895 Xyleborus. Schwarz. Ent. Soc. Wash. Proc. 3:171
1895 Xyleborus. Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 195, 196, 216
1897 Xyleborus. Hubbard. U. S. Div. Ent. Bul. 7, p. 20, 21
1898 Xyleborus. Blandford. Ent. News, 9:3
1904 Xyleborus. Titus & Pratt. U. S. Div. Ent. Bul. 47, p. 7
1904 Xyleborus. Hopkins. U. S. Dep't Agric. Yearbook, p. 383
1905 Xyleborus. Currie. U. S. Div. Ent. Bul. 53, p. 7

Habitat. United States (?), Mexico, Guatemala, Nicaragua, Panama, West Indies, Columbia, Brazil, Peru, Argentina, Mauritius.

Food plants. Sugar cane (?), Liriodendron (?).

177 celsus Eich.

1867 Xyleborus. Eichhoff. Berl. Ent. Zeit. p. 400
1868 Xyleborus. Zimmerman. Am. Ent. Soc. Trans. 2:145
1876 Xyleborus. Leconte. Am. Phil. Soc. Proc. 15:359–60
1878 Xyleborus. Eichhoff. Rat. Tom. p. 399
1878 Xyleborus. Hubbard & Schwarz. Am. Phil. Soc. Proc. 17:666
1890 Xyleborus. Packard. U. S. Ent. Com'n, 5th Rep't, p. 92, 297
1893 Xyleborus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 135; Bul. 32, p. 211
1895 Xyleborus. Hamilton. Am. Ent. Soc. Trans. 22:346, 378
1896 Xyleborus. Hopkins. Can. Ent. 28:249, 250
1897 Xyleborus. Hubbard. U. S. Div. Ent. Bul. 7, p. 22, 24
1900 Xyleborus. Smith. Cat. Ins. N. J. p. 363
1904 Xyleborus. Hopkins. U. S. Dep't Agric. Yearbook, p. 384
1904 Xyleborus. Hopkins. U. S. Div. Ent. Bul. 48, p. 39
1906 Xyleborus. Felt. N. Y. State Mus. Mem. 8, 2:427, 446–48, 504, fig. 102–5

biographus Lec.

1868 Xyleborus. Leconte. Am. Ent. Soc. Trans. 2:160
1876 Xyleborus. Leconte. Am. Phil. Soc. Proc. 15:359, 360 (♂)
1878 =celsus Eich. (?) Eichhoff. Rat. Tom. p. 399, 400
1878 Xyleborus. Schwarz. Am. Phil. Soc. Proc. 17:468, 666
1896 =celsus Eich. Hopkins. Can. Ent. 28:249
1906 Xyleborus. Felt. N. Y. State Mus. Mem. 8, 2:447
Habitat. Middle Atlantic, Central and Southern states.
Food plant. Hicoria.

178 dispar Fabr.

1792 Apate. Fabricius. Ent. Syst. 1:2, p. 363
1793 Bostrichus. Herbst. Col. 113, pl. 48, fig. 2, k
1801 Apate. Fabricius. Syst. Eleut. 2:382
1813 Bostrichus. Gyllenhal. Ins. Suec. 3:10, 363
1837 Bostrichus. Ratzeburg. Forstins. 1:169, taf. 13, fig. 13, 14
1839 Bostrichus. Ratzeburg. Forstins. 1:204–8, taf. 13, fig. 13, 14
1843 Bostrichus. Klingelh. Stet. Ent. Zeit. 4:78
1844 Bostrichus. Hartig. Allgemeine Forst. Jagdz. 13:73, 74
1848 Bostrichus. Noerdl. Stet. Ent. Zeit. p. 249
1854 Bostrichus. Bach. Kaef. 2:124, 131
1862 Bostrichus. Doeb. Zool. 2:183
1863 Fairm. Gen. Col. 4, t. 34, fig. 165, 166
1864 Bostrichus. Bach. Nat. u. Offenb. 10:52, fig. 7, 8
1864 Xyleborus. Eichhoff. Berl. Ent. Zeit. p. 38, t. 1, fig. 13–16
1867 Asinandrus. Ferrari. Borkenk, p. 26, (24)
1874 Asinandrus. Redtenb. Fn. Aust. ed. 3, 2:382
1878 Xyleborus. Eichhoff. Rat. Tom. p. 320–23
1878 Xyleborus. Schoch. M. T. schw. ent. Ges. 5:367
1881 Xyleborus. Eichhoff. Borkenk. p. 53, 67, 68, 73, 269
1887 Xyleborus. Fletcher. Ont. Ent. Soc. 17:14
1888 Xyleborus. Bedel. Faun. Col. Seine, 6:403, 420
1889 Xyleborus. Riley. Ins. Life, 2:145
1890 Xyleborus. Riley & Howard. Ins. Life, 2:279
1890 Xyleborus. Ormerod. Rep't 1889. p. 92
1890 Xyleborus. Ormerod. Man. Inj. Ins. p. 330–34, fig.
1890 Xyleborus. Schwarz. Ins. Life, 3:41
1891 Xyleborus. Schwarz. Ent. Soc. Wash. Proc. 2:64
1892 Xyleborus. Riley. Ins. Life, 5:17
1894 Xyleborus. Hopkins. Can. Ent. 26:278
1894 Xyleborus. Bellevoye. Soc. Rein. Bul. 3:89–111
1895 Xyleborus. Riley & Howard. Ins. Life, 7:419
1895 Tomicus. Judeich-Nitsche. Forstins. 1:549–51
1895 Xyleborus. Chittenden. Ins. Life, 7:385
1895 Xyleborus. Hamilton. Am. Ent. Soc. Trans. 22:346, 378
1897 Xyleborus. Hubbard. U. S. Div. Ent. Bul. 7, p. 22, 23
1898 Xyleborus. Ormerod. Ins. Orchard Fruits, Handbook, p. 185–92
1900 Xyleborus. Smith. Cat. Ins. N. J. p. 362
1901 Xyleborus. Barbey. Scol. l'Europ. Cent. p. 104, pl. 3, fig. 25, 26; pl. 15, fig. 5

1904 Xyleborus. Chapman. Ent. Soc. Lond. Trans. p. 100-2
1906 Xyleborus. Felt. N. Y. State Mus. Mem. 8, 2:446, fig. 103
1907 Asinandrus. Trèdl. Nahrungs. Verbreit. Borkenk. Europ. p. 18

brevis Panz. ♂

1793 Bostrichus. Panz. Fn. Germ. p. 34, fig. 20
Bostrichus. Panz. Crit. Rev. 1:118 (*var* pallida)
1878 = dispar Fabr. Eichhoff. Rat. Tom. p. 321

pyri Peck

1817 Scolytus. Peck. Mass. Agric. Jour. 4:205–7
1819 Scolytus. Peck. Mass. Agric. Jour. 5:307–13
1843 Tomicus. Mass. Ploughman. June 17, v. 2, no. 38
1843 Tomicus. New England Farmer, p. 21
Tomicus. Downing's Horticulturist, 2:365–67
1852 Tomicus. Harris. Ins. Inj. Veg. p. 80
1863 Tomicus. Harris. Inj. Ins. p. 91
1868 Xyleborus. Zimmerman. Am. Ent. Soc. Trans. 2:144
1876 Xyleborus. Leconte. Am. Phil. Soc. Proc. 15:358–60
1877 Xyleborus. Provancher. Faun. Ent. Can. 1:567
1878 Xyleborus. Eichhoff. Rat. Tom. p. 323
1886 Xyleborus. Schwarz. Ent. Am. 2:41
1887 Xyleborus. Schwarz. Ent. Am. 3:20
1889 Xyleborus. Schwarz. Ent. Soc. Wash. Proc. 1:138
1890 Xyleborus. Forbes. Psyche, 5:295
1890 = dispar. Riley & Howard. Ins. Life, 2:279
1891 Xyleborus. Cook. Mich. Agric. Exp. Sta. Rep't, p. 130–31, fig. 4
1893 Xyleborus. Harvey. Me. Agric. Exp. Sta. Rep't, p. 176-78
1893 Xyleborus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 135; Bul. 32, p. 210
1896 Xyleborus. Lintner. 11th N. Y. Rep't, p. 270
1897 = dispar. Hubbard. U. S. Div. Ent. Bul. 7, p. 22, 23
1898 = dispar Fabr. Ormerod. Ins. Orchard Fruits, Handbook, p. 185
1900 = dispar Fabr. Smith. Cat. Ins. N. J. p. 362
1902 Xyleborus. Lochhead. Ont. Ent. Soc. 33:109
1904 Xyleborus. Titus & Pratt. U. S. Div. Ent. Bul. 47, p. 20
1905 Xyleborus. Currie. U. S. Div. Ent. Bul. 53, p. 13, 20

tachygraphus Sahlb.

