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FRANCIS MARION WEBSTER.

Canadian Entomologists had long regarded Mr. F. M. Webster as one of themselves, and the mutual warm friendship and sympathy grew with years. His sudden death in Columbus, Ohio, on January 2nd came, therefore, as a shock to those of us who enjoyed his friendship and benefited by his ripe experience. It was my good fortune to sit with him during the joint "smoker" of the Association of Economic Entomologists and the Entomological Society of America at Columbus, Ohio, after my address on the evening of December 29th, and he left me, laughing in his usual happy manner, to retire for the night. A few hours later pneumonia suddenly developed, and it ran a fatal course with astonishing rapidity.

Although he was born in 1849, in Lebanon, N. H., and had led a strenuous life, his mind was active, his zeal for the extension of his work was stimulating and his broad grasp of the details of his work was undiminished. He belonged to, and was one of, the most worthy of that splendid class of older workers in economic entomology to whom our science owes so much, both by their example and by the thorough character of much of the work they have bequeathed to us.

His first official position was that of Assistant State Entomologist of Illinois in 1882, and he brought with him the rich experience of a keen observer and a practical agriculturist, a mental equipment which always impressed itself upon the character of his subsequent work. From 1884 to 1892 he served as special field agent to the United States Department of Agriculture, and it was largely while working in this capacity that a large part of his best original work was effected. From 1886 to 1890 he was engaged on his well-known investigations in the valley of the lower Mississippi River on the buffalo gnats and their suppression. In 1888 he visited Australia in company with Koeble, who was seeking the natural enemies of the citrus fluted scale, and he also paid visits to Tasmania and New Zealand. His work on the

Hessian Fly and other insects affecting field crops, which established so securely his reputation as an investigator and as an authority on this group of insect pests, was carried out mainly during the years 1891 to 1902, when he held the position of Entomologist to the Ohio State Experiment Station. During 1903-04 he was attached to the Biological Survey of Illinois.

After so many years of fruitful preparation he went to Washington and joined the Bureau of Entomology of the United States Department of Agriculture in 1904, and two years later the section of Cereal and Forage Insect Investigations was created and he was given charge of that important section of the activities of the Bureau. From a single assistant his staff increased to more than fifty trained men, and the last appropriation for his work (1915-16) amounted to \$114,500, figures that indicate the zeal with which he devoted himself to his work. He was one of the first to recognise the importance of the establishment of field stations, and at the time of his death he was directing the work of about eighteen such stations in the different States of the Union.

His connection with Canadian entomology was a long and valuable one. The October number of THE CANADIAN ENTOMOLOGIST of 1888 contained his first contribution—a very characteristic letter—his last appeared a week or two before his death. He was elected an Honorary Member of the Entomological Society of Ontario in 1899, and his connection with the Society was one of which he always spoke with pride and genuine comradeship, for it meant an additional bond with some of his best friends. We shall always remember the pleasure of his company and the practical address he gave at the Jubilee Meeting of our Society in 1912, his last visit to Canada. In our work we shall miss his counsel and co-operation, but we shall be stimulated by his example, and he will always be remembered as one who was ever ready to assist and whom we counted it as a privilege to number among ourselves.

C. GORDON HEWITT.

POPULAR AND PRACTICAL ENTOMOLOGY.

ERADICATION OF THE BEDBUG BY SUPERHEATING.

BY W. A. ROSS, FIELD OFFICER, DOMINION ENTOMOLOGICAL
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Our experience with superheating as an effective method of controlling the Mediterranean Flour Moth (*Ephestia kuehniella*)

March, 1916

led us to believe that the same measure would prove to be a specific for the Bedbug (*Cimex lectularius*) and other household insects. In the month of July, 1914, we had an opportunity of testing this likely remedy in a boarding-house, badly infested with *Cimex*, and the results came up to our best expectations.

The house was an eight-roomed, two-storey frame building, situated near Vineland, Ontario, and was furnished with iron and wooden bedsteads, varnished dressing tables, plain and varnished tables, chairs and the usual bric-a-brac. The heating system consisted of a hot-air furnace in the basement, with shafts leading into all the rooms, and a kitchen stove and parlour heater on the first flat.

