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RECENT WORK AMONG THE BORERS.

BY HENRY H. LYMAN, M. A., MONTREAL.

Since the publication in the September, 1905, number of this journal of my paper entitled "New Gortynas," a number of papers dealing with the same group of moths have appeared, which were naturally of great interest to me.

In the March, 1907, number of the Journ. N. Y. Ent. Soc. appeared a paper by Dr. H. G. Dyar, in which a new species was described under the name *Hydræcia stenocelis*, that author apparently using the names *Hydræcia*, *Papaipema* and *Gortyna* interchangeably.

The type of this species I saw during a recent visit to Washington, and it is certainly a very distinct species, which could not be confounded with any other form at present known.

But the papers of most interest to me were those which appeared in the August and September, 1907, numbers of this journal, from the pen of Mr. H. Bird. In these papers the author has described a number of very interesting species, and made a very considerable addition to our knowledge of this group, in which he has for years done so much good work.

Mr. Bird very truly says that the working out of life histories in this genus is a greater contribution to entomological knowledge than the mere description of new forms, and this, I take it, would equally apply in the case of most other genera. But Mr. Bird would not suggest that a species should not be described unless its life history had been previously unravelled, as he has himself described several species of which the early stages are unknown. Moreover, the conditions in this group are very different from those in most other genera, because these having boring larvæ, it is generally easier to find the larvæ than the moths, and in many cases the determination of the moths is difficult unless they have been bred.

In the September number Mr. Bird described the species boring in *Pteris aquilina* under the name *pterisii*. This species I have had represented in my collection by a single specimen taken by one of our

Montreal collectors in 1903, and I was convinced of its distinctness, but refrained from describing it from a single flown specimen, even though in good condition. In 1904 Mr. Winn bred a single perfect specimen from the Brake, which confirmed my belief in its distinctness, but Mr. Winn submitted his specimen to Mr. Bird, who pronounced it *purpurifascia*. It was also bred at Ottawa by some of the Ottawa entomologists, and on being submitted to Mr. Bird, he wrote that he knew the form "like a book," and that it was only a variety of *Harrisii*, and under that name it was listed in Dr. Fletcher's "Record." I tried to obtain the material to breed these three forms side by side, but before I succeeded Mr. Bird's description appeared.

It matters little who describes a species so long as it is well done, and I know of no one better qualified for the task than Mr. Bird, who has made himself so thoroughly master of this group. I cannot, however, congratulate him upon the name chosen. It was, perhaps, not unnaturally supposed that the name was intended in some way to indicate the food-plant, as in the case of *baptisia*, *thalictri* and *eupatorii*, but upon objection being made that the genitive of *pteris* should be *pteridis*, the author wrote that it was quite a mistake to suppose that the name was intended to indicate the food-plant, and that the species was dedicated to his pet cat which rejoices in the name Pterisius, and that those who spell *Harrisii* with a capital should do the same in the case of *Pterisii*. One may, perhaps, be pardoned for objecting, that, while this may satisfactorily account for the derivation of the name of the moth, the derivation of the name of the immortal cat remains obscure, but fancy bracketing Thaddeus William Harris with a cat! "That yellow, sickly brake" may or may not indicate the presence of this species, as I have examined more that had not been bored than that had. My experience with the larva has been limited to one season, but I have not found it especially parasitized, as out of five or six mature larvæ found, I obtained four moths.

Mr. Bird's statements in regard to my *Gortyna arata* appear to me a little misleading. It was not I who referred it as a synonym of *nelita*, Strecker, but Dr. J. B. Smith, on account of which I made a special pilgrimage to Reading to see the types of Dr. Strecker's species, and not being able to discover any apparent difference beyond what might be expected between flown and bred material, and not being one of those

who will never admit making a mistake, I reluctantly accepted Dr. Smith's reference, which, through the discovery by Mr. Bird of the true *nitela*, has been shown to have been erroneous.

Mr. Bird calls my statement that the usual longitudinal lines in the larva of *ærata* are all continuous "meagre," and suggests that as Burdock, from which I bred it, is very generally bored by *cataphracta*, the question may be open to possible error. Had I only found a larva which I supposed to be that of *ærata*, Mr. Bird's suggestion would be warranted, but seeing that I have bred the moth repeatedly from these larvæ, there is no peradventure in the matter. I have bred this form in four different years, and have secured thirteen moths, of which my six types and three other specimens are still in my collections, and the others have been presented by me to Mr. Bird, Dr. Fletcher, the British Museum and the National Museum at Washington, and I have an inflate of the larva kindly made for me by Mr. Gibson. My statement was merely made to show that it could be separated at a glance from the larva of *rutila* with which it was associated.

Mr. Bird refers to Burdock being frequently bored by *cataphracta*, and that is the case at Ottawa where *rutila* has not yet been found, but *cataphracta* has never been found boring in Burdock here, and was not known to occur here until I bred it from *Eupatorium purpureum*. When I found the larva in that plant, I thought I had discovered another new species, being misled by Mr. Bird's erroneous statement* that the larva is almost identical in markings with that of *nitela*, which he described as having the subdorsal lines absent from the first four abdominal segments, but on obtaining larvæ of *cataphracta* in Burdock from Ottawa from Mr. Gibson, I found that they were identical with mine from the *Eupatorium*.

Ærata I have only found in one limited locality in Westmount, a suburb of Montreal, and its existence there is threatened every year through the abominable practice of the municipal authorities of having the Burdocks along the edge of the street cut down, and its existence so far is probably due to its habit of boring in the lower part of the stalk, as I have sometimes found *rutila* boring in the upper part of the stalk and *ærata* in the lower part.

The following description of the larva of *ærata* was made on the 14th July, 1907, from a larva found boring in Burdock, near the root, on that date, the larva being apparently about half-grown.

*Can. Ent., XXX., 129.

Length at rest 13-16 inch, in motion 15-16 inch. Head yellow brown, with a purplish brown line running down each side, being apparently the prolongation of the band of same colour below the subdorsal whitish stripe, and on it are the ocelli, but in some individuals this line is obscure. Cervical shield large, practically covering the whole of the first thoracic segment, yellowish, lighter than the head, edged on each side with purplish brown, the continuation of that shade below the subdorsal whitish line.

Colours of body practically the same as in *rutila*, being purplish brown, with dorsal and subdorsal pale cream colour or whitish stripes, which are not broken in any part, but are continuous from head to tail. The purplish brown of the first four abdominal segments has the appearance of being deeper in colour than on the rear segments, but this is partly owing to the whitish stripes being narrower on these segments than on those behind them. Warts strongly marked, darker than the purplish-brown ground colour, IV on the seventh abdominal segment being slightly above the level of the spiracle, setæ simple. Anal shield large, yellowish like the cervical shield.

On receipt of the specimen of *ærata* which I sent to the British Museum, Sir George Hampson wrote me that he considered it an unmarked form of *limpida*, Gn., but it appears to me that this must be at least doubtful until more is known of *limpida*, the types of which came from Illinois, especially as that species is not known to have an unmarked form, and in view of the extreme closeness of some of the species, as shown by some of Mr. Bird's more recent discoveries.

Mr. Bird next dealt with the forms which I described as *thalictri* and var. *perobsoleta*, pronouncing the latter identical with *frigida*, Smith, on the ground that there was "nothing in the description and nothing in the types, except the usual difference between flown and bred material" to separate the forms. I may be permitted to point out that it was on precisely identical grounds that my *ærata* was pronounced a synonym of *nelita*, Strecker, as we now know, through Mr. Bird's discovery, erroneously. Mr. Bird points out that in Dr. Smith's plates representing genital armature* Fig. 25 was supposed to be that of *cerussata*, while Fig. 26 represented *frigida*, Sm., and says that afterwards No. 25 was found not

*Trans. Amer. Ent. Soc., XXVI., pl. I., II.

to agree with the structure of the true *cerussata*, but was later found to agree closely with that of my *thalictri*, which he considers a proof that *thalictri*, Lyman, and *frigida*, Smith, are identical. I may say that in examining Dr. Smith's specimens before publishing my description of *thalictri*, I recognized a specimen of that form standing among his specimens of *cerussata*, but I may be permitted to point out that while these two figures, 25 and 26, are similar, they are still distinctly different, and were regarded by Dr. Smith as representing distinct species.

In reference to the great similarity of *cerussata* and *thalictri* which deceived Dr. Smith, I may mention that perfect bred specimens of the latter, some of which were afterwards used by me as types, were submitted by me and other Canadian entomologists to Mr. Bird, and in every case were pronounced by him *cerussata* "without any doubt," and that this opinion was maintained by him till I proved their distinctness. In view of these facts, his statement that "their resemblance to *cerussata* is striking for a species whose larvæ differ so obviously, and it is likely that flown examples of the one could easily be mistaken for the other," is, to say the least, refreshing in midsummer weather.

Mr. Bird's contention that if var. *perobsoleta* and *frigida* are identical there is no need of the name *thalictri* for the white-marked form, I consider absurd. The cases he brings forward of the differences between specimens of *speciosissima*, *Harrisii*, *inquæsitâ* and *purpurifascia* are in no sense parallel, as those differences are so slight as not to deceive anyone, and intergrades also exist, while no one who did not know that *thalictri* and *perobsoleta* belonged to the same species would have had any hesitation in describing them as distinct, and as far as known no intergrades exist, the case being exactly parallel to that of *nitela* and *nebris*, as Mr. Bird has admitted in correspondence. As long, therefore, as the names *nitela* and *nebris* both stand, so long will *thalictri* stand for the form to which I applied it. Dr. Fletcher having submitted to Sir George Hampson two specimens from Manitoba which he thought might be the true *frigida*, Sir George, on comparing them with a coloured drawing of the type of *frigida*, pronounced them the same, and quite distinct from *thalictri*. Being extremely interested in the matter, I made a trip to Washington, primarily to settle this question, taking with me types of *thalictri* and var. *perobsoleta* and the best one of Dr. Fletcher's specimens. On the first glance I thought Sir George's determination

correct, as in colour and general appearance they agreed, but on a close study I was forced to agree with Dr. Dyar that they were distinct, as the course of the t. p. line in Dr. Fletcher's specimen was different.

As to the type of *frigida*, I could not say that it was identical with my *perobsoleta* on account of its very poor and worn condition, nor, from the same cause, could I pronounce it distinct. The course of the t. p. line seems identical, and I admit that they may probably be the same, but at the same time Mr. Bird has demonstrated that there are a number of cases in this group where distinct species could not be separated if in as poor condition as is the type of *frigida*, and I think it a pity that a species should be founded on a single specimen in such poor condition.

On my return home I reported the results of my examination to Dr. Fletcher, and suggested his describing his specimen as a new species, but he declined to do so, but added that I was welcome to do it, and to keep the type, and I, therefore, describe it as follows :

Gortyna Aweme, n. sp.

Alar expanse, 33 mm. Primaries, what Guenée called "gris-incarnat" (grayish flesh-colour), very similar in tone to those of *immanis*. Base of wing light brown, beyond which between the basal and t. a. lines there is a darker transverse shade, most distinct on the costa, and not reaching the inner margin. The t. a. line runs first almost at right angles to the costa, then curves inward and then outward, not quite reaching the inner margin. The t. p. line is strongly curved outwardly around the reniform, and then sweeps down to the inner margin, meeting it about at right angles. The orbicular is very small, even minute, and consists of a dark brown ring with light centre, the claviform is obsolete, the reniform is shaped like the figure 8, but is solid dark brown.

The median shade is bent almost at a right angle, the apex of the angle touching the lower lobe of the reniform, whence a dark shade strikes inwardly almost to the orbicular and a little below it. The dark colour of the t. p. line runs out a little on the nervures, and the space between the t. p. and s. t. lines has a slight tinge of mauve, which runs up to the apex. The s. t. line is not very distinct, and the space beyond it and below the apex is dark brown, which shade fades out towards the hind angle. Secondaries decidedly lighter than in *immanis*, so that there is more contrast with the primaries than in that species, and there is a faint and incomplete waved line partially crossing the centre of the wing.

Below, the wings are light in colour, slightly darker on the costa of both primaries and secondaries, and the former have a dark shade on outer margin and an indistinct transverse bar representing the reniform above. Secondaries without any markings. Type, 1 ♀ taken by Mr. Norman Criddle at Aweme, Man., in my collection.

At Washington I also made the following notes on the types of species recently described by Dr. Dyar :

Gortyna nepheloptena agrees with a form taken at Ottawa by Dr. Fletcher and pronounced *marginidens* by Sir George Hampson, and "near" that species by Dr. J. B. Smith.

Gortyna nephasynteta appeared to me to be probably a worn *marginidens*, with reniform a trifle more solidly white than usual.

Gortyna anargyrea comes very near to *pterisii*, but the stigmata are yellow-brown instead of white.

Gortyna triorthia is *pterisii*, Bird, as admitted by Dr. Dyar.

Gortyna ochropiena is much like a washed-out *serrata*, but the white markings are smaller.

I also saw a co-type of *duplicatus*, Bird, described in the last January number of this journal, but the author cannot be congratulated on this name, as the feminine form *duplicata* would have been more appropriate.

CORRECTION.—If allowable, I should like to make the following correction in my paper on "New Histories and species in *Papaipema* (*Hydræcia*)" in the January number: page 25, line 27 and page 28 line 35, for *duplicatus* read *duplicata*.—HENRY BIRD, Rye, N. Y.

IGNOTUS ÆNIGMATICUS.

CORRECTION.—By some oversight, the name of MR. FREDERICK BLANCHARD was omitted on page 214 (July number). It should have been inserted after the title "The Characters of *Ignotus*," as this portion of the paper, as far as the middle of page 219, was contributed by him, at the request of Mrs. Slosson; the writer of the article, "A Bit of Contemporary History," and of the description of the species *ænigmaticus*. Mrs. Slosson has written to the Editor, expressing her great regret that she did not observe this omission when reading the proof of the article. She is anxious that the fullest credit should be given to Mr. Blanchard, who so kindly prepared the careful diagnosis of the characters of this remarkable insect.

THE QUEBEC SOCIETY FOR THE PROTECTION OF
PLANTS.

At a meeting held at Macdonald College on June 24th, a new Society called the Quebec Society for the Protection of Plants from Insects and Fungous Pests, was organized. The following officers were elected :

President—Prof. W. Lochhead, Macdonald College.

Vice-President—Frere Liguori, La Trappe, Oka.

Sec. Treas.—Douglas Weir, Macdonald College.

Directors—Rev. Dr. Fyles, Levis, P. Q.; Rev. G. Ducharme, Rigaud, P. Q.; Auguste Dupuis, Village des Aulnaies; A. F. Winn, Montreal; Dr. W. Grignon, Ste. Adele.

Curator-Librarian—J. M. Swaine, Macdonald College.

A substantial grant has been given the Society by the Department of Agriculture of Quebec.