1834 Bostrichus. Sahlb. Diss. Ins. Fenn. p. 52
1878 = dispar Fabr. Eichhoff. Rat. Tom. p. 321, 323

thoracicus Panz ♀

1793 Bostrichus. Panz. Fn. Germ. p. 34, fig. 18
Bostrichus. Panz. Crit. Rev. 1:118
1878 = dispar Fabr. Eichhoff. Rat. Tom. p. 321

ratzeburgii Kolen. ♀

1846 Bostrichus. Kolenati. Mel. Ent. 3:39, 115, t. 14, fig. 11
1867 Bostrichus. Ferrari. Borkenk. p. 27, note 2
1878 =dispar Fabr. Eichhoff. Rat. Tom. p. 321, 323

Habitat. Canada, eastern and middle United States, Europe, Asia Minor, Siberia.

Food plants. Fruit trees, Betula, Fagus, Quercus, Tsuga, and, in Europe, many others.

179 fuscatus Eich.

1867 Xyleborus. Eichhoff. Berl. Ent. Zeit. p. 400
1868 Xyleborus. Zimmerman. Am. Ent. Soc. Trans. 2:145
1876 Xyleborus. Leconte. Am. Phil. Soc. Proc. 15:359, 360
1878 Xyleborus. Eichhoff. Rat. Tom. p. 386
1878 Xyleborus. Schwarz. Am. Phil. Soc. Proc. 17:468
1878 Xyleborus. Hubbard & Schwarz. Am. Phil. Soc. Proc. 17:666
1890 Xyleborus. Schwarz. Ins. Life, 3:87
1890 Xyleborus. Packard. U. S. Ent. Com'n, 5th Rep't, p. 93.
1891 Xyleborus. Schwarz. Ent. Soc. Wash. Proc. 2:78
1893 Xyleborus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 135; Bul. 32, p. 210
1894 Xyleborus. Schwarz. Ent. Soc. Wash. Proc. 3:16
1897 Xyleborus. Hubbard. U. S. Div. Ent. Bul. 7, p. 21, 22
1898 Xyleborus. Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 197, 217
1900 Xyleborus. Smith. Cat. Ins. N. J. p. 363
1906 Xyleborus. Felt. N. Y. State Mus. Mem. 8, 2:752

planicollis Zimm.

1868 Xyleborus. Zimmerman. Am. Ent. Soc. Trans. 2:145
1876 Xyleborus. Leconte. Am. Phil. Soc. Proc. 15:360, 361
1878 Xyleborus. Eichhoff. Rat. Tom. p. 391
1891 Xyleborus. Schwarz. Ent. Soc. Wash. Proc. 2:79
1897 (?) =fuscatus. Eich. Hubbard. U. S. Div. Ent. Bul. 7, p. 20, 22
1898 (?) =fuscatus Eich. Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 217

Habitat. New Jersey to Texas, Guatemala, Columbia.

Food plants. Quercus, Hicoria, Castanea, Juglans cinerea, Pinus, (wine and vinegar casks).

180 impressus Eich.

1867 Xyleborus. Eichhoff. Berl. Ent. Zeit. p. 400
1876 Xyleborus. Leconte. Am. Phil. Soc. Proc. 15:359, 360
1878 Xyleborus. Eichhoff. Rat. Tom. p. 389
1890 Xyleborus. Packard. U. S. Ent. Com'n, 5th Rep't, p. 718

Habitat. Georgia, New Jersey, Massachusetts.

Food plant. Pinus.

181 inermis Eich.

1867 Xyleborus. Eichhoff. Berl. Ent. Zeit. p. 401
1878 Xyleborus. Eichhoff. Rat. Tom. p. 370-72

1897 Xyleborus. Hubbard. U. S. Div. Ent. Bul. 7, p. 20
1898 Xyleborus. Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 217
1904 Xyleborus. Hopkins. U. S. Dep't Agric. Yearbook, p. 383
Habitat. Cuba, "Insula Americana, Civitates unitae, Tennessee, St Catharina."
Food plants. Probably those given for "pubescens."

182 **obesus** Lec.

1868 Xyleborus. Leconte. Am. Ent. Soc. Trans. 2:159
1876 Xyleborus. Leconte. Am. Phil. Soc. Proc. 15:359, 360
1878 Xyleborus. Eichhoff. Rat. Tom. p. 323, 324
1887 Xyleborus. Schwarz. Ent. Am. 3:20
1888 (?) = pyri Peck. Schwarz. Ent. Soc. Wash. Proc. 1:45
1890 Xyleborus. Packard. U. S. Ent. Com'n, 5th Rep't, p. 520
1893 Xyleborus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 135; Bul. 32, p. 211
1894 Xyleborus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 35, p. 295, fig. 12
1894 Xyleborus. Hopkins. Can. Ent. 26:278
1896 Xyleborus. Lintner. 11th N. Y. Rep't, p. 270
1897 Xyleborus. Hubbard. U. S. Div. Ent. Bul. 7, p. 23
1900 Xyleborus. Smith. Cat. Ins. N. J. p. 363
1904 Xyleborus. Hopkins. U. S. Dep't Agric. Yearbook, p. 383
1906 Xyleborus. Felt. N. Y. State Mus. Mem. 8, 2:722
Habitat. Canada to Virginia.
Food plants. Quercus, Fagus, Tsuga, Pyrus.

183 **pini** Eich.

1867 Xyleborus. Eichhoff. Berl. Ent. Zeit. p. 401
1876 = xylographus Say. Leconte. Am. Phil. Soc. Proc. 15:360
1878 = xylographus. Say. Eichhoff. Rat. Tom. p. 369, 370
1896 Xyleborus. Eichhoff & Schwarz. U. S. Nat. Musc. Proc. 18:609, 610
1897 Xyleborus. Hubbard. U. S. Div. Ent. Bul. 7, p. 20
Habitat. "Carolina."
Food plants.

184 (?) **propinquus** Eich.

1868 Xyleborus. Eichhoff. Berl. Ent. Zeit. p. 281
1878 Xyleborus. Eichhoff. Rat. Tom. p. 367
1897 Xyleborus. Hubbard. U. S. Div. Ent. Bul. 7, p. 20
1898 Xyleborus. Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 196, 213, 214
Habitat. Tennessee (?), Mexico, Guatemala, Nicaragua.
Food plants.

185 **pubescens** Zimm.

1868 Xyleborus. Zimmerman. Am. Ent. Soc. Trans. 2:145
1876 Xyleborus. Leconte. Am. Phil. Soc. Proc. 15:359, 360
1878 (?) = inermis Eich. Eichhoff. Rat. Tom. p. 371
1878 Xyleborus. Schwarz. Am. Phil. Soc. Proc. 17:468
1886 Xyleborus. Schwarz. Ent. Am. 2:41

1888 Xyleborus. Schwarz. Ent. Soc. Wash. Proc. 1:45
1890 Xyleborus. Packard. U. S. Ent. Com'n, 5th Rep't, p. 710–11
1890 Xyleborus. Schwarz. Ins. Life, 3:87
1890 Xyleborus. Riley & Howard. Ins. Life, 3:167
1891 Xyleborus. Schwarz. Ent. Soc. Wash. Proc. 2:78
1892 Xyleborus. Riley & Howard. Ins. Life, 4:402
1893 Xyleborus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 137; Bul. 32, p. 211
1894 Xyleborus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 35, p. 296, fig. 14
1894 Xyleborus. Hopkins. Can. Ent. 26:279
1894 (?)=perforans Woll. Hopkins. Ins. Life, 7:148
1894 Xyleborus. Schwarz. Ent. Soc. Wash. Proc. 3:16
1895 Xyleborus. Hamilton. Am. Ent. Soc. Trans. 22:346, 378
1896 Xyleborus. Hopkins. W. Va. Agric. Exp. Sta. Rep't, p. 133–35
1897 Xyleborus. Hubbard. U. S. Div. Ent. Bul. 7, p. 19–22
1897 Xyleborus. Howard. U. S. Div. Ent. Bul. 7, p. 85
1898 Xyleborus. Blandford. Ent. News, 9:4
1899 Xyleborus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 56, p. 445
1900 Xyleborus. Smith. Cat. Ins. N. J. p. 363
1904 Xyleborus. Titus & Pratt. U. S. Div. Ent. Bul. 47, p. 57
1905 Xyleborus. Wenzel. Ent. News, 16:124
1906 Xyleborus. Felt. N. Y. State Mus. Mem. 8, 2:396, 702, 720

Habitat. New York, West Virginia, Wisconsin and southward.