The fires were started at 9.30 a.m., thermometers were placed in different parts of the house and the temperatures were noted every hour. The following table shows a record of the temperatures in three of the bedrooms on the upper storey:

| Time | No. 3 | No. 4 | No. 5 |
|-------|-------|-------|-------|
| 9.30 | 78 F. | 77 F. | 78 F. |
| 10.30 | 94 | 82 | 92 |
| 11.30 | 104 | 95 | 102 |
| 12.30 | 114 | 99 | 117 |
| 1.30 | 130 | 109 | 126 |
| 2.30 | 138 | 115 | 136 |
| 3.30 | 146 | 122 | 142 |
| 4.30 | 148 | 127 | 148 |
| 5.30 | 152 | 138 | 149 |
| 6.30 | 162 | 140 | 158 |
| 7.00 | 160 | 140 | 154 |
| 7.30 | 159 | 140 | 153 |

Outside temperatures: Maximum, 73 F. Minimum 64 F.

Thermometers: No. 3—On wall in 1st infested bedroom.

No. 4—On bed in 2nd infested bedroom.

No. 5—On wall in 3rd infested bedroom.

At 1.30 p.m. many of the adults and nymphs had succumbed, and by 4.30 p.m. they were all dead. However, the heating was not discontinued at this point, but was prolonged until 7.30 p.m. because it was considered probable that it would take a longer

exposure to destroy the eggs. The results obtained from this treatment were very gratifying—the bedbugs in all stages were wholly eradicated and the house furniture was not damaged in the slightest degree.

It is more than probable that the above noted temperatures were unnecessarily high, and that the superheating would have been equally effective if the temperature had been maintained between 120 F. and 130 F.

SUNFLOWER INSECTS IN CALIFORNIA AND SOUTH AFRICA.

BY T. D. A. COCKERELL, BOULDER, COLORADO.

On August 16th, 1915, I had an opportunity to collect and study the insects on *Helianthus lenticularis*, the common wild sunflower, at Orange, California. The plants grow commonly by the roadside, where, at this season of the year, they are practically the only wild flowers to be seen. I was unable to find any characters on which to separate the Californian Sunflower from that of Colorado. There was a good deal of variability, thus three plants growing close together showed:

(a). Rays 20, short and broad, obtuse, 34 mm. long, 14 broad, light orange, suffusedly deeper basally.

(b). Rays 21, acute, 29 mm. long, 7.5 broad, coloured nearly as in a.

(c). Rays 18, long, length 40 mm., width 9.5, entirely uniform deep orange. No wild *H. lenticularis* was noticed between San Francisco and Santa Barbara, but the plant was abundant by roadsides in the region round Los Angeles, and also about cultivated fields in the San Diego region.

The object of my investigations was in part to determine, if possible, whether *H. lenticularis* was really a native of California. On reviewing the insect fauna, it appears to show less special adaptation than that on the Rocky Mountain sunflowers, and tends to support the view that the species has been introduced.

The sunflower fauna at Orange, as obtained on August 16th was as follows:

Hymenoptera

Halictus armaticeps Cresson. Six females, collecting pollen.

Halictus nevadensis Crawford. Three females.

Halictus helianthi, n. sp. One female.

Length about 4 mm., anterior wing 3 mm.; head and thorax dark green, abdomen and legs piceous; hind margins of abdominal segments obscurely reddish; pubescence dull white; wings hyaline, iridescent, nervures and stigma testaceous. Head ordinary; eyes converging below; mandibles dark ferruginous, black at base; antennæ dark, flagellum obscurely reddened beneath apically; tegulæ piceous, strongly punctured; mesothorax dullish, finely and distinctly punctured; area of metathorax delicately sculptured.