Among those present at the meeting were: Rev. Dr. Campbell, Montreal; Rev. Dr. Fyles, Levis; Rev. G. Ducharme, Rigaud; Dr. J. W. Robertson, Ste. Anne de Bellevue; Frere Liguori, La Trappe, Oka; Norman Jack, Chateauguay Basin; Peter Reid, Chateauguay Basin; Dr. W. Grignon, Ste. Adele; Prof. W. Lochhead, Macdonald College; J. M. Swaine, Macdonald College; Prof. F. C. Harrison, Macdonald College; Dr. J. L. Todd, Macdonald College; Douglas Weir, Macdonald College; Prof. S. Blair, Macdonald College.

Letters were received from Abbe Huard, Quebec; Dr. Fletcher, Ottawa; H. H. Lyman, Montreal; Mr. Chagnon, Montreal; Auguste Dupuis, Village des Aulnaies; Mr. Delaire, St. Hyacinthe; A. L. Tourchot, St. Hyacinthe, expressing their approval of the formation of the Society, and their regrets that they could not attend, through pressure of other duties.

The success of the new Society is practically assured on account of the interest manifested by both French and English workers. It is truly provincial in its aims, work and membership. There will be two meetings each year, a general winter meeting at Macdonald College for the transaction of necessary business, the reading of reports and papers, and a general review of the year's work; and a summer field meeting at some outside point in the Province of Quebec. As the Society exists for the benefit of the Province, it is urged that all outbreaks of insect and fungus pests be reported to the Secretary of the Society, Macdonald College, so that possible help may be given promptly.

REMARKS ON SOME NEW PSELAPHIDÆ.

BY THOS. L. CASEY, WASHINGTON, D. C.

The systematic descriptive compilation of all the known genera of Pselaphidæ, with catalogue of species, by Mr. Achille Raffray, recently published as one of the series of the "Genera Insectorum," by Wytzman, is an epoch-making work, and one that should be very highly valued. The same exquisite drawings of these marvellous little animals that we have become accustomed to associate with the various papers of the author, and which could only emanate from an unusually skillful artist thoroughly in love with his subject, are even more numerous and more carefully elaborated than in any other of his publications. The many figures representing anatomical details must have cost the author much time and patience, and of them no element of praise, from any point of view, could be superfluous. It is only to be regretted that the proof-reading of the publishers is not all that could be desired, and the text therefore bristles with typographical errors and inconsistencies which must surely try the good temper of the author, who informs me inferentially that this will be the concluding monument to his memory; but that he may be mistaken in this, and that he may live to give us many more important papers, is the earnest wish of his numerous friends.

Of the 31 Pselaphid genera proposed by the present writer, 21 are adopted and 10 rejected; one of these rejected genera is, however, admitted to be valid, though under another name. I am sure that my long-time friend, David Sharp, would be one of the first to repudiate the inadvertent violation of the laws of priority on page 53, where *Thesium*, Csy., is made a synonym of *Apothinus*, Sharp, although the former was published in 1884, and the latter did not see the light until 1887. There are therefore 22 genera considered valid to 9 held to be synonyms. Of these nine rejectamenta three, *i. e.*, *Rafonus*, *Pycnoplectus* and *Zolium*, are plainly distinct genera, as may be realized very readily in the case of *Rafonus* by comparing the figure of a typical species of *Sonoma*, published in Bull. Cal. Acad., 1887, and that given for the type of *Rafonus* (*Faronus tolula*, Lec.), on plate I of Mr. Raffray's work. In *Pycnoplectus* the head is wholly different from that of *Euplectus*, where there are two approximate foveæ continued longitudinally forward in feeble grooves, which sometimes unite with a conspicuous transverse rectilinear impression behind the frontal margin, and between the supra-antennal foveæ marking

the extreme sides of the front ; in *Pycnoplectus* there are two much larger, widely-separated foveæ, connected by a large and deep narrowly-parabolic sulcus, giving a habitus not remotely resembling that of *Euplectus*. *Zolium* has a deep sulcus on the flanks of the elytra, proceeding from a subhumeral pit not even suggested in *Melba*, and the modifications of the head are also different. I have no doubt at all that these three genera are valid, thus leaving six genera which alone are probably synonyms or subgenera; these are : *Faliscus*, *Nicotheus* (not *Nicothæus* as printed in the work under discussion), *Nisa*, *Pytna*, *Actiastes* and *Dalmosella*, although each of the last four refers to a specially-modified group, *Nisa* being peculiar in the terminal joints of the male antennæ, *Pytna* in having carinæ on the under surface of the femora instead of the spines of typical *Tyrus*, *Dalmosella* in its very much more slender and parallel form than in any of the species of *Melba*, where the hind body is constantly inflated, and *Actiastes*, differing from *Actium* in the markedly different position of the cephalic foveæ. These four probably represent subgenera therefore.

Ogmocerus, Raffr.

This genus includes some of the largest known Pselaphids and is confined to the continent of Africa, where individuals of all the four or five species hitherto described are exceedingly rare, being represented by uniques at present.

Ogmocerus Raffrayi, n. sp.—Form stout, moderately convex, piceous-black, subopaque, the elytra and abdomen feebly shining and very finely, rather closely punctulate ; head and prothorax coarsely, very densely, punctato-scabrous, the former longer than wide, oval, moderately narrowed to the broad neck, where there is a tuft of dense setæ at each side ; foveæ large but obscure ; eyes small, before the middle ; front narrowed, parallel, flat, inclined upward, the median depression at apex moderate ; antennæ nearly as long as the entire body, the cylindrical basal joint feebly sigmoid, as long as the head and prothorax combined, two to eleven together gradually and moderately enlarged, with straight sides, becoming decidedly stout at the antennal apex, second joint as long as wide, third shorter than wide, fourth a third, fifth and sixth one-half, longer than wide, seventh a little less, eighth about as long as wide, its apex angulate, ninth and tenth a third wider than long, the eleventh oval and as long as the two preceding, all the joints herissate with moderate setæ ; prothorax wider

than the head, a fifth wider than long, obtrapezoidal, with a deep impression at each side behind the middle; elytra much wider, slightly transverse, with humeri longitudinally tumid dorsally, the fine discal stria extending to apical sixth; abdomen as wide as the elytra and distinctly longer, rather strongly convex toward the median line, broadly margined; legs long and thick, especially the femora. Length, 3.75 mm.; width, 1.3 mm. Liberia (Mt. Coffee).

A description of this species was sent to Mr. Raffray more than a year ago, and in reply I was informed that it pertained to a species different from any yet described; so it gives me pleasure to dedicate it to that accomplished specialist.

Brachygluta, Thoms.

The following species belongs to the group containing *arizona*, *texana* and *loripes*, distinguished by the greatly-developed basal tergite of the males, this being the only segment visible from a dorsal viewpoint.

Brachygluta jacobina, n. sp.—Convex, the hind body much inflated, the anterior parts relatively slender, convex, bright testaceous, shining, having distinct subdecumbent yellowish pubescence; head a little wider than long, the three pubescent foveæ distinct, the eyes large, convex and subbasal; antennæ half as long as the body, rather slender, the club gradually enlarged, the last joint as long as the preceding three, oval; prothorax slightly transverse, equal in width to the head, strongly constricted behind the middle, the three pubescent foveæ strong and normal; elytra distinctly shorter than wide, still more transverse in the female, expanded posteriorly, the humeri rounded, the fine discal stria extending toward tip; abdomen of the male with the first dorsal transverse, much shorter than the elytra, with its apex broadly sinuate and deflexed, the median part of the apex thinner and punctureless, the second dorsal short, obliquely bi-impressed at the middle, its apex also very broadly but extremely feebly sinuate, with the edge thinned; hind tibiæ feebly bent distally. Length, 1.35 mm.; width, 0.65–0.7 mm. California (San Diego).

The female is a little smaller, notably more slender and with more abbreviated elytra than the male, having the abdominal segments normal, several behind the first being visible from above. This species differs from *loripes* in its less obese form and shorter first tergite, with less prominent and more broadly sinuate apex in the male.

Batrisodes, Reitt.

A very large genus possessing two types in America, one with the head and antennæ of the males curiously modified and in very diversified manner, this type occurring in the Atlantic regions, and the other having little or no sexual modification of the head and antennæ, but with a very large cavity near the apex of the male abdomen, this occurring only in the true Pacific coast fauna. The polarity theory of sexual characters, enunciated, I believe, by LeConte, is well illustrated by these two classes of males. The following species deserve notice at the present time :

Species of the Pacific regions.

Apart from *monticola*, distinguished by its deep black colour, *occiduus*, distinct in its short and rapidly-widening elytra, and *cicatricosus*, *denticauda* and *pygidialis*, characterized by peculiarities of sculpture and by the structure of the pygidium, there are at hand six closely-allied smooth polished species, which may be distinguished among themselves as follows :

- First dorsal segment with the two median basal elevations prolonged for some distance posteriorly in slender carinæ. Species of the interior and more elevated regions 2
- First dorsal with the two basal elevations not or scarcely at all prolonged posteriorly. Species of the coast regions 4
2. Abdominal carinæ separated by a distance which is distinctly less than that separating either from the inner line of the lateral margin. Nevada (Reno) *zephyrinus*, Csy.
- Abdominal carinæ more widely separated, the distance between them about equal to that separating either from the inner line of the lateral margin ; body a little stouter, the antennæ rather more slender . . . 3
3. Anterior transverse margin of the abdominal excavation of the male feebly and narrowly arcuate and produced at the middle. Shining, subimpunctate, sparsely but rather coarsely pubescent, testaceous, though much darker than *zephyrinus*, the head and antennæ nearly similar and of the usual type in this group ; prothorax somewhat longer than wide and a little narrower than the head, the median sulcus distinct to anterior two-fifths ; elytra nearly as long as wide, broadly arcuate laterally, arcuately converging at the sides basally, the humeri moderately tumid longitudinally ; three basal foveæ on each distinct, equal and perforate, the two inner very approximate, a

few rather coarse but feeble punctures basally; abdomen as wide as the elytra, but not quite so long, slightly narrowed basally to the elytral apex. Length, 2.25 mm.; width, 0.8 mm. California (Lake Tahoe), also northward to Washington State. *lustrans*, n. sp.

Anterior transverse margin almost straight, the excavation slightly larger than in *lustrans* and more transverse. Body throughout nearly similar, except that there is no evident median pronotal sulcus before the fovea, the elytra not so inflated, and with less arcuate sides, the sides evenly converging to the base, without trace of humeri from a vertical viewpoint, the surface very minutely, sparsely punctulate throughout, the two inner of the basal foveæ separated by their own diameter; abdomen similar in form, as long and wide as the elytra; colour very dark testaceous, the surface highly polished throughout. Length, 2.1 mm.; width, 0.76 mm. California (Tulare Co.) *Tulareanus*, n. sp.

4. Abdominal excavation of the male somewhat oval, about as wide as long, its anterior transverse margin straight; body larger and stouter; ninth antennal joint about as long as wide. British Columbia (Vancouver to Metlakatla) *Albionicus*, Aubé

Abdominal excavation rounded, its anterior margin slightly arcuate medially but scarcely observably so; body much smaller and more slender, the ninth antennal joint evidently transverse. California (San Francisco to Sta. Cruz) *speculum*, Csy.

Abdominal excavation much larger, decidedly transverse, its anterior margin conspicuously arcuate and broadly projecting; body otherwise nearly as in *speculum*, except that it is not quite so slender, and rather more coarsely pubescent. California (Soda Springs, Anderson Valley, Mendocino Co.) *Mendocino*, Csy.

Occidus, Csy., belongs very near *speculum* and *Mendocino*, but is readily distinguishable by its shorter and more rapidly expanded elytra, much longer abdomen and shallower abdominal excavation of the male than in any of the above species; it occurs in Humboldt Co., California. *Pygidialis*, Csy., and *cicatricosus*, Bndl., are evidently very closely allied, having the same very coarse scar-like elytral punctures and denticulate humeri; actual comparison of the types will be necessary to decide this perhaps, if the language of the description of the latter should prove to be misleading.

Species of the Atlantic regions.

The following species are described in every instance from the male alone :

Batrissodes declivis, n. sp.—Form, coloration and sculpture nearly as in *fossicauda*, the abdomen having the same gradually pointed form; head similarly gradually and evenly declivous from the interfoveal convexity to the clypeal apex, without break in continuity, and coarsely, densely punctato-scabrous, the small and fine ambient sulcus similarly feebly indicated, the antennal prominences feeble; clypeal margin evenly and broadly arcuato-truncate throughout the width; antennæ similar, except that the penultimate joint is subglobular and less transverse, and having on its under surface a large deep circular pit in basal two-thirds, the eleventh joint slightly narrower than the tenth, elongate, gradually pointed; prothorax obtrapezoidal, slightly elongate, decidedly narrower than the head; elytra similar, having finely denticulate humeri; abdomen distinctly narrower than the elytra but equally long; pygidium similarly excavated across its lower portion but more obtuse from a dorsal viewpoint; abdomen with a small and feeble apical indentation, which is shallower posteriorly. Length, 2.1 mm.; width, 0.78 mm. Iowa (Iowa City), H. F. Wickham.

Resembles *fossicauda*, Csy., but differs in antennal structure and in its much wider head, with larger and more prominent eyes; the head in *fossicauda* is not wider than the prothorax.

Mr. Raffray places *fossicauda*, on page 159, as a doubtful synonym of *bistriatus*, Lec. It is rather difficult to understand the necessity for this surmise, in the absence of accurate data, but to set the matter right, I may say that there are numerous important points of difference between these two species; the front, for example, is more declivous anteriorly than superiorly, and not evenly declivous from the occiput to the clypeal margin, as it is in *fossicauda* and *declivis*, and the peculiar transverse pygidial excavation of those two species does not exist.

Batrissodes appalachianus, n. sp.—Form as in *punctifrons*, darker in colour, nearly black, the prothorax rather more inflated at the sides and fully as wide as the head, if not somewhat wider, the latter similar except that the flat declivous front is less uniformly punctate, more sparsely so medially than laterally, and bearing, not short and very coarse bristles as in *punctifrons*, but fine, short and inconspicuous hairs, the apex narrower

and rectilinearly truncate, not broadly arcuato-truncate as in that species, the clypeus with its pubescent median tubercle and the antennæ nearly similar, the latter still more elongate, with the large terminal conoidal joint similarly simple and not excavated beneath; elytra a little more elongate, as long as the abdomen, the humeral elevation not denticulate; pygidium and abdomen similar. Length, 1.95 mm.; width, 0.7 mm. Pennsylvania (Westmoreland Co.).

Very close to *punctifrons*, but the character of the frontal sculpture, and particularly the pubescence of the frontal slope, is markedly different. Another species of this group is represented in my collection by a single female taken at Cincinnati by Mr. Dury.