Food plants. Citrus aurantium, Quercus, Tilia americana, Prosopis juliflora, Populus, Juglans cinerea, Castanea, Magnolia, Pinus, Prunus cerasus.

186 retusicollis Zimm.

1868 Xyleborus. Zimmerman. Am. Ent. Soc. Trans. 2:146
1876 Xyleborus. Leconte. Am. Phil. Soc. Proc. 15:359, 360
1878 (?)=affinis Eich. Eichhoff. Rat. Tom. p. 372
1886 Xyleborus. Schwarz. Ent. Am. 2:41
1890 Xyleborus. Packard. U. S. Ent. Com'n, 5th Rep't, p. 93
1895 Xyleborus. Schwarz. Ent. Soc. Wash. Proc. 3:171
1897 Xyleborus. Hubbard. U. S. Div. Ent. Bul. 7, p. 20

Habitat. Maryland.

Food plant. Quercus.

187 tachygraphus Zimm.

1868 Xyleborus. Zimmerman. Am. Ent. Soc. Trans. 2:144
1876 Xyleborus. Leconte. Am. Phil. Soc. Proc. 15:358, 360
1878 Xyleborus. Eichhoff. Rat. Tom. p. 323
1891 Xyleborus. Schwarz. Ent. Soc. Wash. Proc. 2:62
1897 Xyleborus. Hubbard. U. S. Div. Ent. Bul. 7, p. 23
1897 Xyleborus. Chittenden. U. S. Div. Ent. Bul. 7, p. 79

Habitat. New York, middle and Southern states.

Food plants. Liriodendron tulipifera, Acer, Fagus, Cercis canadensis, Rhus.

188 xylographus Say

1826 Bostrichus. Say. Nat. Sci. Phila. Jour. 5:256; ed. Lec. 2:318
1857 Xyleborus. Fitch. Nox. Ins. 4th Rep't, p. 716–20
1868 Xyleborus. Zimmerman. Am. Ent. Soc. Trans. 2:145
1876 Xyleborus. Leconte. Am. Phil. Soc. Proc. 15:359, 360
1878 Xyleborus. Eichhoff. Rat. Tom. p. 369
1878 Xyleborus. Schwarz. Am. Phil. Soc. Proc. 17:468, 666
1883 Xyleborus. Saunders. Ont. Ent. Soc. 14:55
1886 Xyleborus. Schwarz. Ent. Am. 2:41
1889 Xyleborus. Schwarz. Ent. Soc. Wash. Proc. 1:149
1893 Xyleborus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 31, p. 136
1894 Xyleborus. Hopkins. Can. Ent. 26:278
1894 Xyleborus. Hamilton. Am. Ent. Soc. Trans. 21:406
1895 Xyleborus. Hamilton. Am. Ent. Soc. Trans. 22:346, 378
1896 Xyleborus. Hubbard. Ent. Soc. Wash. Proc. 3:318
1896 Xyleborus. Lintner. 11th N. Y. Rep't, p. 270
1897 Xyleborus. Hubbard. U. S. Div. Ent. Bul. 7, p. 24–26
1898 =saxeseni Ratz. Ormerod. Ins. Orchard Fruits, Handbook, p. 192
1898 Xyleborus. Hopkins. Can. Ent. 30:21–29, pl. 2, 3
1899 Xyleborus. Hopkins. W. Va. Agric. Exp. Sta. Bul. 56, p. 258, 347
1899 Xyleborus. Luggar. Minn. Agric. Exp. Sta. Bul. 66, p. 311–13, fig. 241
1900 Xyleborus. Smith. Cat. Ins. N. J. p. 363
1903 Xyleborus. Washburn. Minn. Agric. Exp. Sta. Bul. 84, p. 60, 82, 91, fig. 36
1905 Xyleborus. Skinner. Ent. News, 16:248
1907 Xyleborus. Bremner. Can. Ent. 39:195–96
1907 Xyleborus. Fall & Cockerell. Am. Ent. Soc. Trans. 33:217

aesculi Ferrari ♂

1867 Xyleborus. Ferrari. Borkenk. p. 22, note 2
1878 =saxeseni Ratz. Eichhoff. Rat. Tom. p. 362
1898 =xylographus Say. Hopkins. Can. Ent. 30:28

decolor Boield. ♂

1859 Bostrichus. Boieldieu. Ann. Soc. Ent. Fr. p. 473
1866 Bostrichus. Perris. Ann. Soc. Ent. Fr.
1867 Bostrichus. Ferrari. Borkenk. p. 21, 22, note 2
1876 =saxeseni Ratz. Eichhoff. Stet. Ent. Zeit. 36:378
1878 =saxesenii Ratz. Eichhoff. Rat. Tom. p. 362
1898 =xylographus Say. Hopkins. Can. Ent. 30:29

dohrnii Woll. ♀

1854 Tomicus. Wollaston. Ins. Mad. p. 290
(?) Tomicus. Wollaston. Cat. Col. Ins. Can. p. 253
1878 =saxeseni Ratz. Eichhoff. Rat. Tom. p. 362
1898 =xylographus Say. Hopkins. Can. Ent. 30:28

dryographus Ferrari

1867 Xyleborus. Ferrari. Borkenk. p. 20, 3 et 22, note 2 (ex parte ♀)
1878 = saxeseni Ratz. Eichhoff. Rat. Tom. p. 362, 363
1898 = xylographus Say. Hopkins. Can. Ent. 30:28

saxeseni Ratz.

1837 Bostrichus. Ratzeburg. Forstins. 1:167
1839 Bostrichus. Ratzeburg. Forstins. 1:204
1846 Bostrichus. Wiesmann. Stet. Ent. Zeit. p. 24
1848 Bostrichus. Noerdl. Stet. Ent. Zeit. p. 246. ♂
1854 Bostrichus. Bach. Kaefer, 2:126, 134
1862 Bostrichus. Doebn. Zool. 2:182
1867 Xyleborus. Ferrari. Borkenk. p. 21
(?) Tomicus. Thomson. Scand. Col. 7:370
1876 Xyleborus. Eichhoff. Stet. Ent. Zeit. 36:378
1878 Xyleborus. Schoch. M. T. schw. ent. Ges. 5:367
1878 Xyleborus. Eichhoff. Rat. Tom. p. 361
1881 Xyleborus. Eichhoff. Borkenk. p. 279–82
1886 Xyleborus. Schwarz. Ent. Am. 2:41
1888 Xyleborus. Bedel. Faun. Col. Seine, 6:402, 403, 419
1894 Xyleborus. Bellevoye. Soc. Reims Bul. 3:89–111
1895 Tomicus. Judeich-Nitsche. Forstins. 1:545
1896 = xylographus Say. Eichoff & Schwarz. U. S. Nat. Mus. Proc. 18:609
1897 = xylographus Say. Hubbard. U. S. Div. Ent. Bul. 7, p. 24
1898 Xyleborus Ormerod. Ins. Orchard Fruits, Handbook, p. 192, fig.
1898 = xylographus Say. Hopkins. Can. Ent. 30:21, 22
1901 Xyleborus. Barbey. Scol. l'Europ. Cent. p. 107, pl. 3, fig. 30
1904 Xyleborus. Titus & Pratt. U. S. Div. Ent. Bul. 47, p. 20
1904 Xyleborus. Hopkins. U. S. Div. Ent. Bul. 48, p. 16
1905 Xyleborus. Currie. U. S. Div. Ent. Bul. 53, p. 71
1907 Xyleborus. Trèdl. Nahrungs. Verbreit. Borkenk. Europ. p. 19

subdepressus Rey

1883 Xyleborus. Rey. Rev. d'Ent. 2:142
1898 = xylographus Say. Hopkins. Can. Ent. 30:28

Habitat. Eastern and western United States, Canada, Europe, Japan.

Food plants. Pinus, Hicoria, Quercus, Fagus, Acer, Tsuga, Picea, Prunus, Pyrus in America; Castanea, Betula, Tilia, Populus, Ulmus, Alnus, Sorbus, Aesculus, Abies, Larix, Prunus and Pyrus in Europe.