Microscopic characters: Front densely punctured; a delicate keel between antennæ; tegulæ well punctured; mesothorax reticulated between the punctures, which are well separated on disc; area of metathorax with few, delicately wrinkled plicæ, on a minutely reticulate surface, and with no sharp or shining edge posteriorly; scutellum rather sparsely punctured; abdomen with very minute scattered punctures, close to *H. perparvus* Ellis from Arizona, but *perparvus* differs thus: Mesonotum yellow-green, contrasting with the dark blue-green of rest of thorax (in *helianthi* no marked contrast; mesothorax is an obscure olive green); second and third abdominal segments not, or not noticeably, punctured (in *helianthi* very distinctly punctured in the sub-basal region, where the pigmentation is strongest); plicæ of area of metathorax of same general type, but larger and more numerous, and the minute reticulation is stronger and yet more minute, producing the appearance of a very finely malleate surface (in *helianthi*, especially apically, there are very delicate mainly transverse lines); plumose hairs on posterior face of metathorax shorter. (The nearest relative in Southern California is *H. regulariformis* Crawford, which I took at La Jolla in August; this is larger than *helianthi* and has the mesothorax brighter, yellowish green.)

Agapostemon texanus Cresson. Two females.

Melissodes aurigena Cresson. One female, collecting pollen; 7 males, three of them denuded.

Pseudomelecta californica Cresson. One female.

Diadasia enavata Cresson. One female, collecting pollen.

The absence of any species of *Andrena* and *Megachile* is noteworthy. A single *Bombus* was seen on the flowers, but not captured. No honey-bees were on the flowers, though they were in the vicinity.

Small Torymids were present; one had been captured by a Thomisid spider.

COLEOPTERA.

Desmoris constrictus Say. Grey sunflower weevils were in some numbers; I did not feel sure on casual inspection that they were identical with our Colorado *D. constrictus*, but Mr. H. C. Fall kindly informs me that they belong to that species.

A single *Diabrotica* was seen.

LEPIDOPTERA.

Eupithecia sp. Small yellow geometrid larvæ were common on the flower heads, feeding on the rays, which they resembled in colour. I bred from one of them a small *Eupithecia*, not yet determined. This is the best example of a specially adapted insect apparently peculiar to the Pacific Coast region, in the series. It may however, have lived originally on one of the native yellow-rayed compositæ.

A single *Pyrameis* was seen on the flowers, but no other butterflies.

HEMIPTERA.

Acholla tabida Stal. Common; one had captured a small *Halictus*.

Determined with the aid of advice from Dr. Van Duzee.

Lygus pratensis L. One.

The absence of *Phymata* was noteworthy.

An aphid of the genus *Macrosiphum* was abundant on the sunflowers in one place. I referred specimens to the University of California, and Mr. Swain, who examined them, considers them "nearest to *M. sonchi* L." They are, however, certainly not *M. sonchi*. *Chrysopa* eggs were found on the aphid-infested plants.

ARACHNIDA.

Spiders, which were numerous on the flowers, included the following, kindly determined by Dr. N. Banks:

Icius vitis Cockerell (Attidæ). Common.

Chiracanthium inclusum Hentz (Clubionidæ).

Tetragnatha laboriosa Hentz. (Tetragnathidæ.)

Runcinia aleatoria Hentz (Thomisidæ.)

Misumana diegoi Keyserling (Thomisidæ.)

The last is a special Californian form, represented, however, by a similar species in Colorado. The first is very widely dis-

tributed in the west; the others are common species of wide range over North America.

In addition to the above, I obtained some small Hymenoptera, etc., which I have not yet tried to determine.

SUNFLOWER INSECTS IN THE TRANSVAAL.

Mr. J. Burt-Davy has been growing the red sunflowers (*H. annuus coronatus*) at Burttholm, Vereeniging, Transvaal, and has found the following lepidopterous visitors to the flower-heads, the first three being the most frequent. I give in brackets the nomenclature of recent revisions:

Plusia orichalcea (*Phytometra orichalcea* Fabricius).

Plusia chalcites (*Phytometra chalcites* Esper.).

Melicleptria armigera (*Chloridea obsoleta* Fabricius).

Plusia exquisita (*Phytometra exquisita* Felder).

Plusia oxygramma (possibly *Phytometra albostrigata* Brem. & Gr.; true *oxygramma* is American).

Zinckenia fascialis (*Hymenia fascialis* Cramer).

Audea catocala (*Ulothrichopus catocala* Felder).

Empusada chrysota Hampson.

Coradrena sp.

Thus it appears that in S. Africa sunflowers attract *Plusiines* exactly as they do in this country.

TWO LOCALITY CORRECTIONS.