Batrisodes tridens, n. sp.—Dark castaneous, the elytra brighter testaceous, subimpunctate, the pubescence long, coarse and distinct; head large, subquadrate, wider than long, carinate at each side above, the eyes rather small, not very prominent, the large nude foveæ and ambient sulcus as usual; frontal margin transversely bilobed, the intermediate broad sinus having, at the lower margin of the sinuosity, a short lamina as in *striatus*, except that here it is tridentate, the clypeus separated from the upper front by the same transverse excavation, and having at each side a large and sharply-angulate wing, the lower conical part of the clypeus rounded at apex, having on its upper part between the alæ a tubercle which is biserially setulose, and, in addition, with a very large porrect and transversely projecting yellow seta at each side; antennæ moderate, the basal joint large, strongly rounded beneath, compressed and bearing on its anterior face a large oval concavity, which is minutely granulato-punctate, second to eighth cylindrical, second longer than wide, intermediate joints as long as wide, ninth larger, transverse, tenth large, subglobose, wider than long, scarcely modified on its under surface, though apparently with a small rounded subbasal areola, eleventh conoidal, not quite as wide as the tenth, acutely pointed, unmodified; prothorax of the usual form, not quite as wide as the head, tristriate and with two short discal carinæ; elytra with oblique and prominent denticulate humeri; abdomen unmodified at apex. Length, 2.1 mm.; width, 0.78 mm. Missouri (St. Louis).

This fine species evidently belongs in the vicinity of *striatus*, Lec., but differs in its paler coloration, tridentate median frontal lamina and concave basal joint of the antennæ among other characters.

Cavicornis is taken in some abundance by Mr. Dury near Cincinnati, and *globosus* is also common there; the latter is apparently the most abundant and one of the most widely-diffused species of the genus. *Frontalis*, Lec., is the largest and finest species known to me, and is also widely diffused, though less common; all my examples are males, and were taken in Pennsylvania, Missouri and Wisconsin.

Pycnoptectus, Csy.

The species of *Euplectus*, as regarded by Raffray, were divided by the writer (Ann. N. Y. Acad., 1893, p. 454) into three groups, then held to be subgeneric. Subsequently (l. c., 1897, p. 552) cogent reasons were given for regarding the first of these groups as of full generic value, and I am even more convinced of the correctness of this course now than then. It may be added that the third group, there composed of *pertenuis* alone, is also a distinct genus to be described subsequently.

Pycnoptectus Floridae, n. sp.—Moderately stout, bright testaceous throughout, polished, impunctate, moderately and somewhat sparsely pubescent; head wider than long, the eyes well developed, convex, at rather less than their own length from the base, the tempora moderately converging and rounded; two pubescent foveæ separated by fully half the total width, the ambient sulcus very coarse and deep, triangular in course, with the apex narrowly truncate behind the thick and medially depressed frontal margin; antennæ a little longer than the head and prothorax, the last three joints very gradually wider; occiput feebly and narrowly impressed at the middle; prothorax wider than long, as wide as the head, the three subbasal and single discal foveæ well developed; elytra about as long as the head and prothorax and much wider, rather longer than wide, the basal impression obsolete at basal fourth, the intermediate basal fovea small but distinct; abdomen not quite as wide as the elytra, and evidently longer, the first two dorsals impressed and bicarinate medially at base. Length, 1.3 mm.; width, 0.3 mm. Florida.

Resembles *Hudsonicus* somewhat, but much more completely impunctate, and having more elongate antennæ and relatively longer elytra.

Pycnoptectus longipennis, n. sp.—Form somewhat as in *Floridae*, slender, similarly impunctate, polished and moderately convex, dark testaceous, finely, not conspicuously pubescent, the hairs decumbent; head but little wider than long, nearly as in *Floridae*; prothorax much less transverse and decidedly narrower than the head, but little wider than

long, the subbasal foveæ distinct, the discal moderate and slightly elongate; elytra a little longer than the head and prothorax and very much wider, somewhat longer than wide, perceptibly wider at apex than at base, the basal impression broad, becoming obsolete a little beyond basal third; abdomen as in *Floridæ*. Length, 1.3 mm.; width, 0.35 mm. Pennsylvania (Westmoreland Co.), P. Jerome Schmitt.

The male has the fourth ventral—not the fifth of Raffray—simple, the fifth with a posteriorly arcuate flat elevation in basal half and median seventh, the sixth broadly, feebly and simply impressed, and the seventh, or rhomboidal ventral pygidium, large, convex and medially carinulate.

Pycnoptectus impressiceps, n. sp.—Body more linear and much stouter, rather convex, the hind body less decidedly wider than the anterior parts, the pubescence moderately long and conspicuous, similarly dark testaceous, shining and subimpunctate; head nearly similar, the eyes a little larger, the ambient sulcus deeply impressed, especially anteriorly, the sides of the upper surface feebly and coarsely undulato-rugose but not punctate; prothorax much wider than long and fully as wide as the head, the discal fovea very deep, somewhat oval; elytra somewhat shorter than the head and prothorax, and a little shorter than wide, convex, the discal basal impression obsolete at about the middle of the length; abdomen much narrower than the elytra and equally long, the carinæ of the two basal tergites distinct. Length, 1.38 mm.; width, 0.45 mm. Pennsylvania (Westmoreland Co.), P. Jerome Schmitt.

The male in this unusually short, stout and convex species has two transverse carinæ on the median transverse line near the middle of the fourth ventral, the fifth with a median pyramidal tumor, the sixth broadly impressed medially, with two smaller rounded tubercles separated by about a fifth of the width of the segment, the large convex carinulate ventral pygidium as usual.

Euplectus, Leach.

The species of this genus are very distinct from the preceding in their flattened form and smaller approximate cephalic foveæ among other characters.

Euplectus Acomanus, n. sp.—Linear, depressed, dark blackish-piceous, the elytra more rufous; pubescence very short, not conspicuous though distinct, subdecumbent, the hairs directed obliquely inward posteriorly on the elytra; head large, transverse, basally truncate, the sides parallel, the

eyes moderately small, but slightly prominent; foveæ separated by less than the distance of either from the eye; surface coarsely, densely punctate everywhere except in the moderate frontal depression, bounded by the short parallel sulci; antennæ one-half longer than the head; prothorax much narrower than the head, slightly wider than long, shining, minutely, sparsely punctate, the discal fovea large and elongate; elytra parallel, as long as the head and prothorax, and slightly wider than the former, decidedly longer than wide, the discal stria evident, extending slightly behind the middle; abdominal segments equal, not quite as wide as the elytra, the basal medial impressions subobsolete. Length, 1.3-1.4 mm.; width, 0.35 mm. New Mexico (Cloudcroft), Warren Knaus.

The male has a large, deep, rounded impression involving the median part of the sixth and anterior part of the seventh or large convex ventral pygidium, the latter with a double impressed longitudinal line.

Euplectus Duryi, n. sp.—Slender, less linear and depressed, shining, subimpunctate, piceo-testaceous, the pubescence moderate; head wider than long, moderately large, the eyes small, the tempora converging slightly to the truncate base; foveæ small, separated equally from each other and either eye; surface wholly impunctate along the middle from base to apex, the lateral parts coarsely but not very closely punctate; antennæ rather short; prothorax wider than long, evidently narrower than the head, prominently rounded laterally near the apex, the sides strongly converging and nearly straight thence to the base, the discal fovea rather small, only moderately elongate; elytra somewhat shorter than the head and prothorax, evidently though not greatly wider than the former, slightly elongate, the discal stria evanescent slightly before the middle; abdomen as long as the elytra and very nearly as wide, the two basal segments each with two rather long diverging basal carinæ medially. Length, 1.3 mm.; width, 0.28 mm. Ohio (Cincinnati), Charles Dury.

The male has a small median fovea at the apex of the sixth ventral, the large convex ventral pygidium eccentrically divided by a fine longitudinal carinule.

Leptoplectus, n. gen.

The minute and extremely slender linear species of this genus have the head large and well developed, with two rather approximate foveæ, more anterior in position than the large pubescent and very widely

separated foveæ of *Pycnoplectus*, and resembling *Euplectus* in this feature as well as in the linear subdepressed form and general facies, but the eyes are far down on the sides of the head and the antennæ much more like those of *Trimium*, having the last joint relatively large, as in *Actium*, the ninth and tenth short, though not shorter than the preceding joints, and less transverse and lenticular than in the *Trimium* series. The four species in my cabinet are assignable to two groups, as follows :

- Cephalic foveæ united by a broad, deep and continuous ambient sulcus, the frontal margin thick and convex 2
- Cephalic foveæ large, though in the same position, elongate-oval, disconnected from the transverse frontal sulcus, the frontal margin acute and laminate 3
2. Body extremely slender, filiform, pale flavo-testaceous in colour, somewhat shining, the pubescence rather abundant and distinct but decumbent; head subparallel, but little wider than long, punctured laterally; prothorax as long as wide, narrower than the head, of the usual form in *Euplectus*, the surface finely, loosely punctate, more strongly basally; transverse sulcus subobsolete; elytra parallel, but little wider than the head, much longer than wide, the juxta-humeral impression obsolete at basal fourth; abdomen parallel, almost as wide and fully as long as the elytra. Length, 0.85 mm.; width, 0.2 mm. (♀). District of Columbia and Pennsylvania (Westmoreland Co.)..... *pertenuis*, Csy.
- Body slender, linear and subdepressed but broader and perceptibly larger than in *pertenuis*, pale testaceous, rather inconspicuously pubescent; head but slightly wider than long, parallel and straight at the sides, broadly sinuate at base, the eyes at more than their own length from the rounded basal angles; surface moderately convex, polished, the two small deep perforate and nude foveæ mutually separated by a little less than either from the eye, the ambient sulcus shallower than in *pertenuis*; surface sparsely but coarsely, not very deeply punctate laterally; tenth antennal joint fully three times as wide as long, the eleventh rather longer than the four preceding combined; prothorax about as long as wide, narrower than the head, more broadly rounded at the sides anteriorly than in *pertenuis*, polished, sparsely, subasperately punctate, the foveæ large as usual, the transverse sulcus barely traceable; elytra slightly shorter than the head and prothorax, but little wider than the former, slightly though

very obviously longer than wide, parallel, the impression extending through basal third; abdomen as in *pertenuis*. *Male* with two small rounded and projecting median lobes and three sinuses at the apex of the fourth ventral, the fifth with a small tubercle opposite each of the lateral sinuses, and a small setigerous tubercle opposite the median and rather deepest sinus; sixth segment broadly and strongly concave almost throughout its width, the seventh convex and longitudinally carinulate; median trochanters with a small posterior tooth. Length, 1.0 mm.; width, 0.25 mm. (♂, ♀). Pennsylvania (Westmoreland Co.), Schmitt, and Ohio (Cincinnati), Dury. . . *filiformis*, n. sp.

3. Form rather stouter and less parallel than in the preceding species, shining, dark testaceous, the elytra infuscate; pubescence rather inconspicuous; head but little wider than long, the sides feebly converging basally, the eyes at much more than their own length from the base, the latter broadly sinuate; occiput with a fine axial impression as usual; surface finely, sparsely and equally punctate throughout; foveæ large, elongate, deep, mutually separated rather more than either from the eye, their posterior part pubescent; transverse frontal pit deep, polished and impunctate; antennæ as in *filiformis*; prothorax as long as wide, narrower than the head, minutely, equally punctate like the latter, the foveæ nearly similar; transverse sulcus similarly obsolete; converging sides each with a very small tooth at the fovea, not distinctly observable in *filiformis*, though slightly evident in *pertenuis*; elytra obviously shorter than the head and prothorax, distinctly wider than the former, parallel, with feebly arcuate sides, evidently longer than wide, the deep impression obsolete at basal third; abdomen parallel, much narrower than the elytra and not quite so long, the segments equal as usual, the two basal feebly impressed medially at base. *Male* with much feebler sexual characters, the fourth ventral unmodified, the fifth very short medially and scarcely half as long as the fourth, not modified except perhaps a very small feeble median tubercle; sixth as long as the fourth, broadly, subangularly emarginate throughout the width, its surface flattened medially; seventh not convex, but flat or feebly, unevenly impressed transversely, longitudinally carinulate, broadly angular anteriorly, broadly rounded throughout the width at apex. Length, 0.9 mm.; width, 0.25 mm. (♂). Pennsylvania (Westmoreland Co.), Schmitt. *insolens*, n. sp.

Form more slender, very much smaller in size, linear, testaceous throughout; head scarcely wider than long, formed nearly as in *insolens*, finely, sparsely perforato-punctate but more remotely so medially; foveæ large, separated distinctly more than either from the eye, the frontal sulcus and its laminate anterior wall similar; prothorax nearly similar in form and finely, sparsely, uniformly perforato-punctate, with the lateral teeth small but distinct, very much smaller than the head, the foveæ all smaller and more feeble than in any other species; elytra shining and very minutely, sparsely punctulate as usual, subelongate, distinctly wider than the head, parallel, with feebly arcuate sides, the impression obsolete at basal third; abdomen nearly as in *insolens*. *Male* apparently with simple characters, the seventh ventral as in *insolens* but more narrowly and parabolically rounded behind; last dorsal rather tumid or strongly, longitudinally convex along a transverse subapical line. Length, 0.8 mm.; width, 0.2 mm. (♂). Ohio (Cincinnati), Dury.
exilissimus, n. sp.

My only example of *exilissimus* is in a very fragmentary condition, so that it is difficult to even measure it, and the male sexual characters are for the most part concealed by the mounting; it is one of the frailest and most minute of the entire Pselaphidæ. In glancing over the Pselaphidæ of my collection, it may be casually observed that the smallest and most slender species are *Thesiastes atratus*, *Biblopectus ruficeps* and *Dalmosella tenuis*, which are certainly to be numbered among the more wonderful of the inhabitants of this planet.

Actium, Csy.

The following species of this genus may be advantageously described at the present opportunity:

Actium bicolor, n. sp.—Stout, convex, polished, subimpunctate, the pubescence fine and inconspicuous, testaceous, the elytra brighter though clouded at base and apex, the head and abdomen black; head of the usual form, the two pubescent foveæ separated by nearly half the entire width, the ambient sulcus very feeble; antennæ moderate, joints seven to ten gradually wider, the latter nearly four times as wide as long, the eleventh as long as the preceding five, elongate-ovoidal; prothorax slightly wider than long and distinctly wider than the head, impunctate, broadly rounded at the sides anteriorly, moderately narrowed toward base, with the usual

two basal foveæ connected by the posteriorly cuspid transverse sulcus; elytra scarcely as long as wide, almost twice as wide as the prothorax, the sides rounded, the humeri distinct, the sulcus obsolete at or a little before the middle; surface punctured apically, the basal foveæ three in number; abdomen distinctly narrower than the elytra and not quite as long, very declivous posteriorly as usual, the basal segment with two slender parallel carinæ separated by almost half the total width and extending somewhat beyond the middle of the segment, the second segment with two similar though slightly smaller carinæ. *Male* with the fourth segment extremely short at the middle, the fifth short even at the sides, disappearing at the middle, the sixth very large, punctulate, broadly flattened or feebly concave toward the middle, the operculum of the seventh segment densely punctulate, small, transversely oval and eccentric. Length, 1.25 mm.; width, 0.46 mm. New Mexico (Cloudcroft), Warren Knaus.

This species somewhat resembles *politum* of the Pacific coast fauna but is smaller; it may be recognized at once by its peculiar coloration.