XYLOCLEPTES Ferrari

1867 Ferrari. Borkenk. p. 37
1878 Eichhoff. Rat. Tom. p. 216
1881 Eichhoff. Borkenk. p. 210
1883 Leconte & Horn. Col. N. A. p. 518

1888 Bedel. Faun. Col. Seine, 6:396, 399
1895 Judeich-Nitsche. Forstins. 1:449, 451
1898 Blandford. Biol. Centr. Am. Col. 4, pt 6, p. 185, 188
1901 Barbey. Scol. l'Europ. Cent. p. 80

189 (?) bispinus Duft

1825 Bostrichus. Duft. Fn. Aust. 3:92, 7
1837 Bostrichus. Ratzeburg. Forstins. 1:155, t. 13, fig. 5
1839 Bostrichus. Ratzeburg. Forstins. 1:189, t. 13, fig. 5
1849 Bostrichus. Bach. Verh. nat. Ver. Rheinl. p. 161
1849 Bostrichus. Bach. Stet. Ent. Zeit. p. 161, 200
1854 Bostrichus. Bach. Kaef. 2:129
1862 Bostrichus. Doebner. Zool. 2:178
1864 Bostrichus. Bach. Nat. u. Offenb. p. 51, fig. 6
1867 Xylocleptes. Ferrari. Borkenk. p. 40
1874 Xylocleptes. Redtenb. Fn. Aust. ed. 3. 2:378
1878 Xylocleptes. Eichhoff. Rat. Tom. p. 216, fig. 61
1881 Xylocleptes. Eichhoff. Borkenk. p. 210
1886 Xylocleptes. Schwarz. Ent. Am. 2:42
1888 Xylocleptes. Bedel. Faun. Col. Seine, 6:399, 415
1901 Xylocleptes. Barbey. Scol. l'Europ. Cent. p. 80, pl. 2, fig. 27; pl. 10, fig. 1

retusus Oliv.

1778 Scolytus. Olivier. Ent. 4:10, tab. 2, fig. 14, a, b
1878 = bispinus Duft. Eichhoff. Rat. Tom. p. 217
Habitat. Europe, United States (?).
Food plant. Clematis.

190 cucurbitae Lec.

1879 Xylocleptes. Leconte. U. S. Geol. Surv. Bul. 5:519
1886 Xylocleptes. Schwarz. Ent. Am. 2:42
1897 Xylocleptes. Cockerell. N. Y. Ent. Soc. Jour. 5:150
1907 Xylocleptes. Fall & Cockerell. Am. Ent. Soc. Trans. 33:217
Habitat. Utah, New Mexico.
Food plant. Cucurbita foetidissima.

191 decipiens Lec.

1878 Xylocleptes. Leconte. Am. Phil. Soc. Proc. 17:624
1878 Xylocleptes. Hubbard & Schwarz. Am. Phil. Soc. Proc. 17:666
1886 Xylocleptes. Schwarz. Ent. Am. 2:42
1893 Xylocleptes. Chittenden. Ent. Soc. Wash. Proc. 2:394
1896 Xylocleptes. Lintner. 11th N. Y. Rep't, p. 270
1906 Xylocleptes. Felt. N. Y. State Mus. Mem. 8, 2:715
Habitat. Virginia, Michigan, New York (Ithaca).
Food plants. Hicoria, Pyrus, Acer.

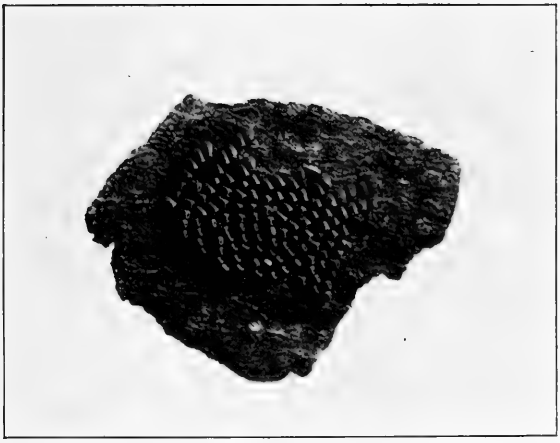
EXPLANATION OF PLATES

PLATE 1

161

1 Snow-white linden moth; eggs, slightly enlarged. (Original)
2 Adult moths. (Author's illustration)

Plate 1



1

2

Snow-white linden moth

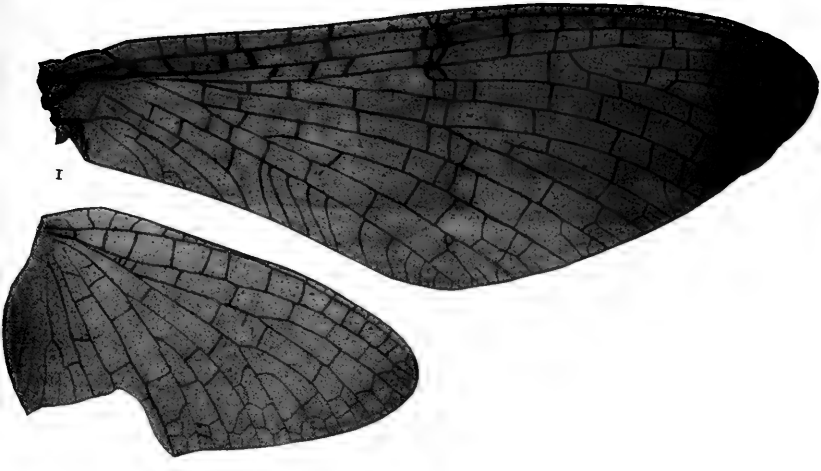
PLATE 2

163

Siphlonisca aerodromia Ndm.

1 Wings
2 Dorsal view of abdomen of female

Plate 2



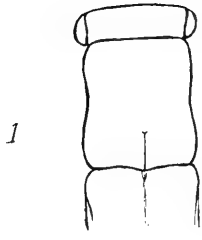
Siphlonisca aerodromia Ndm.

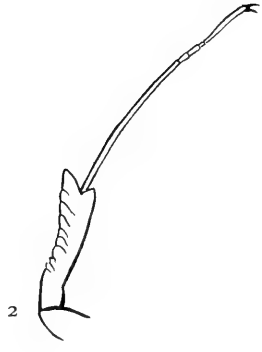
PLATE 3

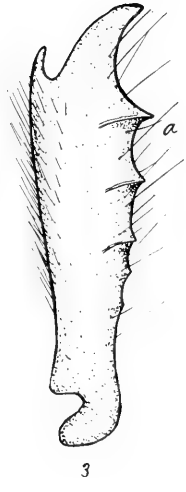
165

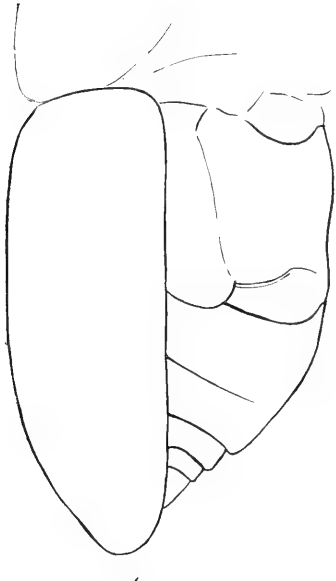
1 Platypus compositus Say, dorsum of head and prothorax. (Enlarged)
2 Platypus compositus Say, fore leg. (Greatly enlarged)
3 Erineophilus schwarzi Hopk., foretibia; *a*, outer border, after Hopkins. (Greatly enlarged)
4 Eccoptogaster rugulosus Ratz., side view of abdomen. (Enlarged)
5 Eccoptogaster rugulosus Ratz., foretibia; *a*, outer border. (Greatly enlarged)