In the Canadian Entomologist, October, 1915, pp. 329 and 331, Dr. Dietz described two new species of Tipulidæ, which we had sent to him, viz., *Limnobia gracilis* and *Dicranomyia aquita*, the localities given being "Tsolinoi Lake—about five miles north of Athabaska Lake—July 5th, 1914 (F. Harper) and "Fort Resolution, August 24th, 1914 (F. Harper.)" I have been recently informed by Mr. Harper, who collected the specimens, that the localities should be changed to read as follows:

Limnobia gracilis—Tsal-Wor Lake, Saskatchewan, about eight miles from the north shore of Lake Athabaska, at a point midway of its length.

Dicranomyia aquita—District of Mackenzie, along the south shore of Great Slave Lake.

ARTHUR GIBSON,
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THE STONEFLIES OF THE GENUS PELTOPERLA.

BY JAMES G. NEEDHAM AND LUCY W. SMITH, ITHACA, N. Y.

This obscure genus of stone-flies is of wide distribution in North America, and it includes a considerable number of species, only two of which have hitherto been made known. The type species *P. arcuata* was described by the senior author in 1899 in the *Proceedings of the Biological Society of Washington*. However, specimens of both adult and larva of this species had long reposed in the Cornell University collection. In 1907 Nathan Banks described a second species, *P. minor*, from British Columbia. In 1912, Professor H. Garman published an excellent figure of a nymph belonging in this genus in Bulletin No. 159 of the Kentucky Agricultural Experiment Station. This specimen was from a rill flowing into Straight Creek near Cary, Kentucky, and was labelled "An Undetermined Stonefly nymph, (No. 3)."

Meanwhile specimens for study have been coming into our hands from various quarters: from Ramapo, N. Y., contributed by Mr. William T. Davis; from Black Mts, N. Carolina, loaned by Mr. William Beutenmuller; from several localities in Georgia, collected by Dr. J. C. Bradley; from Nevada, loaned from the Museum of Comparative Zoology by the curator, Mr. Samuel Henshaw. There are also a few specimens bearing only general locality designation from unknown sources in the Cornell University collections, and along with these a few nymphs from British Columbia, from California, from Arizona, and from Washington, D. C. One species, described below as *P. maria*, from Pelham, Mass., has been collected and reared by the junior author. No good characters have as yet been discovered for distinguishing this nymph from that of *P. arcuata*, or from those of the other species which have not as yet been reared. This paper will therefore be limited to characterization of the adult forms.

Soft-bodied stoneflies such as these make very unsatisfactory pinned specimens. They shrivel like prunes in drying, and, as a rule, the best differential characters offered by the genitalia may be made out only by boiling and softening and expanding the specimens. The colours fade hopelessly, either pinned or in alcohol. Our descriptions of colour will therefore be useful only in so far

as they indicate general distribution of the deeper pigmentation areas. What is described from pickled or mummified specimens as yellow may have been green in life.

This genus includes species varying from 10 mm. to 20 mm. in length, and from 18 mm. to 50 mm. in expanse of wings. It is characterized by the possession of but two ocelli, by having a broadly depressed body, short head retracted under the front of a wide prothorax, long antennæ, and very short caudal filaments that are often hardly longer than the abdomen is wide. The venation of the wings is characterized by numerous costal cross-veins, a short sub-costal vein, not reaching the level of the cord, and the branches of the vein Cu 1 appear to spring from its anterior side.

Nymphs of this genus, so far as observed hitherto, live in spring-fed rivulets under stones. About Ithaca, N. Y., they are not uncommon in such places, and they are abundant in a small southern tributary to Enfield Creek near the mouth of the gorge. The nymphs are unique in form, having a wide thorax, broadly rounded and covered with an appressed pubescence above. The abdomen is narrower and rather short. A few long tapering gill filaments protrude backward singly about the base of the legs, both dorsally and ventrally.

Nine species are here described, of which seven are believed to be new. Only the adults are characterized, and, unfortunately, but one sex is known as yet in the case of several of the species. The accompanying plate will doubtless serve better than the descriptions for distinguishing the species. The drawings of genitalia and of the disc of the prothorax have all been done on uniform scale. They are the work of the junior author.