Actium retractum, n. sp.—Smaller and much more slender and depressed, polished, pale testaceous throughout, subimpunctate, the pubescence inconspicuous; head well developed for this genus, though distinctly narrower than the prothorax, the widely-distant foveæ united by a feeble ambient sulcus; antennæ more slender though similar, the tenth joint not quite so transverse, the eleventh more slender, conoidal, as long as the five preceding; prothorax relatively large, distinctly wider than long, more strongly narrowed basally, the foveæ and transverse sulcus as usual; elytra evidently though not greatly shorter than wide, scarcely one-half wider than the prothorax, the sides arcuate, the humeri evenly rounding, the sulcus traceable to the middle, the basal foveæ three in number; abdomen as long as the elytra and nearly as wide, less declivous posteriorly than in the preceding, the first dorsal with two very short carinules separated by less than a third the total width, the second without visible carinules. *Male* with the first three ventral sutures straight from side to side, the others strongly sinuate, the fifth segment short at the middle, the sixth large and punctulate but scarcely more than flattened medially; the nearly flat operculum of the seventh is very large, sparsely punctulate, slightly wider than long. Length, 1.2 mm.; width, 0.33 mm. ♂, ♀). Queen Charlotte Islands, J. H. Keen.

Allied to the *candidum*, *marinicum*, *pacificum* group of the genus, much more parallel in form and smaller than the typical species.

Actium blandum, n. sp.—Form stout and convex, with the hind body inflated as in *politum* and other normal west coast forms, shining, subimpunctate, moderately pubescent, very pale flavo-testaceous throughout; head small, with rather large prominent eyes, nearly as in *bicolor* throughout, except that the tenth antennal joint is much less transverse, not quite three times as wide as long; prothorax as long as wide, much wider than the head, prominently subangulate at the sides near the middle, the sides subsinuately converging thence to the base, the lateral foveæ nude, each with a short stiff seta; elytra nearly as long as wide, four-fifths wider than the prothorax, the sides arcuate, the humeri obtusely angulate and distinct, the sulcus traceable not quite to the middle, the basal foveæ two in number; abdomen narrower and much shorter than the elytra, the first dorsal with two parallel carinæ in nearly basal half and separated by about a fourth the entire width, the second dorsal without visible carinæ. *Male* with ventrals two to five gradually shorter along the median line, the sutures becoming more sinuate, the sixth segment longer, lunate, scarcely modified, the flat operculum of the seventh very large, subimpunctate, elliptical and slightly elongate, central and not at all eccentric. Length, 1.25 mm.; width, 0.48 mm. Pennsylvania (Westmoreland Co.), Schmitt.

This species approaches the west coast forms in outline more closely than any other eastern species that I have seen; it differs, nevertheless, very greatly in male sexual characters from such types as *bicolor*. The *Trimium durum*, of Brendel, is omitted altogether by Raffray; it seems to be an *Actium*, but is unknown to me.

Pseudactium, n. gen.

A special genus seems to be necessary for certain species resembling *Actium* in general organization, but of more parallel form, much larger head and distinctly different antennæ, the latter having the club more Euplectiform, as shown by Brendel in the case of a typical species (Tr. Am. Ent. Soc., 1893, pl. IV, fig. 7). The acute side margins of the prothorax, large pubescent discal foveæ connected by a transverse biarcuate groove and subhumeral pubescent fovea with attendant longitudinal pleural sulcus, and equal abdominal segments, are as in *Actium*. The three species known to me may be described as follows, the first being the type:

Pseudactium Carolinae, n. sp.—Form slender, moderately convex, polished, subimpunctate, rather sparsely and inconspicuously pubescent,

dark testaceous; head wider than long, with two pubescent foveæ separated by half the entire width and connected by a simple parabolic sulcus, the eyes rather small, the tempora converging slightly; antennæ one-half longer than the head, rather slender, the three joints of the club gradually wider, ninth and tenth between two and three times as wide as long, symmetric, the eleventh obtusely ogival apically, as long as the preceding three; prothorax equal in width to the head, a little wider than long, the sides strongly rounded anteriorly, converging and nearly straight from somewhat before the middle to the base, the pubescent foveæ and connecting biarcuate sulcus deep; elytra slightly shorter than wide, moderately inflated distally, not quite one-half wider than the prothorax, the sides rounded; humeri narrowly exposed, distinct; sulcus obsolete somewhat behind the middle, the base with a very minute and feeble intermediate fovea; abdomen slightly narrower and a little longer than the elytra, parallel, the first dorsal with a transverse nude basal impression in median third but not carinate. Length, 1.15 mm.; width, 0.28 mm. North Carolina, Schmitt.

A single female. The erect minutely capitate setæ of the under surface of the head are present anteriorly and very fine, though long, their terminal knobs subspherical.

Pseudactium mellinum, n. sp.—Form shorter and thicker, convex, polished, similarly subimpunctate, pale flavo-testaceous throughout, the pubescence inconspicuous; head nearly similar, the eyes notably larger and more convex, the last antennal joint relatively more elongate, about as long as the preceding four combined; prothorax equal in width to the head, nearly as in *Carolinæ*; elytra very much larger, as long as wide and as long as the head and prothorax, fully three-fifths wider, the median basal fovea stronger, the sides rounded; discal stria extending well behind the middle; abdomen narrower than the elytra and much shorter, the basal impression of *Carolinæ* obsolete or very nearly. *Male* with the first four ventral sutures nearly straight and transverse, the fifth strongly sinuate, the fifth segment long at the sides, very short medially; sixth large, broadly impressed medially, deeply sinuate behind for the rather large and obliquely oval flat operculum, which occupies nearly all the seventh segment and slightly longer than wide, minutely, sparsely punctulate and shining. Length, 1.1 mm.; width, 0.4 mm. Pennsylvania (Westmoreland Co.), Schmitt.

Differs profoundly from the preceding species in its more obese form, greater convexity and very much more developed elytra.

Pseudactium cephalicum, n. sp.—Form narrower, more depressed and parallel, shining, subimpunctate, dark testaceous, the pubescence much longer and more conspicuous than in either of the preceding; head nearly as in the preceding, larger, wider than long, the eyes rather small, convex, the tempora somewhat strongly converging; antennæ with the last joint but little longer than the preceding three, rather acutely pointed; prothorax evidently narrower than the head, wider than long, constituted as in the preceding; elytra more nearly as in *Carolinæ*, much shorter than wide, barely one-half wider than the prothorax, rounded and basally narrowed at the sides, the dorsal stria unusually developed, obsolete at apical third; abdomen slightly narrower and evidently longer than the elytra, the basal impression of the first dorsal very feeble. Length, 1.35 mm.; width, 0.38 mm. Pennsylvania (Westmoreland Co.), Schmitt.

This species is represented by the female alone and is more closely allied to *Carolinæ* than to *mellinum*, but differs from both in its much longer pubescence and more elongate discal stria of the elytra. The species described by Brendel under the name *Trimiopectus? parabolicus*, is evidently a member of this genus, but differs, among other features, in its very abbreviated elytral stria or sulcus, which is said to extend only a fifth from the base. The locality was not mentioned by the describer, but the type was probably found in Iowa.

Oropus, Csy.

This is probably the largest genus of peculiarly Pacific coast Pselaphidæ, and numerous species have come to light since my last revision. They are rather closely allied among themselves, but may be assigned to three easily-recognized divisions, as follows:

- | | |
|---|----------------|
| Basal segment of the dorsum but little longer than the second | 2 |
| Basal segment much elongated, constituting nearly half the abdomen as viewed from above | (Group III) 12 |
| 2. Larger, stouter and more convex species, the elytra about as long as wide | (Group I) 3 |
| Smaller, more slender and more depressed species, the elytra always distinctly shorter than wide, with the rounded sides more diverging from the base | (Group II) 9 |
| 3. Head large, about as wide as the prothorax | 4 |
| Head smaller, always distinctly narrower than the prothorax | 6 |

4. Antennæ shorter and thicker, a little shorter than the head and prothorax; pronotal sulcus sometimes interrupted behind the middle. California (Fisk's Mill, Sonoma Co.) *interruptus*, Csy.
 Antennæ more slender, fully as long as the head and prothorax or a little longer; body less stout 5
5. Ninth and tenth antennal joints but slightly transverse, less than one-half wider than long; lateral teeth of the prothorax very feeble, in the form of feeble rounded swellings of the edge. *Male* with the fourth dorsal feebly, transversely impressed at base, the polished impression with a fine feebly-chagrined line along the bottom in median third. California (Sonoma Co.) *convexus*, Csy.
 Ninth and tenth antennal joints much more transverse, one-half to two-thirds wider than long; lateral teeth of the prothorax prominent and very acute; body a little smaller and narrower, though even more convex, polished, dark testaceous, the pubescence rather sparse, moderately distinct; integuments very finely, sparsely punctate, the elytra more coarsely and rugulosely so, though not densely; impression at the base of the first dorsal deep and large, one-half the discal width. *Male* with the fourth dorsal wholly impunctate, more broadly, feebly and indefinitely impressed transversely in nearly basal half, the sparsely and feebly chagrined line broader and more indefinite. Length, 1.6 mm.; width, 0.6 mm. California (Marin, Alameda and Sta. Cruz Co's.) *testaceus*, n. sp.
6. Male with a large, broadly concave and more indefinitely bounded transverse impression in about basal half of the fourth dorsal 7
 Male with a short, deeper and more abruptly defined transverse impression at the base of the fourth dorsal 8
7. Form stout, convex, dark castaneo-testaceous, polished, the pubescence moderately long, reclined, distinct though not dense; head thick, subtriangular, the eyes well developed, the ambient sulcus deep as usual, the antennæ notably stout apically, the penultimate joints distinctly transverse; prothorax not very greatly though evidently wider than the head, not quite as long as wide, angularly rounded and prominent at the sides before the middle, the lateral teeth small but evident; discal foveæ and sulci as usual; elytra convex, about as long as the head and prothorax, three-fourths or more wider than the latter, the sides rounded, the elongate humeral callus very pronounced;

- third discal stria extending nearly to apical fourth; abdomen slightly shorter than the elytra and not quite as wide, the first dorsal impressed and puberulent at base; ventral sexual characters of the male simple, the sixth segment feebly tumid laterally. Length, 2.0 mm.; width, 0.8 mm. British Columbia (Metlakatla), J. H. Keen, and Vancouver Island *Keeni*, n. sp.
8. Larger species, some 2 mm. in length, the head unusually small, very much narrower than the prothorax; basal impression of the abdomen wider, about half the total width. Vancouver Island . . . *striatus*, Lec.
- Smaller species, the head larger, though evidently narrower than the prothorax; basal impression of the abdomen narrower, evidently less than one-half the total width, and more strongly bilobed. California (Humboldt to Sonoma) *abbreviatus*, Csy.
9. Antennal club very stout, the two penultimate joints strongly transverse 10
- Antennal club more slender, the penultimate joints very moderately transverse 11
10. Species of the Sierras, the head small, very much narrower than the prothorax; second elytral stria broadly amalgamating with the sutural stria near apical third. California (Placer Co.) *montanus*, Csy.
- Species of the northern coast regions, larger in size, the second stria free throughout; head moderately small though very obviously narrower than the prothorax, the eyes moderate, though a little more prominent, evenly castaneo testaceous, polished, moderately convex, the pubescence rather sparse and inconspicuous; prothorax a little wider than long, of the usual form, finely, sparsely perforatopunctate, the lateral teeth small and rather obtuse; elytra more strongly, though sparsely and more rugosely punctate; elytra transverse, one-half longer and wider than the prothorax, the sides strongly diverging and broadly arcuate from base to apex, the elongate humeral callus strong; abdomen with unusually arcuate sides, as wide as the elytra and much longer, the basal impression nearly one-half the total width. Length, 2.0 mm.; width, 0.72 mm. British Columbia (Metlakatla), Keen *brevipennis*, n. sp.
11. Last two joints of the antennal funicle shorter than the preceding, though scarcely at all broader, strongly transverse, the club about as long as the preceding six joints combined, with unusually little

difference in size and form between its first two joints, both fully twice as wide as long, the last joint gradually pointed, but little wider than the tenth and as long as the four preceding combined; body dark testaceous, polished, the head nearly as wide as the prothorax, the lateral teeth of the latter strong, broadly angulate; elytra and abdomen nearly as in *brevipennis*. Length, 1.7 mm; width, 0.63 mm. California (Humboldt Co.).....*curtipennis*, n. sp.

Last two joints of the antennal funicle not materially shorter or more transverse than the preceding; antennal club relatively still more slender but with the joints rather more rapidly increasing in size, the ninth and tenth differing more markedly in size and not so transverse; body nearly similar, though darker in colour, the elytra sometimes brighter and rufescent, the lustre shining; punctuation rather more evident; head a little smaller, more distinctly narrower than the prothorax; hind body similar though very slightly less inflated, the entire outline rather more slender than in *curtipennis*. Length, 1.7 mm.; width, 0.6 mm. California (San Francisco and Marin Co's.).....*castaneus*, n. sp.

12. Elytra evidently shorter than wide 13

Elytra as long as wide; form slender 14

13. Moderately stout, rather convex, shining, dark testaceous, the pubescence rather long and distinct; head of the usual form and structure, the antennæ stout apically, the ninth and tenth joints twice as wide as long, the last stout and rather longer than the preceding three; prothorax slightly wider than the head, of the usual form and sculpture, the punctures strong and evident, though not dense; lateral teeth small but distinct and spiniform; elytra with rounded sides, which are more converging and rounded basally, the humeral callus moderate; striæ as usual; surface minutely, sparsely punctulate; abdomen not quite as long or wide as the elytra, the basal impression wider than usual, more than half the total width. *Male* with the fourth dorsal broadly concave, impunctate and glabrous, the surface gradually curved posteriorly above and subacute, so that its reverse side appears from above as a pronounced tooth behind the broadly and feebly parabolic hind margin of the third segment, which is herissate with longer dense hairs, the acute upper tip of the fourth is also tufted with very short fine and dense hairs. Length, 1.7 mm.; width, 0.63 mm. California (Sta. Cruz Co.).....*basalis*, n. sp.

Form less stout, smaller in size, moderately convex, shining, testaceous, the pubescence rather more herissate and evident; head more transverse, with slightly smaller foveæ; antennæ nearly similar, the penultimate joints slightly more transverse; prothorax somewhat wider than the head, of the usual form and with the usual sulci and foveæ, but having the sculpture between the transverse groove and base granulose and not rather coarsely and simply punctate as in *basalis*, the lateral teeth smaller and more angular; elytra nearly as in *basalis*, but with less evident humeri, the abdomen almost similar, rather shorter than the elytra and virtually as wide. *Male* with nearly similar sexual characters. In the original description the posterior abdominal tooth was erroneously described as pertaining to the tip of the third segment. California (Marin Co.)... *cavicauda*, Csy.