Plate 3









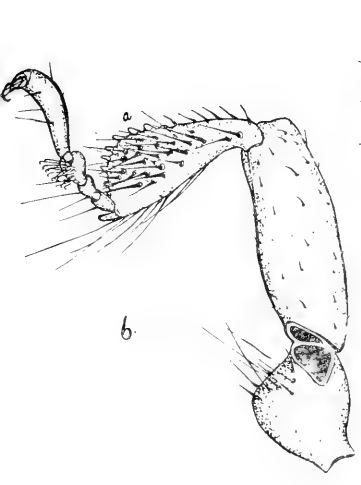
Scolytid structures

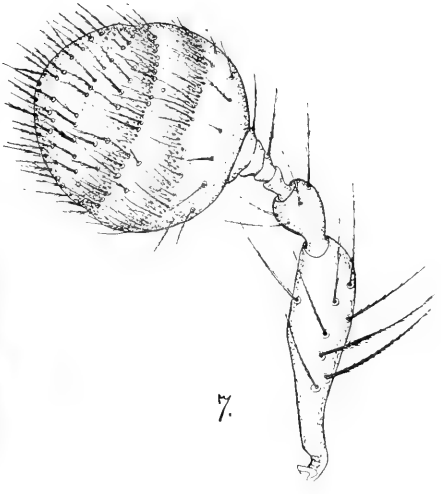
PLATE 4

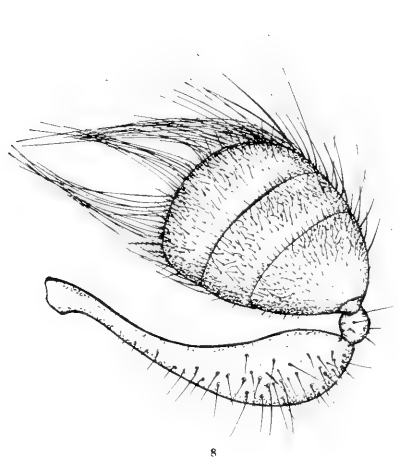
167

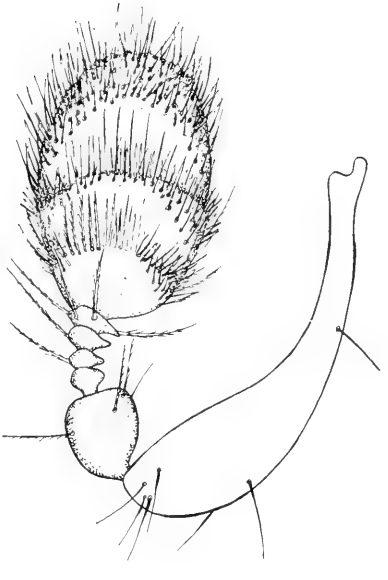
6 Pityophthorus minutissimus Zimm., fore leg; *a*, outer border. (Greatly enlarged)
7 Pityogenes undes. sp., antenna. (Greatly enlarged)
8 Pterocyclon mali Fitch, antenna. (Greatly enlarged)
9 Pityophthorus minutissimus Zimm., antenna. (Greatly enlarged)

Plate 4









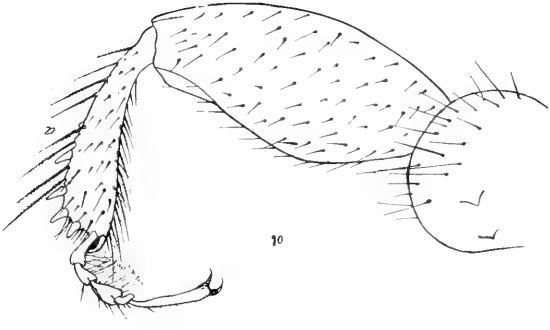
Scolytid structures

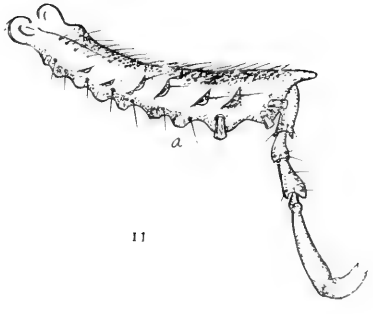
PLATE 5

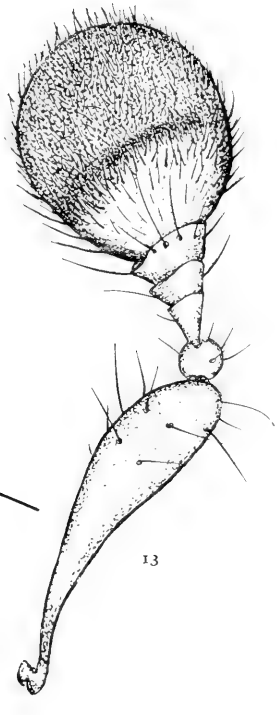
169

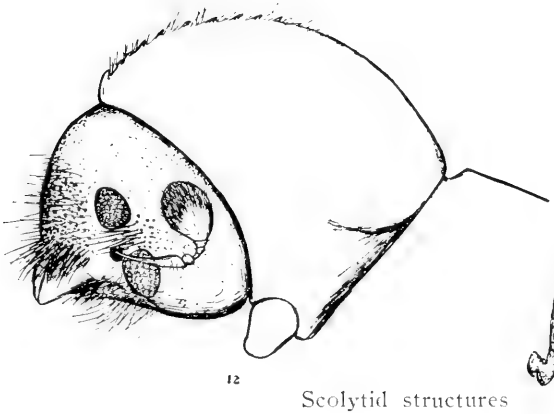
10 Pityogenes undes. sp., fore leg; *a*, outer border. (Greatly enlarged)
11 Pterocyclon mali Fitch, foretibia and tarsus; *a*, outer border. (Greatly enlarged)
12 Trypodendron politus Say, side view of head and prothorax, showing divided eye. (Enlarged)
13 Trypodendron politus Say, antenna. (Greatly enlarged)

Plate 5









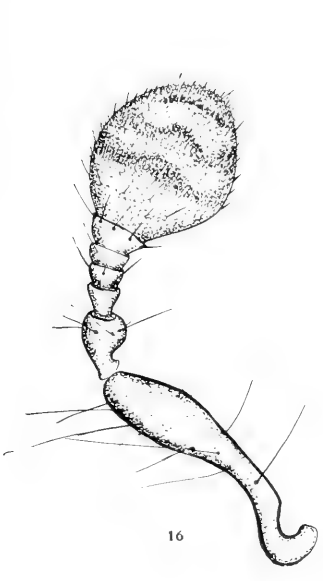
Scolytid structures

PLATE 6

171

14 Ips (Tomicus) pini Say, distal portion of maxilla. (Greatly enlarged)
15 Xyleborus undes. sp., *a*, distal portion of maxilla. (Greatly enlarged)
16 Ips pini Say, antenna (outer face). (Greatly enlarged)
17 Xyleborus undes. sp. *a*, ventral view of prosternum. (Enlarged)
18 Dryocoetes autographus Ratz., ventral view of prosternum; *Ant.*, antenna (outer face); *Gs.*, gular suture; *C.*, forecoxa; *Ps.*, prosternum. (Enlarged)

Plate 6



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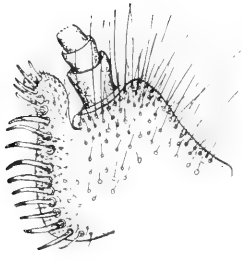

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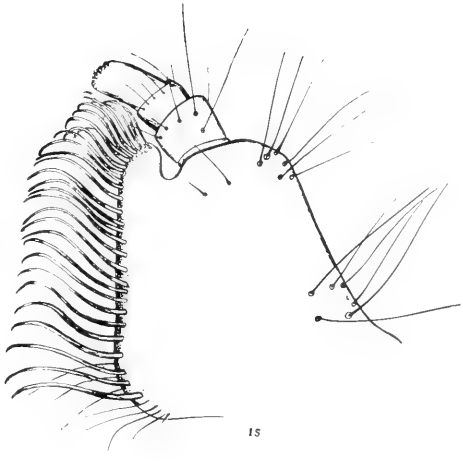

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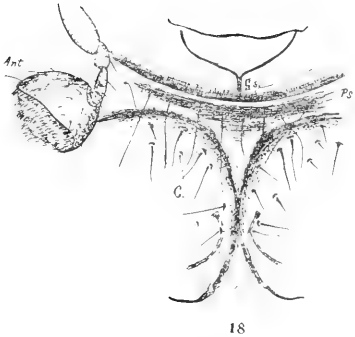

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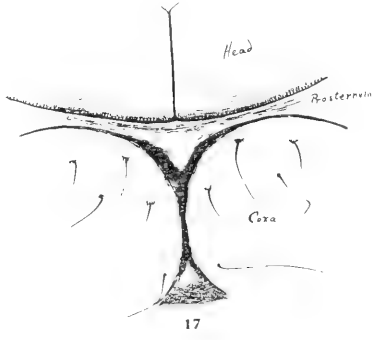


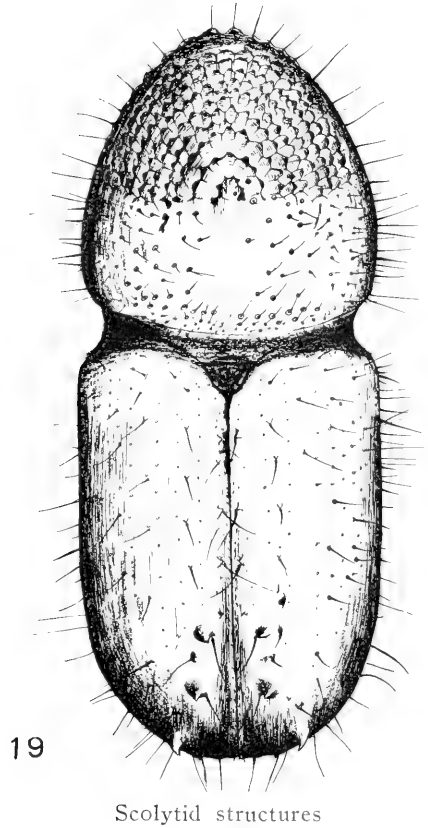
17

Scolytid structures

PLATE 7

19 Pityogenes undes. sp., dorsum of male. (Enlarged)
20 Dendroctonus terebrans Oliv., side view of head and prothorax. (Enlarged)