Two very distinct types of male genitalia occur in this genus. One is represented only by a new species from Nevada, *Peltoperla thyra*. In this, the 9th abdominal segment is abbreviated almost to complete disappearance on the mid-dorsal line; the mid-ventral callosity is a mere crescentic transverse ridge at the base of a deep V-shaped suture, the supra-anal plate is remarkably hypertrophied, elevated, bent forward in the middle, and armed with a pair of lateral expansions beside its knobbed tip (Fig. 14). In the other group, represented by all the other species of which

males are known (Figs. 5, 8 and 11) the 9th abdominal segment is prolonged on the mid-dorsal line; its mid-ventral callosity is elevated on a clavate pedicel; the supra-anal is rudimentary, and the subanal plates are developed as a pair of upcurving hooks, whose tips meet the prolongation of the tergum of the 9th segment.

These differences are so remarkable that in any other order of insects they would doubtless be used to distinguish genera; but here they appear not to be accompanied by corresponding differences in other parts and we must agree with Enderlein that the remarkable differences in secondary sexual characters often found in a series of species of Plecoptera, otherwise uniform, are probably not of generic significance.

There are slight venational differences between species, in the number of cross-veins in certain areas, and in the number of terminal forks of veins Rs and Cu, but in absence of a considerable series of specimens, we have no means of knowing how constant are the apparent differences, and our experience with such characters in this order leave us little confidence in their reliability. *Peltoperla brevis* appears, however, to be the only species in which the radial sector is but once forked beyond the cord. The differences in the form of the apex of the 8th ventral segment in the female is probably the most available criterion of the remaining species. *Peltoperla anna* is the only species which shows no appreciable prolongation of the apex of this sternite: *P. dorothea*, *P. ada* and *P. arcuata* have it successively more prolonged and entire; *P. maria*, *P. cornelia* and *P. cora* have it successively prolonged and with a wide median notch.

The two species hitherto made known are not here redescribed but new figures of them are given in the accompanying plate.

DESCRIPTION OF NEW SPECIES

Peltoperla maria, n. sp.

Length of female 16 mm.; expands 27 mm.

Colour brownish, darker on the sides of the thorax and apex of the abdomen. Head yellowish with a diffused brownish blotch on the disc in front of the ocelli. Antennæ yellowish, paler for a distance beyond the two basal segments, which are thick and brownish. Wings yellow hyaline with brownish veins.

There are some 14 cross-veins in the costal space before the end of the subcosta, and seven beyond. The cross-veins in the median and cubital areas are 5 and 7 respectively. Legs yellowish brown, not distinctly bicoloured; 8th ventral segment of the female slightly produced and broadly emarginate in the middle by a shallow wide notch.

Type—A female in the Cornell University collection from Pelham, Mass., reared on the 20th of May, 1913, by the junior author.

***Peltoptera anna*, n. sp.**

Length of male 13 to 14 mm.; expands 23 mm. Length of female 20 mm.; expands 27 mm.

A yellowish species (possibly greenish in life), having inter-segmental darker areas about the bases of the legs and on the sides of the thorax. Head yellow. Antennæ yellowish, slightly darker on the pedicel and on the apical half. Prothorax with pale brown marks just before the middle of the disc and a transverse brownish crescent close to the rear margin. Legs yellow, with a knee-cap of brownish-yellow on the base of the tibia externally, and the tips of the tarsi also brownish. Abdomen yellow, with broad, half-rings of brown margining the ventral segments. A pair of large, brownish blotches almost covers the 9th segment ventrally and the tips of the subanal plates are suffused with brown. Wings yellowish hyaline, with the veins darker.

The 8th ventral segment of the female shows in this species no elongations. The plate is cut squarely across the margin, and scarcely differs in appearance from that of adjacent segments. At the base of the 9th ventral segment of the male, there is a chitinized knob supported upon a short pedicel directed backward. The apex of this segment is slightly produced upward in the rear and covers the bases of the enlarged subanal plates, which are pointed, and reach with their tips the level of the dorsum of the segment. Caudal appendages short, abruptly tapering; each of the segments beyond the 4th basal bears a single, stout, downwardly directed seta.