14. Form slender, moderately convex, testaceous, distinctly and coarsely though sparsely pubescent; head and antennæ nearly as in *cavicauda*, the former with very small sparse granules, the antennæ about as long as the head and prothorax, the latter slightly wider than the head, very nearly as long as wide, having the usual sulci and foveæ, the surface finely, sparsely, subasperately punctulate, the area between transverse groove and base finely and sparsely granose; lateral teeth extremely feeble and obtuse; elytra as long as the head and prothorax, the humeri distinct, the sides broadly arcuate, the striæ as usual; abdomen evidently shorter than the elytra, though about as wide, the basal segment long but very evidently less than half the length from above. Length, 1.4 mm.; width, 0.48 mm. California (Siskiyou Co.)..... *debilis*, n. sp.

The last species is founded upon a specimen formerly placed with *cavicauda* (Ann. N. Y. Acad., VII, 1893, p. 448); it is assumed to be a female, but differs from the female of *basalis*, which has the fourth dorsal feebly convex and similar to the others, in having that segment broadly flattened or feebly concave. It is evidently a distinct species.

The third group, comprising the last three species of the table, has very much more accentuated male sexual characters than the others, and the more elongate first dorsal gives its species a peculiar appearance; they are the smallest of the genus, but otherwise there is no difference of a generic nature; the relative size of the basal segment therefore appears to be of very much less significance here than among the allies of *Trimium*.

Individuals of the two sexes are very unequally represented in the various groups, for, in the first group, out of seventeen examples before me there seems to be only one male, and in the second, having abbreviated elytra, out of twelve examples there is but one female; in the third group, among five examples, three are males and two females. There is little or no sexual difference in structure, size or general appearance.

Rhexius, Lec.

This genus, composed of smaller and more slender species, replaces *Oropus* in the Atlantic regions of America, and has very much the same general facies, differing profoundly, however, in the constricted and greatly narrowed apex of the prothorax, elongate basal antennal joint and general absence of discal elytral striae. The single lateral and subposterior thoracic tooth of *Oropus*, is replaced by three minute and equidistant denticles along the arcuate part of each side. The sexual characters are even feebler than in *Oropus*, there being no dorsal modifications, and the last ventral is merely larger and more apically impressed in the male; there is no sexual difference at all in bodily form or habitus. The species are similarly closely allied among themselves, necessitating careful observation; those in my collection may be defined as follows:

- Body with longer, erect and more conspicuous pubescence 2
 Body with shorter, sparser and less bristling pubescence 3
2. Form rather convex, shining, subimpunctate, testaceous; head transverse, the eyes moderate, the tempora long and only just visibly converging, the base broadly sinuate, the occiput impressed, with a long carinule extending to before the middle, the large perforate nude foveae widely separated, before the middle, not connected with the strong, broad, transverse sulcus behind the apical margin, the later being thin and acute; basal joint of the antennae very thin, as long as the following six joints, the club as long as the funicle, with the eleventh joint as long as the preceding three; prothorax transverse, as wide as the head, the part behind the apical stricture three-fourths wider than long, the surface convex, the three basal pits as usual, not connected by a transverse sulcus, the median sulcus strong, linear and, as usual, extending onto the apical lobe; elytra slightly abbreviated, as long as the head and prothorax and one-half wider, the sides rounded, the humeri distinct, the juxta-humeral impression large and strong,

the four perforate basal foveæ well developed; sutural stria fine, the others obsolete; abdomen about as long and wide as the elytra, the basal segment slightly longer than the second, with a basal impression in fully median half. Length, 1.4 mm.; width, 0.5 mm. Mississippi (Vicksburg), [New Orleans,—Leconte]. . . *insculptus*, Lec.

Form similar but much smaller in size, the head similar, except that the foveæ are smaller and feebler and the anterior pit small, feebler and transversely oval, the frontal edge not fine and acute, but low and broadly convex as usual; occipital carina finer and shorter, the antennæ nearly similar; prothorax smaller and less transverse, very distinctly narrower than the head; elytra more distinctly shorter than wide, not as long as the head and prothorax, and only a third wider than the former, otherwise similar, the median discal impression, in neither case striiform, extending rather further from the base; abdomen about as wide as the elytra and very evidently longer. Length, 1.25 mm.; width, 0.42 mm. Missouri (St. Louis).

hirsutus, n. sp.

3. Prothorax small, much narrower than the head 4

Prothorax larger, subequal in width to the head 6

4. Head larger, moderately transverse, the eyes small, at about twice their own length from the base, the first antennal joint thicker, as long as the next six, as wide as the second and fully half as wide as the eleventh, its upper surface punctato-rugulose and hairy, the long erect hairs of its under surface conspicuous; frontal pit small, transverse, the depressed frontal margin thick and convex, granulose; surface strongly granose laterally; prothorax distinctly transverse, smooth, convex and polished, tumid and strongly granose basally, also in and near the anterior stricture, having the usual sulci and disconnected basal foveæ; elytra distinctly shorter than wide, much shorter than the head and prothorax, scarcely a third wider than the head, the sides diverging and arcuate, the humeri feeble, the discal impression short and broad, not quite extending to basal third, the surface minutely, sparsely asperulato-punctate; abdomen fully as wide as the elytra and evidently longer, the basal impression in median half abruptly and obliquely limited at the sides. Length, 1.3 mm.; width, 0.5 mm. District of Columbia *ruber*, n. sp.

Head relatively smaller, the front similar, the basal antennal joint much more slender, not quite as wide as the second and less than half as thick as the eleventh, its upper surface smooth and almost glabrous; eyes larger.....5

5. Head almost twice as wide as long, the eyes unusually large, convex and prominent, at barely their own length from the base; surface smooth and polished medially, finely, sparsely granose laterally; prothorax nearly as in *ruber*, but more finely and sparsely granose basally and apically; elytra larger, not quite so abbreviated, shining, the discal impression strong and broad basally, but with its internal part prolonged posteriorly, becoming obsolete only behind the middle; abdomen about as long as the elytra and nearly as wide, rounded at the sides, the basal impression almost similar. *Male* with the last ventral large, nearly as long medially as the three preceding combined, gradually strongly and broadly impressed toward apex, the hind margin thin and sublaminar. Length, 1.5 mm.; width, 0.52 mm. Pennsylvania (Westmoreland Co.), P. Jerome Schmitt.

ferrugineus, n. sp.

Head evidently not twice as wide as long, the eyes well developed, but less prominent, and at rather more than their own length from the base; body much smaller in size and more yellowish in colour; prothorax nearly as in *ferrugineus*, but more convex and with a less evident sinus at each side near the base; elytra smaller and rather more abbreviated, about as long as the head and prothorax, and fully a third wider than the former, impressed nearly as in the preceding, except that the median groove extends only to the middle; abdomen fully as wide as the elytra but not quite so long, the basal impression not quite so extended transversely as in *ferrugineus*. *Male* with the last ventral very much shorter and more transverse, with a rather smaller and more definite transversely oval apical impression. Length, 1.3 mm.; width, 0.42 mm. Pennsylvania (Westmoreland Co.), Schmitt.....Schmitti, Brend.

6. Form rather stout, convex, shining, testaceous; head well developed, thick, convex, transverse, deeply sinuate at base as usual, granulose except between the three foveæ, the apical transversely oval and deep, the frontal margin thick, depressed; eyes moderately small, prominent, at a little more than their own length from the base; first antennal joint as long as the funicle, rather thicker

than usual, more than half as thick as the eleventh, finely punctatose, and with bristling pubescence; prothorax with the usual sulci and foveæ, moderately transverse, only slightly narrower than the head, very sparsely granose at base; elytra but little shorter than wide, fully as long as the head and prothorax and nearly one-half wider, the humeri pronounced, the discal lines rather distinct, the second extending to slightly before, the third to slightly behind, the middle; abdomen about as long and wide as the elytra, the basal impression nearly half the total width, limited abruptly by oblique lines at the sides. Length, 1.5 mm.; width, 0.54 mm. Virginia (Norfolk).....*virginicus*, n. sp.

Form, colour and general characters nearly as in the preceding, but with the basal joint of the antennæ sensibly more slender in the male, as compared with the male of *virginicus*; general form a little stouter throughout, the prothorax decidedly shorter and more transverse, scarcely visibly narrower than the head; elytra broader, much more evidently shorter than wide, the second impression very short, basal, the juxta-humeral impression large and deep, rapidly becoming very faint and narrow, and barely traceable to the middle; abdomen nearly similar. Length, 1.5 mm.; width, 0.58 mm. Cab. Levette, probably from Indiana.....*transversus*, n. sp.

The last two species, and particularly *virginicus*, are probably more especially allied to *substriatus*, Lec., founded upon a unique from Tampa, Fla., which I have not seen; it is said to be larger, darker and less convex than *insculptus*, the eyes small, the elytra each with four faint striæ, of which the subhumeral is longer and more distinct, the others extending only to about the middle; the antennæ have the ninth and tenth joints less abruptly larger than in *insculptus*. The length is 1.5 mm.

Mr. Keen has recently sent me a specimen of *Megarafonus ventralis*, from Metlakatla, British Columbia, showing that its range is somewhat extended.

A NEW GENUS OF BYRRHIDÆ.

BY THOS. L. CASEY, WASHINGTON, D. C.

The following is one of the more interesting of the many recent discoveries of Mr. J. H. Keen, and I have taken advantage of the present opportunity to suggest for it a probable systematic position in the Byrrhid series:

Exoma, n. gen.

Body small, oval, very convex, the elytral striæ so deeply impressed as to form coarse sulci; head deflexed, deeply inserted, subquadrate, the arcuate frontal margin reflexed, the clypeus short, broadly arcuate; labrum large, transverse, sinuate, vertically inflexed under the clypeus; maxillary palpi slender, the last joint oval, acuminate; eyes basal, flattened, transversely oval, with convex separated facets; the antennæ are 11-jointed, inserted in small ante-ocular excavations, slender but short, the basal joint thicker, oval, the last three larger, gradually increasing and forming a loose club; prosternum broadly lobed anteriorly, flattened and produced between the coxæ, its sinuato-truncate apex received within a mesosternal pit between the middle coxæ; metasternum ample, the episterna narrow and completely fused; abdomen with five free segments, much above the plane of the metasternum; epipleuræ broad, parallel and horizontal to the end of the metasternum, being there abruptly broken, ascending and thence much narrowed posteriorly, disappearing before the apex; the posterior wall of the metasternum and epipleura forms a shelter for the hind thighs; legs short, the two anterior free though retractile; tarsi well developed, 5-jointed, coarsely hairy, the first and fifth joints of the posterior elongate, the three intermediate shorter.

The peculiar epipleural structure and the sulcate elytra constitute of this genus such a marked exception that it is impossible to associate it with any thus far known; its divergencies are apparently tribal or subtribal in nature. The type is the following:

E. pleuralis, n. sp.—Deep black, shining, the upper surface with short, erect, curved setæ, very easily removed and forming a single series on each of the convex elytral intervals, more persistent on the head and pronotum, which are frequently covered with concealing foreign matter; head finely, sparsely punctulate, the erect setæ very small and inconspicuous; prothorax transverse, at base as wide as the elytra, narrowed anteriorly, the surface with very minute and remote asperulate punctulation bearing the stronger curved setæ; elytra barely as long as wide, inflated basally and widest at about basal third, rapidly narrowed thence to the narrowly-rounded apex. Length, 1.5-1.6 mm.; width, 0.9-1.0 mm. British Columbia (Metlakatla).

This genus will be considered again in a general revision of the American Byrrhidæ which the author has in contemplation, and he takes this occasion to say that material of any kind in this family, from any part of the continent, would be most welcome.

A SECONDARY SEXUAL CHARACTER OF APHIDIDÆ.

BY JOHN J. DAVIS,

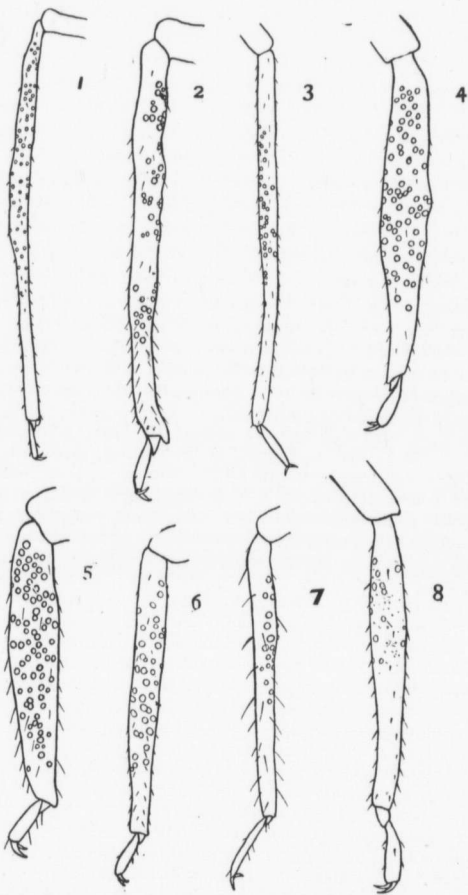
Office of the State Entomologist, Urbana, Illinois.

A character of the oviparous females of Aphids which has been previously mentioned in descriptions, but which, so far as I can learn, has never been treated as a secondary sexual character, is the presence of sensoria upon the hind tibiæ, in consequence of which the hind tibiæ are usually noticeably swollen. The term "sensoria," in Aphid descriptions, was first used by Professor O. W. Oestlund, in his "Synopsis of the Aphididæ of Minnesota" (1887), in referring to the pores on the antennæ.

Buckton, in his "Monograph of the British Aphides," Vol. I (1875), p. 104, probably referred to these sensorial pores when he wrote, in his description of the apterous oviparous female of *Siphonophora rosæ*, Reaum., that "the hind tibiæ are furnished with numerous tubercular spots, which probably assist the insect in arranging the soft and glutinous eggs in the recesses of the leaf buds." Also in Volumes I and II of this same work he mentions, in the descriptions of the apterous oviparous females of *Siphonophora dirhoda*, Walk.; *Aphis edentula*, Buck.; *A. pruni*, Reaum.; *A. viburni*, Schr.; *A. sambucaria*, Pass., and *Chaitophorus betulæ* (?), Buck., that the hind tibiæ are flattened, expanded or dilated.

These so-called pores or tubercular spots on the hind tibiæ were first referred to as sensoria by Dr. S. A. Forbes, who, in the Eighteenth Report of the State Entomologist of Illinois (1894), mentions and figures them as being conspicuously present on the hind tibiæ of the apterous oviparous females of *Aphis maidi-radici*, Forbes. Since then, mention of these tibial sensoria as occurring on the sexual females of *Siphocoryne avenæ*, Fabr., and *Hormaphis hamamelidis*, Fitch, has been made by Mr. Theo. Pergande in Bulletin 44 (1904) and in Technical Bulletin 9 (1901) of the U. S. Bureau of Entomology; by Professor E. Dwight Sanderson, who refers to them as "pores" in his descriptions of the apterous oviparous females of *Aphis pomi*, De G.; *A. sorbi*, Kalt., and *A. brevis*, Sand. (he also shows these "pores" in his figure of *Aphis Fitchii* = *Siphocoryne avenæ*, but makes no mention of them in his description), in the Thirteenth Annual Report of the Agricultural Experiment Station of Delaware (1892), and in *Entomological News* (1906), in his description of the apterous oviparous females of *Macrosiphum granaria*, Buck., he says: "meta-tibiæ with numerous pores"; by Miss Edith M. Patch, who, in Bulletin 147 of the Maine Agricultural Experiment Station (1907), mentions and figures the sensoria on the hind tibiæ of *Macrosiphum solanifolii*, Ashm.; and by Professor F. L. Washburn, in CANADIAN ENTOMOLOGIST (1908), who found them present on the hind tibiæ of the apterous oviparous females of *Toxoptera graminum*, Rond.