Plate 7



Scolytid structures

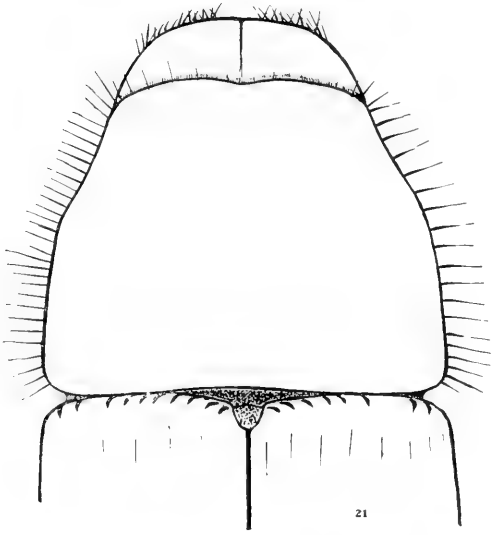
PLATE 8

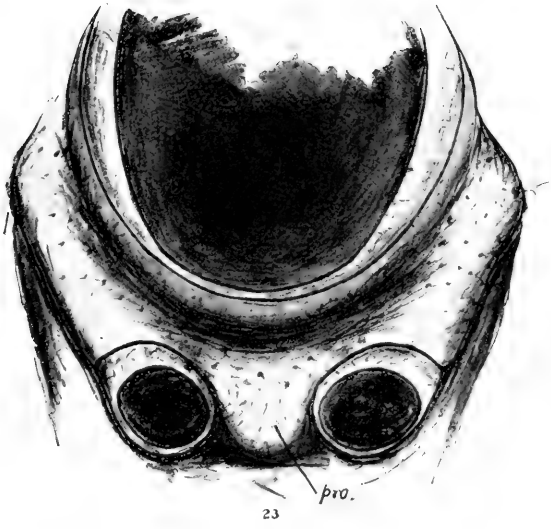
175

21 Dendroctonus terebrans Oliv., dorsum of head and prothorax. (Enlarged)

23 Hylurgops glabratus Zett., cephalic aspect of mesosternum; *pro.*, protuberance of mesosternum. (Enlarged)

Plate 8





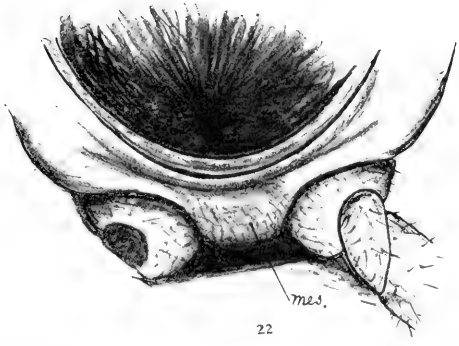
Scolytid structures

PLATE 9

177

22 Hylastes undes. sp., cephalic view of mesosternum; *mes.*, mesosternum. (Enlarged)
24 Chramesus icoriae Lec., antenna. (Greatly enlarged)
25 Chramesus icoriae Lec., dorsum. (Enlarged)
27 Phloeosinus dentatus Say, antenna. (Greatly enlarged)

Plate 9



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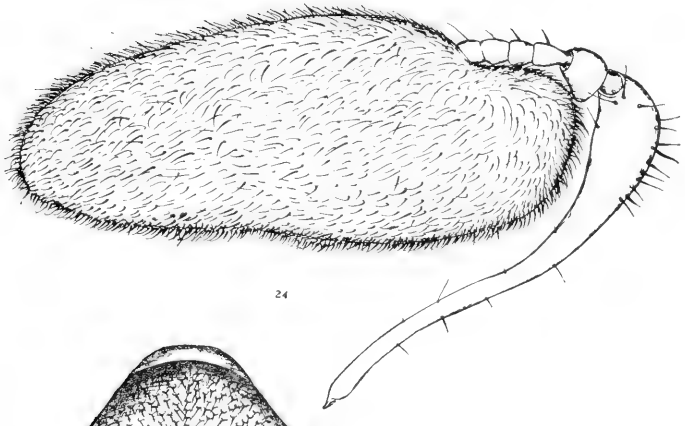

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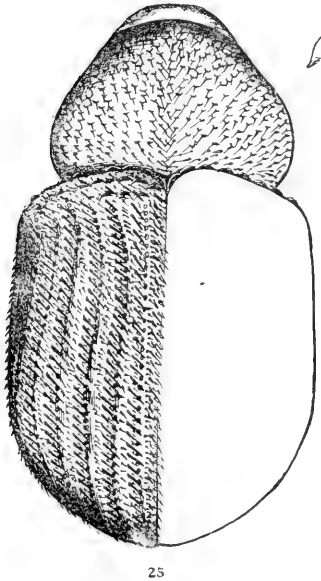


25

27

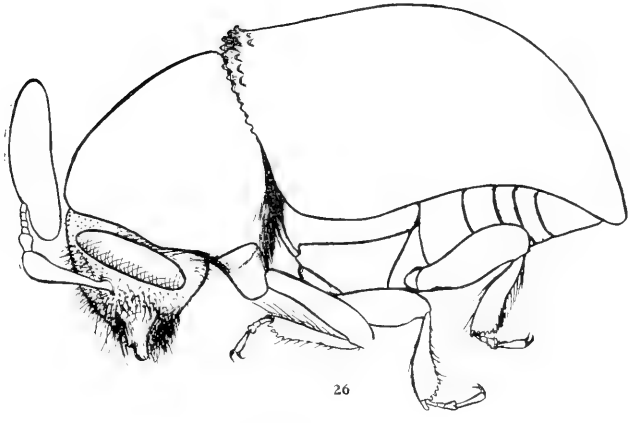
Scolytid structures

PLATE 10

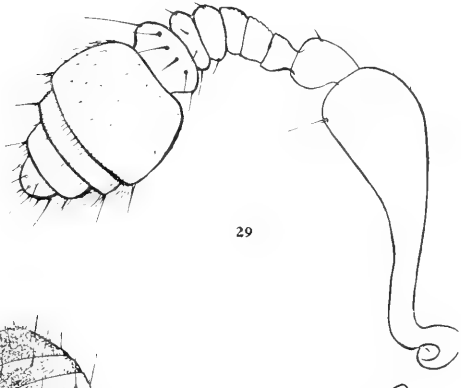
179

26 Chramesus icoriae Lec., lateral view. (Enlarged)
28 Dendroctonus terebrans Oliv., antenna. (Greatly enlarged)
29 Hylurgops glabratus Zett., antenna. (Greatly enlarged)
30 Phloeotribus liminaris Harris, antennal funicle and club. (Greatly enlarged)

Plate 10



26



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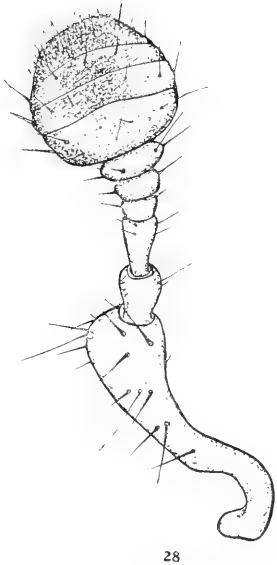

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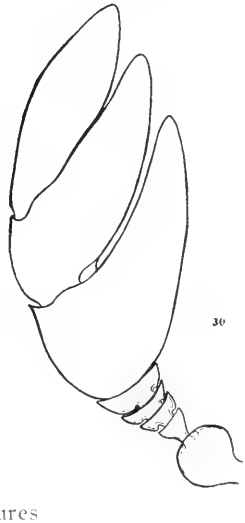


30

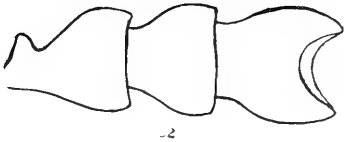
Scolytid structures

PLATE 11

181

31 Hylurgops glabratus Zett., foretarsus. (Greatly enlarged)
32 Hylastes undes. sp., first three segments of foretarsus. (Greatly enlarged)
33 Hylurgops glabratus Zett., venter of abdomen. (Enlarged)
34 Hylesinus aculeatus Say, venter of abdomen. (Enlarged)
35 Hylurgops glabratus Zett., mesosternum; *C.*, coxal cavity; *pro.*, protuberance of mesosternum. (Enlarged)
36 Hylurgops glabratus Zett., pronotum and base of elytra. (Enlarged)
37 Hylastes undes. sp., pronotum and base of elytra. (Enlarged)