Types—Male and female, in the Cornell University collection were collected at Burton, Ga., (altitude 1800 feet), on May 21st, 1911, by Dr. J. Chester Bradley.

***Peltoperla cornelia*, n. sp.**

Length of female 18 mm.; expands 30 mm.

Colour brownish-yellow. Head yellow, except for an obscure brownish diffused spot before and between the ocelli. Disc of prothorax pale brownish, obscurely and coarsely rugose. Legs yellowish, with the sides of the femora brown. A dark basal knee-cap covers the tibiae, with apices of tibiae and all of the tarsi brown. Abdomen entirely yellow. Wings smoky-yellowish, the veins brown, costal cross-veins closely crowded, there being about 15 before the end of the subcosta and 8 beyond.

The 8th ventral segment of the femora, produced backward to cover about half of the 9th segment, broadly rounded on the sides and very broadly emarginate in the middle, and a wide notch that is hardly more than an undulation of the margin.

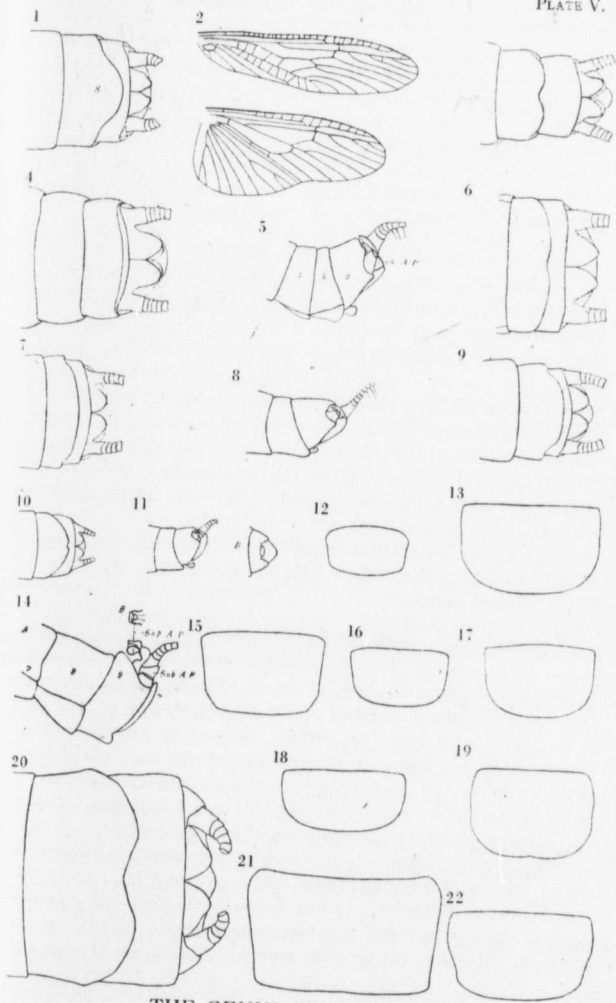
Type—A single female collected at Cornelia, Georgia, on the 5th of April, 1906 (possibly the 4th of May, the label bearing the designation, "5-4").

***Peltoperla dorothea* n. sp.**

Length of male 14 mm.; expands 21 to 28. Length of female 17 mm.; expands 28 to 30.

Colour, pale brownish. Head yellowish, except for a broadly diffused band between the eyes before and between the ocelli. The ocelli are somewhat nearer to the eyes than to each other. Antennae brownish and distinctly yellowish basally just beyond the 2nd segment. Prothorax, nearly straight across the front margin, with nearly parallel sides and very broadly rounded hind margin. Angles all obtuse. Rugosity upon the discs few, irregular, and somewhat paler. Thorax and abdomen brownish on the sides, yellow below. Wings smoky-hyaline, with brown veins. Setae yellow, slightly darker on the tip, densely clothed with yellowish hair and bearing beneath a line of long, stout spines, one on each segment.

The 9th ventral segment of the male bears a conspicuous knob upon a stalk that rises from the extreme base of the segment. The apical border is upturned, partly covering the bases of the sub-anal hooks, which are up-curved, parallel and sharp-pointed, and reach to the rear of the dorsal segment. The 8th ventral segment of the female is entire and moderately produced into a



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broadly-rounded lobe which covers nearly the entire width of the 9th segment, but only the basal third of its length.