August, 1908



SENSORIA ON HIND TIBIAE OF APHIDIDAE.

In a recent letter from Professor C. P. Gillette, he writes that he has examined a few species, contained in the collection of the State Agricultural College of Colorado, namely: *Brachycolus Ballii*, Gill.; *Callipterus* sp., *C. discolor*, Mon.; *Drepanosiphum Braggii*, Gill.; *D. acerifolii*, Thos., and *Chaitophorus nigræ*, Oest., and all bore sensoria on the hind tibiæ of the sexual females, they being rather obscure in the species of *Callipterus* and *Brachycolus*.

I have found these tibial sensoria on the oviparous females of *Sipha flava*, Forbes; *Callipterus trifolii*, Mon.; *Aphis brevis*, Sand.; *A. maidi-radici*, Forbes; *A. Folsomii*, Davis; *Myzus elæagni* (?), Del Guer.; *Macrosiphum lirioidendri*, Mon.; *Rhopalosiphum berberidis*, Kalt., and *Drepanosiphum acerifolii*, Thos.

Thus we find that these sexual tibial sensoria have been found present on species representing twelve different genera, namely: *Macrosiphum*, *Myzus*, *Rhopalosiphum*, *Drepanosiphum*, *Aphis*, *Sipha*, *Siphocoryne*, *Chaitophorus*, *Toxoptera*, *Brachycolus*, and *Hormaphis*.

I have examined many species for these tibial sensoria, and have never found them present on the hind tibiæ of viviparous females or males, but have always found them present on oviparous females. Although a positive statement can not now be made with our present knowledge, still it is quite probable that the hind tibiæ of the oviparous females of the *Aphididae*, or at least of the subfamilies *Pemphiginae*, *Schizoneurinae*, *Lachninae*, and *Aphidinae*, are usually noticeably swollen, and always bear more or less distinct and numerous sensoria. I know of no other definite character for the distinguishing of the viviparous and oviparous females, excepting the presence of either embryos or eggs in the body. Mention has been made by several authors that the oviparous females of certain species hold their bodies vertical to the surface upon which they are resting. I have observed this characteristic position as common to the sexual females, especially with *Sipha flava* and *Aphis maidi-radici*, but I find that it is not constant with all species, nor is it always the case with the two species above mentioned.

EXPLANATION OF PLATE 8.

Hind tibiæ of oviparous females of (1) *Macrosiphum lirioidendri*, Mon.; (2) *Aphis Folsomii*, Davis; (3) *Drepanosiphum acerifolii*, Thos.; (4) *Rhopalosiphum berberidis*, Kalt.; (5) *Aphis maidi-radici*, Forbes; (6) *Myzus elæagni* (?), Del Guer.; (7) *Sipha flava*, Forbes; and (8) *Callipterus trifolii*, Mon.

NOTES ON THE SPECIES OF RHYNCHAGROTIS, SM., WITH DESCRIPTIONS OF NEW SPECIES.

BY JOHN B. SMITH, SC.D., NEW BRUNSWICK, N. J.

(Continued from page 228.)

Rhynchagrotis alternata, Grt.

One of the well-known, widely-distributed species which does not vary greatly. It is almost as large as *variata*, but not so broad-winged, the colours are usually of some shade of luteous, more or less mottled, and with the terminal space paler, though rarely contrasting. From all its allies it differs in the large, ovate, oblique orbicular and large reniform, which may be kidney-shaped or a little constricted; both maculae pale-ringed. The transverse maculation is usually all present, but broken. Localities represented in the material before me range throughout the Northern States and Canada to the Rocky Mountains, southward down the Mississippi Valley into Ohio, and along the Atlantic Coast to the District of Columbia.

Rhynchagrotis Belfragei, Sm.

Similar to *alternata* in size, but narrower winged, darker and even in colour, the median lines almost lost. The ordinary spots are concolorous, narrowly pale-ringed, smaller than in its ally, the orbicular more nearly round.

Only 2 ♂'s are at hand, from Texas, and they are from the original type lot taken by Belfrage. It is strange that it has not been turned up again in more recent collections.

Rhynchagrotis anchocelioides, Gn.

Better known as *cupida* in collections, and locally not uncommon. It is almost as large as *alternata*, but is red or brown in colour, not mottled, and with a distinct blackish mark on costa preceding the s. t. line. In the normal form the maculation is obscure, the median lines barely marked, the ordinary spots only a little darker.

What we have always known as *brunneipennis*, but which seems nearer to what Hampson calls *cupida*, Grt., is a distinctly smaller form, with the median lines distinct though broken, the ordinary spots pale-ringed and blackish centered, the s. t. space distinctly darker. I have suspected two species, and am not sure yet that there is only one; but all of the 13 examples of this type before me are females, and the change in form is somewhat gradual.

Nevertheless, the last word on this species has not been said.

August, 1908

Rhynchagrotis cupidissima, Grt.

There is a long series collected by Mr. Buchholz in Yavapai County, Arizona, that shows a fine series of variations. As compared with the preceding, this is a slightly larger species, tending to luteous or creamy, a red tinge being exceptional, and usually accompanied by a dark s. t. shade preceding the s. t. line, while the terminal space becomes paler. There is rarely a distinctly darker costal blotch preceding s. t. line, although the s. t. shade is always best marked on the costa. The secondaries are almost blackish in both sexes, and the species is, on the whole, very characteristic.

The range of distribution is wide, specimens from Chicago matching others from Arizona so closely that no differences are notable, and California examples matching others from New Mexico. The Chicago examples were taken by Mr. Healy in June and August, and while I questioned the accuracy of the records when the specimens were first received, there seems to be no doubt that the specimens were actually taken there.

Rhynchagrotis trigona, Sm.

This species differs at once from all the preceding in the shorter, broader, more triangular wings. The primaries are usually of some shade of pale luteous, tending to receive a reddish admixture in one direction and a smoky admixture in another. As a rule, while all the maculation is present in the specimens, it is scarcely relieved and does not disturb the apparent uniformity of the wing. Exceptionally the ordinary spots will become black, contrasting, and the lines, or some of them, may be blackish.

I have a long series of examples from Colorado Springs in June and July, a very long series taken by Mr. Buchholz in Yavapai Co., Arizona, in July, and a small series from Fort Wingate, New Mexico, in July. Altogether over 100 examples, and enough to get a fairly good idea of what the species looks like.

Rhynchagrotis sambo, n. sp.

Has the *trigona* primaries of *trigona*, but is smaller and the wings are a little longer, not quite so stubby. Maculation also as in *trigona*, but much better defined, the ordinary spots being usually black or contrastingly darker, while the s. t. line is pale, preceded by a distinct blackish or dusky shading. While there are some almost uniform examples, the tendency is all in the opposite direction, the basal area becoming

darker between the basal and t. a. line until a conspicuous black band appears; the s. t. space in turn may also become darker until it is completely black-filled; one example, with basal and s. t. bands and the ordinary spots lost, presenting an appearance that proved puzzling until the series now in hand was examined. Secondaries blackish, fringes rufous.

Expands.—1.16–1.28 inches = 29–32 mm.

Habitat.—Kaslo, British Columbia, July and August, Mr. Cockle; Peachland, B. C., in July, Mr. Wallis, through Dr. Fletcher; Ainsworth, B. C., in July, Mr. Findlay, also through Dr. Fletcher.

A series of 12 ♂'s and 12 ♀'s, most of them in good or fair condition, and while extremely variable, yet in altogether a different direction from *trigona*, which is approached only in one or two very uniform examples.

Rhynchagrotis alcandola, Sm.

Ground colour pale luteous-gray. Sides of palpi dark brown. Primaries very uniform in general tint. Basal line barely indicated on costa. T. a. line faintly indicated by scattered black scales, its course outwardly oblique. T. p. line geminate, consisting rather of venular points connected by black scales, very evenly outcurved over the cell and very slightly incurved below it. The s. t. space is black powdered, deepening to a distinct shade before the pale, slightly irregular s. t. line, which is the most obvious feature of the wing. Small terminal black points in the interspaces, and a pale yellow line at base of fringes. Orbicular irregular, oblique, blackish-filled, with narrow yellow defining line. Reniform large, blackish-filled, with a narrow yellow defining line; nearly upright, a little drawn in at centre. Secondaries smoky, paler at base. Beneath powdery, with an extramedial dusky line and a discal spot.

Expands.—1.40 inches = 35 mm.

Habitat.—Yavapai Co., Arizona, Oct. 4, Mr. Hutson.

One female, in fair condition only. Prof. F. H. Snow has other examples, and I sent him the MSS. name some time since, expecting to get additional material for the description. It is to validate the name sent out that I base the species on a single defective example, knowing that there are other and better ones in collections.

The species is perhaps nearest to *alternata*, but obviously distinct in the course of the s. t. line, the dark s. t. space and in the form of the ordinary spots.

BLENNOCAMPINÆ—DESCRIPTIONS OF NEW GENERA AND SPECIES—SYNONYMICAL NOTES.

BY ALEX. D. MACGILLIVRAY, ITHACA, N. Y.

The genera of the subfamily Blennocampinæ, as understood by the writer, can be differentiated by the following characters: front wings with the radial cross-vein, the radio-medial cross vein, and the free parts of R_4 and R_5 always present; the medio-cubital cross-vein joined to the vein $Sc + R + M$ at or near the origin of media, its distance from media always less than one-half the length of the cross-vein, and always parallel to the vein M_{3+4} ; the base of the third anal vein atrophied, or at least in part, so that the anal cells are of the petiolate type; the antennæ with nine segments; the body short and stout.

Selandria (Blennocampa) floridana, Cr.—This species belongs to the genus *Pareophora*.

Neopareophora, n. gen.—Malar space broad and distinct, the eyes being distant from the bases of the mandibles; antennæ with the third segment subequal in length with the fourth; mesothoracic epimera not with a transverse suture below the episternum, separating off a præsternum; claws simple, without a tooth. Type *Neopareophora Martini*, MacG.

Neopareophora Martini, n. sp.—Body black, with the labrum, the mandibles, the prothorax, the tegulæ, the mesopleura, side lobes of the mesonotum, the legs, the venter and the tip of the abdomen yellow or rufous; cerci elongate; saw-guides obliquely truncated at apex; wings hyaline. Length, 4 mm.

Habitat: West Springfield, Mass. (J. O. Martin).

This species is named after my friend, Mr. James O. Martin.

Neopareophora scelestæ, n. sp.—Body black, with the labrum, the mandibles for the most part, the front legs, more or less infuscated at base and apex, and the middle legs beyond the apices of the femora rufous; cerci hardly projecting; saw-guides large and obliquely rounded to an apex above; wings infuscated. Length, 7 mm.

Habitat: Black Mts., North Carolina (William Beutenmuller).

This species resembles *Selandria (Monophadnus) scelestæ*, Cr., very closely, and for some time was considered the same as that species.

Phymatocera nigra, Harrg.—Through the kindness of Mr. Harrington, I have been able to examine type specimens of this species, and find that it belongs to the genus *Neopareophora*. Konow has referred this species incorrectly to *Rhadinocerca*.

Neotomostethus, n. gen.—Malar space broad and distinct, the eyes being distant from the base of the mandibles; antennæ with the third segment longer than the fourth; mesothoracic epimera with a transverse suture below the episternum, separating off a præsternum; claws with a small tooth within before the apex. Type *Neotomostethus hyalinus*, MacG.

Neotomostethus hyalinus, n. sp.—Body black, with the tegulæ and the legs below the knees, except the apices of the posterior tibiæ and tarsi, white; antennal fovea broad and rounded; antennal furrow wanting on the front; wings hyaline. Length, 6 mm.

Habitat: McLean, N. Y.

Rhadinocera similata, n. sp.—Body black; the wings strongly infuscated; the postocular area elongated; the ocellar basin distinct; the saw-guides rounded at apex to a blunt point above. Length, 8 mm.

Habitat: Ithaca, N. Y., and Agricultural College, Mich.

Hypargyricus, n. gen.—Malar space broad and distinct, the eyes being distant from the base of the mandibles; antennæ with the third segment subequal in length to the fourth; mesothoracic epimera not with a transverse suture below the episternum; claws cleft at apex, the inner tooth nearly as long as the outer. Type *Hypargyricus infuscatus*, MacG.

Hypargyricus infuscatus, n. sp.—Postocular area strongly elevated; saw-guides straight on the upper and lower margins, and rounded to a blunt point at middle of apex; body black; the front femora and tibiæ more or less white in front, suffused with black; wings infuscated. Length, 8 mm.

Habitat: Ithaca, N. Y.

Selandria (Phymatocera) fumipennis, Nort.—This species belongs to the genus *Hypargyricus*. The genus *Phymatocera*, so far as I am aware, does not occur in America.

Isiodictium atratum, n. sp.—Body black, with the clypeus, the labrum, a spot on the mandibles, the collar narrowly, the tegulæ, a narrow line on the posterior margin of the abdominal segments, broadest on the venter, and the legs, brownish-white; a band on the posterior margin of each lobe of the mesonotum, the scutellum, and the median tergal abdominal segments more or less rufous; saw-guides concave above and convex below, broadly rounded at apex to a point above; wings hyaline. Length, 6 mm.

Habitat: Ames, Iowa (E. D. Ball).

Periclista confusa, n. sp.—Body black, with the clypeus, the labrum, the collar broadly, the tegulæ, the legs beyond the coxæ, and the abdomen at sides above and for the most part beneath, luteous, shading to brownish; the median lobe of the mesonotum for the most part and the pleura, brown; the ocellar basin flat and distinct; the postocular area not marked in front by a furrow; the front finely punctured; the fourth segment of the antennæ longer than the fifth; the wings hyaline. Length, 5 mm.

Habitat: Ithaca, N. Y.

Selandria (Monophadnus) marginicollis, Nort.—An examination of a type specimen proves this species to belong to the genus *Periclista*, and to be very similar in coloration to *Periclista purpuridorsum*, Dyar.

Tomostethus.—There are three species in the Eastern United States belonging to this genus, *Selandria (Monophadnus) bardus*, Say, *Selandria (Blennocampa) inabilis*, Nort., and the following new species:

Tomostethus Nortonii, n. sp.—Body black, with the labrum, a fine line on the collar, the tegulæ, the front legs below the middle of the femora, and the middle and hind legs beyond the knees, white; the saw-guides concave above and broadly convex below, obliquely, truncately rounded to a point at apex above; wings hyaline. Length, 6 mm.