Plate II



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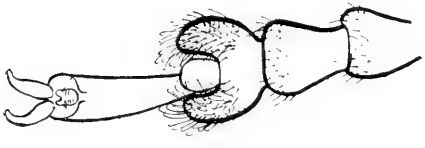

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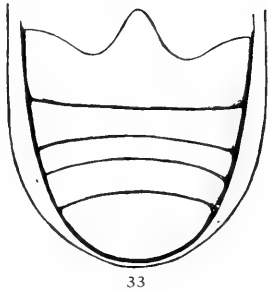

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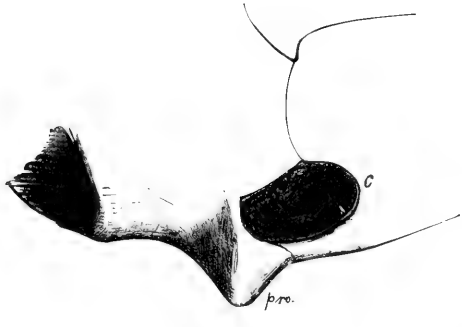

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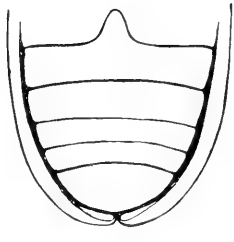

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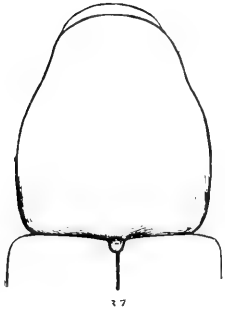

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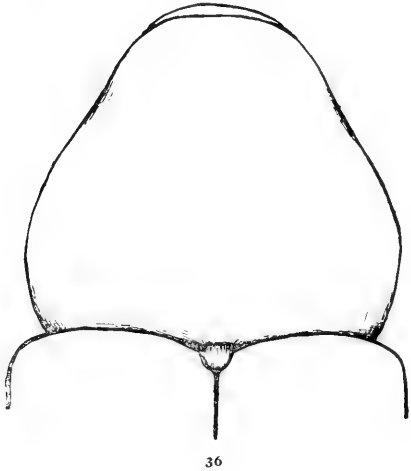


36

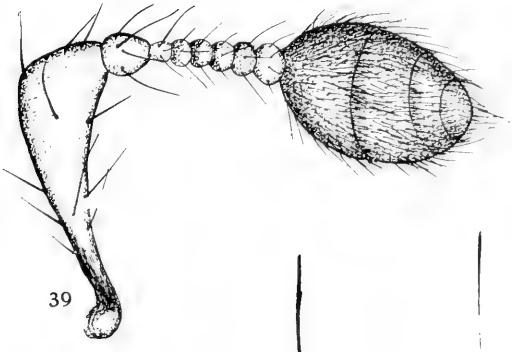
Scolytid structures

PLATE 12

183

38 Xylocleptes undes. sp, antenna. (Greatly enlarged)
39 Hylastinus obscurus Marsh, antenna. (Greatly enlarged)
40 Ips pini Say, declivity of elytra. (Enlarged)
41 Micracis opacicollis Lec., declivity of elytra. (Enlarged)

Plate 12



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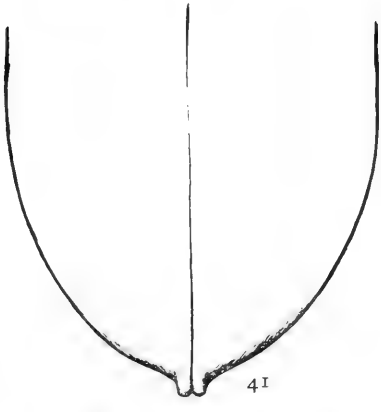

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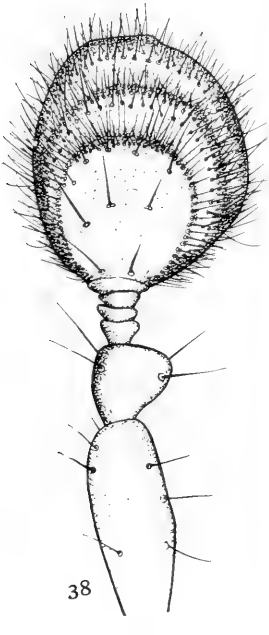

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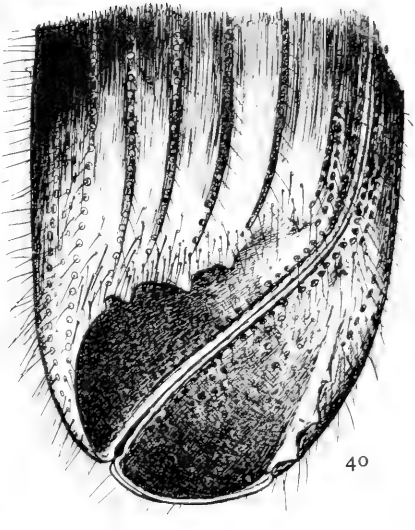


40

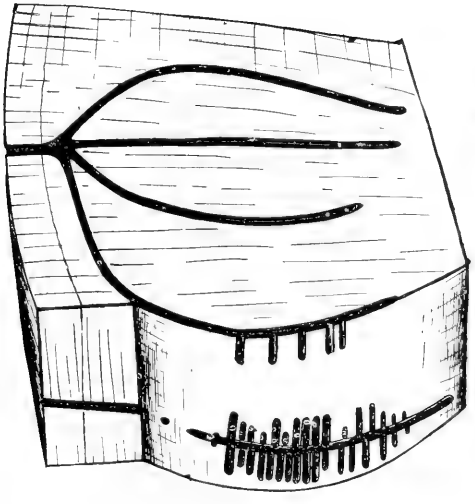
Scolytid structures

PLATE 13

185

42 Xyleborus undes. sp., *a,* antennal funicle and club. (Greatly enlarged)
43 Polygraphus rufipennis Kirby, left aspect of head showing divided eye. (Enlarged)
44 Xyleborus undes. sp., *a,* foretibia. (Greatly enlarged)
45 Pterocyclon mali Fitch, work in oak
46 Micracis opacicollis Lec., work in chestnut twig

Plate 13



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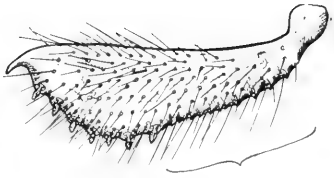

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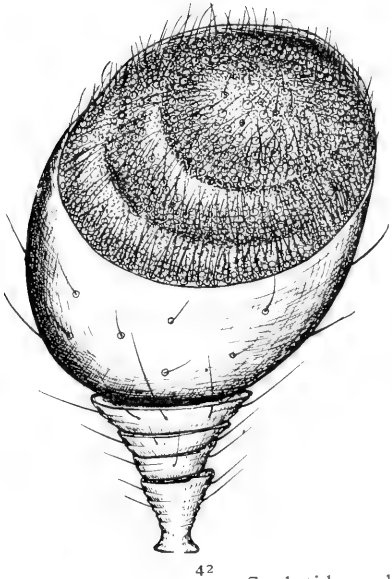

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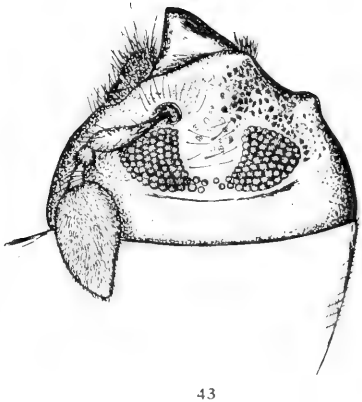


43

Scolytid work and structures

PLATE 14

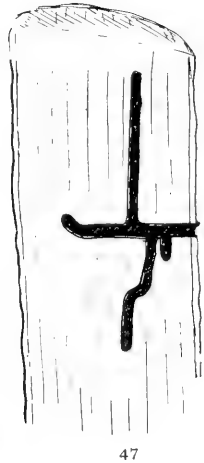
187

47, 48 Xyleborus undes. sp., *a*, work in maple branch
50 Pityogenes undes. sp., work in white pine

Plate 14

50

48



47

Scolytid work

PLATE 15

189

49 Pityophthorus minutissimus Zimm., work in oak

Plate 15

49

Pityophthorus work in oak

PLATE 16

191

51 Chramesus icoriae Lec., work in hickory

Plate 16

51

Chramesus work in hickory

PLATE 17

193

52 Hylesinus aculeatus Say, work in ash

Plate 17

52

Hylesinus work in ash

INDEX

ERRATA

Page 24, line 3 from bottom, for a m p e l o p h i a , read a m p e l o p h i l a .