Habitat: Ames, Iowa (E. D. Ball).

Named after Edward Norton, the pioneer student of the North American species of Tenthredinoidea.

Monophadnus distinctus, n. sp.—Body black, with the labrum, the tegulæ, and the legs below the knees, white; the antennal furrow continuous and distinct from the clypeus to the occiput; the ocellar basin distinct; the scutellum coarsely punctured behind at sides; the appendage of the scutellum flat and impunctate; the wings hyaline. Length, 7 mm.

Habitat: Lake Forest, Ill. (J. G. Needham).

Monophadnus minutus, n. sp.—Body black, with the tegulæ, the corners of the prothorax somewhat, and the legs below the knees, white; the front with a deep, broad puncture on each side above the lower end of the antennal furrow but not connected with it; scutellum with a few scattered coarse punctures behind; the scutellar appendage flat and impunctate; the antennal fovea continues with the ocellar basin; the wings hyaline. Length, 5 mm.

Habitat: Milwaukee, Wisconsin (Ward).

Monophadnus bipunctatus, n. sp.—Body black, with the tegulæ and the legs below the knees, white; the antennal furrow interrupted on the front; front never with a large puncture on each side; the scutellum coarsely punctured at sides behind; the scutellar appendage flat and not carinate at middle; the saw-guides obliquely rounded to a blunt point at apex; the wings slightly infuscated. Length, 6 mm.

Habitat: Ithaca, N. Y.

Monophadnus æqualis, n. sp.—Body black, with the tegulæ, the pronotum for the most part, the front legs beyond the bases of the femora, the middle and hind legs beyond the knees, white; the antennal furrow interrupted on the front; front never with a large puncture on the sides, and finely punctured; the ocellar basin fairly distinct; the scutellum and the metathorax uniformly, densely punctured; the saw-guides oblique at apex and pointed. Length, 5.5 mm.

Habitat: Ithaca, N. Y.

Monophadnus plicatus, n. sp.—Body black, with the tegulæ, the margin of the pronotum more or less, and the legs beyond the knees, white; the head with the V-shaped furrow behind the front ocellus distinct; the antennal furrow interrupted on the front; front never with a large puncture on each side; the scutellum more densely punctured than the metathorax; the scutellar appendage longitudinally carinate at middle; the saw-guides with the two edges parallel and obliquely truncate at apex; wings yellowish hyaline. Length, 6.5 mm.

Habitat: Ames, Iowa (E. D. Ball).

Monophadnus transversus, n. sp.—Body black, with the labrum, the tegulæ, the pronotum entirely, the legs beyond the knees, and a narrow margin to the apex of each tergal and ventral segment, white; head with the V-shaped furrow behind the front ocellus indefinite, almost obliterated; antennal furrow interrupted on the front; the front never with a large puncture on each side; the scutellum more densely punctured than the metathorax; the scutellar appendage longitudinally carinate at middle; the saw-guides with the two sides parallel, squarely truncated at apex, with the corner rounded; the wings yellowish hyaline. Length, 6 mm.

Habitat: Michigan.

Paracharactus, n. gen. Malar space narrow and indistinct, hardly more than a line beneath the eyes; mesothoracic epimeron not with a transverse suture below the episternum separating off a præsternum; claws with an erect tooth at middle. Type, *Paracharactus obscuratus*, MacG.

Paracharactus obscuratus, n. sp.—Body black, with the tips of the clypeus, the labrum, the hypoclypeal area, the angles of the prothorax, the posterior third of the mesopleura, and the front and middle legs below the knees, yellow or rufous; the ocellar basin indistinct. Length, 5 mm.

Habitat: Ithaca, N. Y., and West Spring, Mass. (J. O. Martin).

Selandria (Phymatocera) rudis, Nort. This species belongs to the genus *Paracharactus*.

Neocharactus, n. gen.—Malar space narrow and indistinct, hardly more than a line beneath the eyes; mesothoracic epimeron not with a transverse suture below the episternum separating off a præsternum; claws with two erect teeth at middle. Type, *Neocharactus Bakeri*, MacG.

Neocharactus Bakeri, n. sp.—Body black, with the clypeus, the labrum, a spot on the mandibles, the tips of the first and second segments of the antennæ, the tegulæ, the corners of the prothorax in part, a line on the apex of each abdominal segment, somewhat indistinct at middle, the front and middle coxæ beneath, and the remainder of the legs beneath in great part, white; the third segment of the antennæ longer than the fourth; the head more or less aeneous and finely punctured; the antennal fovea twice as long as broad, the sides square; a triangular area around the median ocellus; the wings hyaline. Length, 5 mm.

Habitat: Santa Clara Co., California (Carl F. Baker).

Monophadnoides conspicuus, n. sp.—Body black, with the tegulæ, the pronotum, the front legs beyond the trochanters, and the middle and hind legs beyond the middle of the femora, luteous; abdominal segments one to five yellowish-rufous; the front with a pit-like puncture on each side; the antennæ with the third segment shorter than segments four and five together; the saw-guides of moderate width, straight above and below, obliquely rounded to a point above at apex; the wings hyaline. Length, 6.5 mm.

Habitat: McLean, Mass.

Monophadnoides conspiculata, n. sp.—Body black, with the collar narrowly, the tegulæ, the legs below the knees, white; the antennæ with the second segment longer than broad; front with a pit-like puncture on each side; the pentagonal area wanting; the scutellum wholly smooth; the saw-guides straight above, convex below and obliquely, emarginately truncated at apex; wings hyaline. Length, 5 mm.

Habitat: Ithaca, N. Y.

Monophadnoides consobrinus, n. sp.—Body black, with the angles of the pronotum, the tegulæ, the legs below the knees, white; the furrow in front of the postocular area narrow, deep and distinct; the pentagonal area flattened, the walls flat and practically wanting; the third segment of the antennæ not as long as the fourth and fifth together, the second segment broader than long; the scutellum wholly smooth; the saw-guides straight above, convex below, broadly, obliquely rounded to a blunt point at apex above; the wings hyaline. Length, 6 mm.

Habitat: Durham, N. H. (C. M. Weed).

Monophadnoides cordatus, n. sp.—Body black, with the tegulæ, the legs below the knees, white, except that the tips of the tibiæ and tarsi are more or less infuscated; the furrow in front of the postocular area broad, shallow and indistinct; the pentagonal area wholly wanting; the third segment of the antennæ as long as the fourth and fifth together, the second segment broader than long; the scutellum wholly smooth; the saw-guides convex above and below, obliquely truncated to a point at apex above; the wings hyaline. Length, 5 mm.

Habitat: Illinois (Nason).

Monophadnoides concessus, n. sp.—Body black, with the angles of the pronotum, the tegulæ and the legs below the knees, white; the antennæ with the third segment shorter than the fourth and fifth together; the head smooth and polished; the front with a V-shaped furrow behind the median ocellus; the scutellum punctate at apex; the saw-guides straight above and below, obliquely, convexly rounded at apex; the wings white. Length, 6 mm.

Habitat: Ithaca, N. Y.

Monophadnoides crassus, n. sp.—Body black, with the collar narrowly, the tegulæ, the legs below the knees, white; the front without a V-shaped furrow behind the median ocellus; the third segment of the antennæ subequal in length with the fourth and fifth together; the pentagonal area wanting; the scutellum punctate at apex; the saw-guides straight above and below, obliquely rounded to a blunt point at apex and above. Length, 6 mm.

Habitat: Durham, N. H. (C. M. Weed).

Monophadnoides conspersus, n. sp.—Body black, with the angles of the pronotum, the tegulæ, the trochanters, and the legs below the knees, white; the front with a V-shaped furrow behind the median ocellus; the third segment of the antennæ subequal in length with the fourth and fifth

together; the pentagonal area wanting; the scutellum finely striate at apex; the saw-guides broad, straight above, strongly convexly rounded from below to the apex above. Length, 5 mm.

Habitat: Ithaca, N. Y.

Monophadnoides costalis, n. sp.—Body black, with the angles of the pronotum, the tegulae, and the legs below the knees, white; the front without a V-shaped furrow behind the median ocellus; the pentagonal area wanting; the scutellum striate at apex; front with a pit-like puncture on each side; the saw-guides straight above and below, oblique at apex, drawn out into a long point above. Length, 6 mm.

Habitat: Wellesley, Mass. (A. P. Morse).

Monophadnoides coracinus, n. sp.—Body black, with the angles of the pronotum narrowly, the tegulae, and the legs below the knees, white; the antennae with the third segment shorter than the fourth and fifth together; the pentagonal area and the V-shaped furrow behind the median ocellus wanting; the front not with a pit-like puncture on each side; the scutellum smooth, at most extremely, finely, rugosely roughened. Length, 6 mm.

Habitat: Wellesley, Mass. (A. P. Morse).

Monophadnoides collaris, n. sp.—Body black, with the angles of the pronotum broadly, the tegulae, the apices of the coxae, the trochanters more or less, and the legs below the knees, white; the antennae with the third segment shorter than the fourth and fifth together; the pentagonal area indistinctly impressed; the V-shaped furrow behind the median ocellus distinct; the scutellum distinctly punctured at sides; the saw-guides broad, convex above and below, broadly, obliquely rounded to a blunt point at apex above. Length, 6 mm.

Habitat: Ithaca, N. Y.

Aphanisus, n. gen.—Malar space narrow and indistinct, hardly more than a line beneath the eyes; the antennae with the third segment always longer than the fourth; mesothoracic epimeron not with a transverse suture below the episternum; front wings with the radial cross-vein and the free part of R_4 inclined at different angles; the hind wings with the transverse part of M_2 present; the claws cleft at apex. Type *Aphanisus lobatus*, MacG.

Aphanisus lobatus, n. sp.—Body black, with the pronotum, the tegulae, the legs, and a fine margin on the apex of the abdominal segments, white or luteous; front with a distinct pentagonal area, its lateral walls sharp and distinct; the front smooth and polished and without a

pit-like puncture; the scutellum impunctate at sides; the wings somewhat infuscated; the saw-guides broad, straight above, broadly convexly rounded from the base to a hooked point above. Length, 5 mm.

Habitat: Ormond, Florida (Mrs. A. T. Slosson).

Aphanisus muricatus, n. sp.—Body black, with the collar, the tegulae and the legs below the knees, the femora more or less infuscated, white; front with a distinct pentagonal area, its lateral walls low and indistinct; the front finely, rugosely roughened; the front without a pit-like puncture on each side; the wings hyaline; the saw-guides straight above, convexly rounded from below to a blunt point above. Length, 5 mm.

Habitat: Ithaca, N. Y.

Aphanisus odoratus, n. sp.—Body black, with the collar, the tegulae, and the legs below the knees, white; the front with the pentagonal area entirely wanting, and with a pit-like puncture on each side connected below with the antennal furrow; the scutellum punctured at sides; the wings hyaline; the saw-guides straight above, convex below, and obliquely rounded to a point above. Length, 5 mm.

Habitat: Ithaca, N. Y.

Aphanisus nigrinus, n. sp.—Body black, with the collar, the tegulae, and the legs beyond the middle of the femora, white; front with the pentagonal area wanting, and not with a V-shaped furrow behind the median ocellus, and with a pit-like puncture on each side but not connected with the antennal furrow; the scutellum roughened at sides; the saw-guides straight above and convexly rounded from base to a blunt point above; the wings hyaline. Length, 6 mm.

Habitat: Riverton, New Jersey (H. L. Viereck).

Blennocampa abnormalis, n. sp.—Body black, with the tegulae and the legs below the knees, the tibiae more or less infuscated, white; the front without a V-shaped furrow behind the median ocellus; the pentagonal area wanting; the clypeus angularly emarginate; the antennae with the third segment at least as long as the fourth and fifth together; the wings hyaline. Length, 5.5 mm.

Habitat: Ithaca, N. Y.

Blennocampa antennata, n. sp.—Body black, with the tegulae and the legs below the knees, luteous; the front tibiae and tarsi more or less infuscated; the front with a V-shaped furrow behind the median ocellus; the antennal fovea with a rounded papilla at centre; the antennae with the third segment at least as long as the fourth and fifth together; the scutellum

smooth at apex; the saw-guides convex above and below and obliquely, convexly truncated at apex. Length, 6 mm.

Habitat: Durham, N. H. (C. M. Weed).

Blennocampa aperta, n. sp.—Body black, with the tegulæ and the legs below the knees except the apices of the tibiæ and the greater part of the tarsi, white; the antennal fovea flat, without a papilla at centre; the front with a V-shaped furrow behind the median ocellus; the antennæ with the third segment at least as long as the fourth and fifth together; the scutellum smooth at apex; the saw-guides strongly convex above and below, and rounded to a point at apex. Length, 6 mm.

Habitat: West Haven, Ct. (E. B. Whittlesey).

Blennocampa angulata, n. sp.—Body black, with the tegulæ and the legs below the knees, except the apices of the tibiæ and the tarsi, white; the antennal fovea an elongate furrow; the front with a V-shaped furrow behind the median ocellus; the scutellum finely striate at sides; the saw-guides broad, straight above; convex below, obliquely truncated at apex. Length, 6 mm.

Habitat: Wellesley, Mass. (A. P. Morse).

Blennocampa adusta, n. sp.—Body black, with the tegulæ and the legs, except the tips of the middle and hind tibiæ and tarsi, white; the antennal fovea with a large rounded papilla at centre; the front with a V-shaped furrow behind the median ocellus; the antennæ with the third segment at least as long as the fourth and fifth together; the scutellum punctured at sides; the saw-guides straight above and convexly, obliquely rounded from base to apex above. Length, 6 mm.

Habitat: Wellesley, Mass. (A. P. Morse).

Blennocampa acuminata, n. sp.—Body black, with the tegulæ and the legs below the knees, luteous; the antennal fovea flat and without a papilla at centre; front with a V-shaped furrow behind the median ocellus; the third segment of the antennæ at least as long as the fourth and fifth together; the scutellum punctured at sides; the saw-guides broad, straight above and below, broadly, convexly and somewhat obliquely rounded at apex. Length, 6 mm.

Habitat: Chicopee, Mass. (J. O. Martin).

Selandria (Blennocampa) parva, Cress.—This species belongs to the genus *Erythraspides*. Adults were bred by Professor Comstock, from larvæ collected on Fuchsia.

NOTES ON EUCHLOE HYANTIS, EDW.

BY KARL R. COOLIDGE, PALO ALTO, CALIF.

The history of *Euchloe hyantis* well illustrates the state of confusion of some of the western *Euchloinae*. In 1871 W. H. Edwards described, in the Transactions of the American Entomological Society, both sexes of a species of *Euchloe* (*Anthocharis*), which he called *hyantis*, the types coming from Mendocino, Calif. In his Pac. Coast Lepidoptera papers (Proc. Calif. Acad. Sci., No. 22, 1876), Hy. Edwards writes: "*Anthocharis creusa*, Dbl. I have little doubt, from an examination of a figure by Mr. Butler, of the British Museum, kindly loaned to me by Mr. W. H. Edwards, that this species is the same as *A. hyantis*, Edw., which is well known to occur in the Sierra Nevadas, and in other high lands of the State. It is said by Dr. Behr to be far from rare in the neighbourhood of Oroville, and has been subsequently taken by Baron R. Osten Sacken in the Yosemite Valley, and by myself near Lake Tahoe. It is probably often confounded with *A. ausonides*, but it is abundantly distinct." W. H. Edwards, in his list of *Rhopalocera*, published in 1877, places it as a synonym, and in his later list (1879) it is entirely omitted. In 1878, however, Hy. Edwards changed his former opinion and gives it specific rank.

Of the later authors Beutenmuller (Revision N. Am. species of *Euchloe*†) places *hyantis* as a synonym of *creusa*, and describes as new, under the name *lotta*, the form heretofore known as *creusa*.

Creusa was named by Doubleday and Hewitson, and, according to Beutenmuller, the figure given in their "Genera of Diurnal Lepidoptera" agrees well with *hyantis* or possibly *ausonides*. There is no mention of *hyantis* in Holland's Butterfly Book or in the Check List of American Macro-Lepidoptera published by the Brooklyn Entomological Society in 1882. Dr. Skinner* makes *coloradensis*, Hy. Edw., a synonym of *ausonides*, and places *hyantis* as a variety. The same writer in his supplement puts *elsa*, Beut., and *lotta*, Beut., as varieties of *creusa*. Smith in his catalogue gives *hyantis* specific rank, as does W. G. Wright (Butt. West Coast). Dyar¹ places *hyantis* as a variety of *ausonides*. Dr. A. G. Butler (CAN. ENT., XXXI, 1899, p. 19), writes: "As regards *E. creusa*, I believe to vary seasonably as much as its very close ally, *E. ausonia*; the

†Am. Mus. Nat. Hist., x., p. 235-248. (1898).

*A Syn. Cat. of N. Am. Rhop., Phila., 1898.

1. Bull. U. S. Nat. Mus., No. 52, Wash., 1902.

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attempt to distinguish between *E. ausonides* and *E. hyantis* looks to me like a failure, not that they cannot be readily distinguished by size, form of secondaries, depth of ground-tint, and size of white spots on under surface, but because these differences are to be seen in undoubted seasonal variations in the European form, *E. ausonia*, and because if *E. ausonides* is distinct from *E. hyantis*, the Vancouver form, which differs in the pattern of the under surface, has an equal claim to separation. As regards typical *E. creusa*, which Dr. Beutenmuller considers to be *E. hyantis*, I can definitely assure him that the type (which we possess) agrees with his var. *elsa*. My idea of this species is that it can be arbitrarily sorted out into seven graded forms: *E. ausonides*, *E. var.* from Vancouver, *E. hyantis*, *E. lotta*, *E. coloradensis*, *E. creusa* = *elsa*."

In the same volume of the CANADIAN ENTOMOLOGIST (p. 56) Beutenmuller says: "In answer to Dr. Butler's comments upon my revision of the species of *Euchloe*, I could state that Dr. Butler may possibly be right in considering *creusa* (var. *elsa*), *hyantis* and *lotta* seasonal forms of *ausonides*, but with the present knowledge it is not possible to place them so, and for this reason I concluded it would be best to allow the species to remain distinct until more light could be obtained on the subject. At any rate, I was certain that what we had labeled in our collections as *creusa* was not Doubleday and Hewitson's species, which Dr. Butler definitely asserts is my var. *elsa*. What seems strange to me is, how was it that Edwards did not recognize the figure of *creusa* sent to him by Dr. Butler? *Creusa* (var. *elsa*) cannot be mistaken for either *hyantis* or *lotta* (so-called *creusa*). Doubleday and Hewitson did not give a description of *creusa*, and their figure of the species is unrecognizable, consequently has no scientific value."

It has been supposed that *hyantis* is the spring brood of *ausonides*, but Edwards (CAN. ENT., XXIV, p. 109) contradicts this, saying that *ausonides* is monogenetic, as he had bred a few typical examples in March. Last year, however, Mr. E. J. Newcomer and myself succeeded in breeding *ausonides* throughout all its stages, and a fair percentage of the pupæ emerged in early summer.² These examples were certainly not *hyantis*, and differed from the spring brood in being slightly larger and perhaps more yellowed. In order to straighten out this group, it will be necessary to breed out the various forms. I would like very much to

2. The fact that the European *ausonia* was 2-brooded and the American *ausonides* single-brooded, was one of the distinctions given by Edwards and Beutenmuller for distinguishing the two.

receive any eggs of such species, particularly from the mountainous regions of the west. The synonymy, as now known, I would place as follows:

- ausonides, Bdv.
 = coloradensis, Hy. Edw.³
 creusa, Dbl. & Hew.
 = var. elsa, Beut.
 var. hyantis, Hy. Edw.
 var. lotta, Beut.

ERRATA.

The following corrections may be made to my Notes on the new *Rhopalocera* described by W. G. Wright in his Butterflies of the West Coast:

- P. 238—No. 178, *Melitæa eremita*, Wright, = *palla*, ♀ (*blackish form*).
 No. 181, *Melitæa sabina*, Wright, = *palla*, ♀ (*reddish form*).
 No. 186, *Melitæa leona*, Wright, = *obsoleta*, Hy. Edwards (from type locality).

SOME RECENT PAPERS ON HEMIPTERA.

BY J. R. DE LA TORRE BUENO, NEW YORK.

From time to time, notes, papers and monographs on some branch of Entomology are published, but, unfortunately, not always in the most widely read nor even accessible publications. Such, for instance, are three papers, one of great interest, not only to American Hemipterists, but also to the general student of biology. Of the other two, one should receive the notice of Hemipterists in general, and the other of those whose interest is mainly in water-bugs.

The first is a paper on fauna, by Dr. G. Horvath, of Buda-Pesth, entitled, "Les Relations entre les Faunès Hémiptérologiques de l'Europe et de l'Américaine du Nord." This important contribution was read at the opening session before the 7th Zoological Congress at the Boston meeting in 1908, and its author now publishes it in the, to us, inaccessible "Annales Historico-naturales Musei Nationalis Hungarici."¹

3. Hardly worthy of rank, as, in good series, all intergradations are to be found.

(1) 1908, vol. vi., pp. 1-14.

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He calls attention to the great resemblance already noted between the faunas of Europe and North America, going so far in many cases as to the identity of genera and species, and this after rejecting mistaken identifications on the one hand, and demonstrating the identity of American species, reputed as new, with well-known European forms on the other. His researches have given 161 species and 261 genera of European-American Hemiptera, and this includes the imported and naturalized forms, of which 31 have come to America from Europe, and only 2 have been exported to the other side of this continent. The imported species, except *Clinocoris lectularius* and *Reduvius personatus*, are all Homoptera—more or less injurious to cultivated plants. Deducting imported species (the number of which does not include certain forms held by our entomologists to be imported because found here later than in Europe, from which view Horvath differs), there are 128 species common to both continents, 59 Heteroptera and 69 Homoptera. In the former he lists 3 Pentatomias (or Cimicids); 9 Lygaeids; 4 Aradids; 1 Gerrid, *Gerris rufoscutellatus*, Latr.; 6 Reduviids, of which 5 are Reduvioli; 4 Acanthids (or Saldids); 2 Anthocorids; no less than 28 Mirids (or Capsids); 1 Notonectid and 2 Corixids. The Homoptera are mainly Jassids, Cercopids, Aphids (by far the most abundant) and Coccids.

In examining these lists one is struck by the fact that the vast majority belong to the colder parts of Europe, and only 6 are from the South, and also found in the Southern United States. Their artificial spread is inadmissible, and while he does not consider theories of a great continent between Europe and America, nor that the dispersal was by way of Iceland and Greenland when these had a milder climate, Dr. Horvath considers that the fact that the common species are also Palearctic forms evidently shows that the dispersal was by way of Behring Strait. In confirmation of this supposition we have the fact² that five species have been found only at the extreme north-west of America, and that certain others have not penetrated far into the Palearctic region, and still others are common only to north-western America and north-eastern Asia.

As to the genera, he finds that of those common to the two faunas, no less than 138 are of Palearctic origin, 31 are Nearctic, 23 Holarctic, 13 Neotropical, 5 Oriental, 4 Ethiopian, 12 intertropical and 22 cosmopolitan.

(2) Dr. Horvath cites six, but one is known to me *positively* to be a mis-identification.

Moreover, there are 8 of uncertain origin. From this tabulation he deduces that nearly 84 per cent. of the common genera have migrated by the Behring route.

His conclusions are as follows :

1st. There is a certain number of species and genera of Hemiptera which are common to Europe and North America.

2nd. The greater part of these common Hemiptera is native to the Palæarctic region and belongs to the temperate zone.

3rd. The migration of these Hemiptera has taken place mainly by way of Behring Straits.

4th. The few southern types common to the two continents originated in the intertropical region, whence they came independently to enrich the Palæarctic and Nearctic faunas.

5th. Artificial importation plays only a secondary role in the spread of European-American Hemiptera ; but it is Europe that has supplied America, along with cultivated plants, with more species than the latter has received from Europe.

(To be continued.)

THE BITER BIT.

Everybody knows that toads are great insect destroyers, accepting nauseous species, and not refusing even stinging bees, so I was surprised the other day, on hearing the cry of a toad in pain, to find one nearly the size of a hen's egg attacked by a ground beetle a little over an inch long and half an inch broad, belonging to the genus *Dicaelus*. These beetles are broad and flat, black, with a blue line on the outer edges of the elytra. The toad was held by the middle of the upper arm by the powerful jaws of the beetle, and vainly struggled to push off its assailant with the other limbs, and the beetle actually tried to carry the toad away, pushing it ahead two or three inches while I watched. The toad had a bloody wound in its shoulder, and bite-marks, corresponding to the beetle's jaws, all along its flank and thigh, so the fight must have lasted a considerable time. The beetle frequently relaxed its hold slightly to take a better bite; it held on like a bulldog, with no intent of letting go while I carried them to the house to show to my wife, and indeed I had to pry the beetle's jaws apart to separate the combatants. These *Dicaelus* beetles are rather common here, but I never knew them to prey on vertebrate animals before.—THEODORE L. MEAD, Oviedo, Fla.

NOTES ON ELEAS COLLECTED ON RAT AND HUMAN HOSTS IN SAN FRANCISCO AND ELSEWHERE.

BY R. W. DOANE, STANFORD UNIVERSITY, CALIF.

In Feb., 1908, Dr. W. B. Wherry, of the Dept. of Public Health of San Francisco, sent to the University for identification a few vials of fleas, most of which had been collected from rats in the plague-stricken districts and from doctors, nurses and others who had been at work in these districts. Those from the rats showed the following species: *Ceratophyllus fasciatus*, Bosc., 1 ♂, 6 ♀'s; *Ctenocephalus canis* (Curtis), Baker, 2 ♀'s; *Loemopsylla (Pulex) cheopis*, Rothschild, 16 ♂'s, 19 ♀'s. Five ♂'s and one ♀ of *Ctenopsyllus musculi* (Duges), Wagner, were taken from a mouse in the plague laboratory, and 220 specimens of *Pulex irritans*, Linn., were taken from human hosts or on their clothing in the plague laboratory and hospital and in the refugee camps where human plague cases were of frequent occurrence. A single specimen of an undetermined species of *Ceratophyllus* was also taken from a human host.

A later sending from Dr. Wherry, April, '08, showed 88 specimens of *Ceratophyllus fasciatus* and 1 *Ctenopsyllus musculi* from rats, 7 *Loemopsylla cheopis* from mice, 25 *Pulex irritans* and 1 specimen of *Ceratophyllus* sp. from human hosts (one *P. irritans* was from the body of a Chinaman who had died of the plague), and 477 specimens of *Ctenocephalus canis* collected from a single Dachshund pup.

From time to time between March 1st and June 1st, Dr. W. C. Rucker, executive officer of the U. S. Public Health and Marine Hospital Service, has sent me many vials of fleas taken from rats and humans. These were mostly collected by the small army of rat catchers in the different sections of the city. A summary of all these sendings shows 619 specimens of *Ceratophyllus fasciatus*, 163 specimens of *Pulex irritans*, 56 *Ctenopsyllus musculi*, 9 *Ctenocephalus canis*, and 139 *Loemopsylla cheopis* from rats, and 668 *Pulex irritans* and 2 *Ceratophyllus fasciatus* from human hosts..

From February to May, Dr. Snow, of Stanford University, had a man catching rats and mice on the campus in order to determine whether any showed symptoms of plague.

From the rats were taken 174 specimens of *Ceratophyllus fasciatus*, 62 *Ctenopsyllus musculi*, and 8 *Hoplopsyllus anomalus*, Baker; from the mice, 26 *Ceratophyllus fasciatus* and 14 *Ctenopsyllus musculi*.

On examining a number of dead rats in San Jose, that had been brought in for the bounty, I found, on March 14, 7 specimens of *Loemopsylla cheopis*. Only this one lot of rats was examined there.

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Summarizing all these lots, we have :

On rats (<i>Mus norvegicus</i>)—	On humans—
Ceratophyllus fasciatus 863	Pulex irritans 680
Pulex irritans 163	Ceratophyllus fasciatus 2
Loemopsylla cheopis 139	Ceratophyllus sp 2
Ctenopsyllus musculi 118	On mice (<i>Mus musculus</i>)—
Hoplopsyllus anomalus 8	Ceratophyllus fasciatus 25
Ctenocephalus canis 9	Ctenopsyllus musculi 14
	Loemopsylla cheopis 7
	On mice (<i>Microtus californicus</i>)
	Ceratophyllus fasciatus 1

A study of these records shows that *Loemopsylla cheopis*, which is known as the plague flea in countries where the disease is epidemic, is well established in San Francisco, and is spreading to other near-by cities. Doubtless a search would reveal it in many localities. It is interesting, too, to note that out of the 672 fleas taken from human beings, some of them patients who were sick or had died of the plague, from attendants in the hospitals, and from men engaged in catching the rats, not a single *Loemopsylla cheopis* was found. On the other hand, *Pulex irritans*, which is the most common human flea, has been found quite abundantly on rats. One sending from Dr. Rucker contained 81 specimens of *P. irritans* and no other species. These were collected from 18 rats taken in houses and sewers in one of the infested districts. It will be noted, too, that *C. fasciatus*, the most common rat flea, was in two instances taken from human beings.

The records from Stanford University show that *C. fasciatus* was more common on mice than *Ctenopsyllus musculi*, the latter being quite common on the rats.

The eight specimens which seem to be identical with Baker's *Hoplopsyllus anomalus*, which was originally described from a *Spermophile* in Southern Colorado, are interesting in that they seem to show a possible connection between the rats and the squirrels. Dr. Blue has often stated that should the plague ever become endemic here it would probably spread from the rats to the ground squirrels, thus making it much more difficult to stamp out.

The single specimen of *Ceratophyllus fasciatus* also shows the possibility of the spread of the plague to the native rats and mice.