New York State Education Department

New York State Museum

JOHN M. CLARKE, Director

PUBLICATIONS

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Museum annual reports 1847–date. *All in print to 1894, 50c a volume, 75c in cloth; 1894–date, sold in sets only; 75c each for octavo volumes; price of quarto volumes on application.*

These reports are made up of the reports of the Director, Geologist, Paleontologist, Botanist and Entomologist, and museum bulletins and memoirs, issued as advance sections of the reports.

Director's annual reports 1904–date.

1904. 138p. 20c.
1905. 102p. 23pl. 30c.
1906. 186p. 41pl. 35c.
1907. 212p. 63pl. 50c.
1908. 234p. 39pl. map. 40c.

These reports cover the reports of the State Geologist and of the State Paleontologist. Bound also with the museum reports of which they form a part.

Geologist's annual reports 1881–date. Rep'ts 1, 3–13, 17–date, O; 2, 14–16, Q.

In 1898 the paleontologic work of the State was made distinct from the geologic and was reported separately from 1899–1903. The two departments were reunited in 1904, and are now reported in the Director's report.

The annual reports of the original Natural History Survey, 1837–41, are out of print.

Reports 1–4, 1881–84, were published only in separate form. Of the 5th report 4 pages were reprinted in the 39th museum report, and a supplement to the 6th report was included in the 40th museum report. The 7th and subsequent reports are included in the 41st and following museum reports, except that certain lithographic plates in the 11th report (1891) and 13th (1893) are omitted from the 45th and 47th museum reports.

Separate volumes of the following only are available.

Report	*Price*	*Report*	*Price*	*Report*	*Price*
12 (1892)	$.50	17	$.75	21	$.40
14	.75	18	.75	22	.40
15, 2v.	2	19	.40	23	.45
16	1	20	.50	[*See* Director's annual reports]	

Paleontologist's annual reports 1899–date.

See first note under Geologist's annual reports.

Bound also with museum reports of which they form a part. Reports for 1899 and 1900 may be had for 20c each. Those for 1901–3 were issued as bulletins. In 1904 combined with the Director's report.

Entomologist's annual reports on the injurious and other insects of the State of New York 1882–date.

Reports 3–20 bound also with museum reports 40–46, 48–58 of which they form a part. Since 1898 these reports have been issued as bulletins. Reports 3–4, 17 are out of print, other reports with prices are:

Report	*Price*	*Report*	*Price*	*Report*	*Price*
1	$.50	10	$.35	18 (Bul. 64)	$.20
2	.30	11	.25	19 (" 76)	.15
5	.25	12	25	20 (" 97)	.40
6	.15	13	*Free*	21 (" 104)	.25
7	.20	14 (Bul. 23)	.20	22 (" 110)	.25
8	.25	15 (" 31)	.15	23 (" 124)	.75
9	.25	16 (" 36)	.25	24 (" 134)	

Reports 2, 8–12 may also be obtained bound in cloth at 25c each in addition to the price given above.

Botanist's annual reports 1867–date.

Bound also with museum reports 21–date of which they form a part; the first Botanist's report appeared in the 21st museum report and is numbered 21. Reports 21–24, 29, 31–41 were not published separately.

Separate reports for 1871–74, 1876, 1888–98 are out of print. Report for 1899 may be had for 20c; 1900 for 50c. Since 1901 these reports have been issued as bulletins.

Descriptions and illustrations of edible, poisonous and unwholesome fungi of New York have also been published in volumes 1 and 3 of the 48th (1894) museum report and in volume 1 of the 49th (1895), 51st (1897), 52d (1898), 54th (1900), 55th (1901), 56th (1902), 57th (1903), 58th (1904), 59th (1905) and 60th (1906) reports. The descriptions and illustrations of edible and unwholesome species contained in the 49th, 51st and 52d reports have been revised and rearranged, and, combined with others more recently prepared, constitute Museum memoir 4.

Museum bulletins 1887–date. O. *To advance subscribers, $2 a year or $1 a year for division (1) geology, economic geology, paleontology, mineralogy; 50c each for divisions (2) general zoology, archeology and miscellaneous, (3) botany, (4) entomology.*

Bulletins are grouped in the list on the following pages according to divisions.

The divisions to which bulletins belong are as follows:

1 Zoology
2 Botany
3 Economic Geology
4 Mineralogy
5 Entomology
6 "
7 Economic Geology
8 Botany
9 Zoology
10 Economic Geology
11 "
12 "
13 Entomology
14 Geology
15 Economic Geology
16 Archeology
17 Economic Geology
18 Archeology
19 Geology
20 Entomology
21 Geology
22 Archeology
23 Entomology
24 "
25 Botany
26 Entomology
27 "
28 Botany
29 Zoology
30 Economic Geology
31 Entomology
32 Archeology
33 Zoology
34 Paleontology
35 Economic Geology
36 Entomology
37 "
38 Zoology
39 Paleontology
40 Zoology
41 Archeology
42 Paleontology
43 Zoology
44 Economic Geology
45 Paleontology
46 Entomology
47 "
48 Geology
49 Paleontology
50 Archeology
51 Zoology
52 Paleontology
53 Entomology
54 Botany
55 Archeology
56 Geology
57 Entomology
58 Mineralogy
59 Entomology
60 Zoology
61 Economic Geology
62 Miscellaneous
63 Paleontology
64 Entomology
65 Paleontology
66 Miscellaneous
67 Botany
68 Entomology
69 Paleontology
70 Mineralogy
71 Zoology
72 Entomology
73 Archeology
74 Entomology
75 Botany
76 Entomology
77 Geology
78 Archeology
79 Entomology
80 Paleontology
81 "
82 "
83 Geology
84 "
85 Economic Geology
86 Entomology
87 Archeology
88 Zoology
89 Archeology
90 Paleontology
91 Zoology
92 Paleontology
93 Economic Geology
94 Botany
95 Geology
96 "
97 Entomology
98 Mineralogy
99 Paleontology
100 Economic Geology
101 Paleontology
102 Economic Geology
103 Entomology
104 "
105 Botany
106 Geology
107 "
108 Archeology
109 Entomology
110 "
111 Geology
112 Economic Geology
113 Archeology
114 Paleontology
115 Geology
116 Botany
117 Archeology
118 Paleontology
119 Economic Geology
120 "
121 Director's report for 1907
122 Botany
123 Economic Geology
124 Entomology
125 Archeology
126 Geology
127 "
128 Paleontology
129 Entomology
130 Zoology
131 Botany
132 Economic Geology
133 Director's report for 1908
134 Entomology

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Bulletin	*Report*	*Bulletin*	*Report*	*Bulletin*	*Report*	*Bulletin*	*Report*
12–15	48, v. 1	66, 67	56, v. 4	92	58, v. 3	117	60, v. 3
16, 17	50, v. 1	68	56, v. 3	93	58, v. 2	118	60, v. 1
18, 19	51, v. 1	69	56, v. 2	94	58, v. 4	119-21	61, v. 1
20–25	52, v. 1	70, 71	57, v. 1, pt 1	95, 96	58, v. 1	122	61, v. 2
26–31	53, v. 1	72	57, v. 1, pt 2	97	58, v. 5	123	61, v. 1
32–34	54, v. 1	73	57, v. 2	98, 99	59, v. 2	124	61, v. 2
35, 36	54, v. 2	74	57, v. 1, pt 2	100	59, v. 1		
37–44	54, v. 3	75	57, v. 2	101	59, v. 2		
45–48	54, v. 4	76	57, v. 1, pt 2	102	59, v. 1		
49–54	55, v. 1	77	57, v. 1, pt 1	103–5	59, v. 2		
55	56, v. 4	78	57, v. 2	106	59, v. 1	*Memoir*	
56	56, v. 1	79	57, v. 1, pt 2	107	60, v. 2	2	49, v. 3
57	56, v. 3	80	57, v. 1, pt 1	108	60, v. 3	3, 4	53, v. 2
58	56, v. 1	81, 82	58, v. 3	109, 110	60, v. 1	5, 6	57, v. 3
59, 60	56, v. 3	83, 84	58, v. 1	111	60, v. 2	7	57, v. 4
61	56, v. 1	85	58, v. 2	112	60, v. 1	8, pt 1	59, v. 3
62	56, v. 4	86	58, v. 5	113	60, v. 3	8, pt 2	59, v. 4
63	56, v. 2	87–89	58, v. 4	114	60, v. 1	9	60, v. 4
64	56, v. 3	90	58, v. 3	115	60, v. 2	10	60, v. 5
65	56, v. 2	91	58, v. 4	116	60, v. 1	11	61, v. 3

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Hudson, G. H. On Some Pelmatozoa from the Chazy Limestone of New York.
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