The male type is from Ramapo, New York, collected on the 31st of May by Mr. William T. Davis. The female type is in the American Museum of Natural History, and was collected by Mr. William Beutenmuller in the Black Mountains of North Carolina in May. There are several male and female co-types collected at the same time and place by Mr. Beutenmuller.

***Peltoperla ada*, n. sp.**

Length of female, 14 mm.; expands 24 mm.

A slender yellow species. Head wholly yellow. Antennæ yellow at the base, growing somewhat darker beyond the basal third. Prothorax yellow, with indistinct, embossed markings on the disc, shorter than usual, its length being about half its width. Front border nearly straight, sides converging posteriorly, a little border around hind margin. Legs pale yellowish, excepting the extreme tips of the tarsi, which are darker. Abdomen and setæ yellow. The 8th ventral segment of the female produced backward in a broadly rounded entire lobe, which covers two-thirds of the 9th segment.

Type—One female specimen in the Cornell University collection, collected at Black Rock Mountain, Ga., May 24, 1911, by Dr. J. Chester Bradley.

***Peltoperla cora*, n. sp.**

Length of female 28 mm., expands 50 mm.

Yellowish brown. Top of head wholly yellow. Distance between ocelli about one-half distance from ocellus to eye. Antennæ pale brown, base pale yellow. Prothorax concave in front, bulging at sides, slightly narrowed posteriorly with obtuse hind angles, hind border straight across middle, sloping backward at sides; length little more than one-half width; margins strongly flaring; disc concolorous, obscurely and sparsely rugose.

Legs mostly brown, tarsi wholly so; femora and tibiæ paler on the sides with margins brown, darker externally.

Abdomen brownish, yellow below, excepting the immense ventral plate of the 8th segment, which almost covers the 9th segment. It is very broad, with wide and shallow apical emargina-

tion. Setæ brown, with yellowish bases, very short and abruptly tapering.

Type—A single female from Reno, Nevada, in the Museum of Comparative Zoology.

***Peltoperla thyra*, n. sp.**

Length of male 18 mm.; expands 30 mm.

Colour yellowish brown. Head obscure, but a little darker around the ocelli. Prothorax nearly uniform yellowish brown, faintly rugose, somewhat more squarely angled than in the other species, though like the others narrowed posteriorly and somewhat rounded behind. Legs yellow, with tips of tibiae and tarsi darker. Wings yellowish-hyaline; veins amber-brown; abdomen yellowish, with the apical segments much darker. Setæ yellowish basally, darker towards the apex.

The 9th ventral segment is divided by a U-shaped suture, which separates off the upturned posterior lobe from the basal part of the segment, and just before the suture on the mid-ventral line there is a broad, chitinous callosity that is very different from the knob of the males of the other two species above described. It is not elevated upon a stalk, but merely caps the mid-ventral portion of the hind margin of this basal half of the sternum of the 9th segment. On the dorsal side the 9th segment is broadly excavated on its hind margin, a wide V-shaped notch almost dividing it in two in the median line. The edges of the V are upturned and chitinized. The 10th segment is not visible externally, reduced to a very narrow, thinly chitinized ring that is somewhat wider below. Supra-anal plate remarkably developed, broadened upward, and then recurved forward at its tip, knobbed at the end and bearing two thinner, wing-like appendages at its sides. The median terminal knob is beset with backwardly curved prickles.

The ventral callosity of the 9th segment is crescentic in outline when viewed from below. Within the apex of the 9th segment there are visible a pair of chitinized appendages, the nature of which is unknown. They are divergent basally, parallel and approximate at their tips, and possibly are in the nature of copulatory organs.

Type—Single male specimen from Nevada in the Cornell University collection.

EXPLANATIONS OF PLATE V.

Fig. 1. *Pelto-perla arcuata* Needham.—End of abdomen of ♀ adult in ventral view.

Fig. 2. *Pelto-perla arcuata* Needham.—Wings.

Fig. 3. *Pelto-perla maria*, n. sp.—End of abdomen of ♀ in ventral view.

Fig. 4. *Pelto-perla anna*, n. sp.—End of abdomen of ♀ in ventral view.

Fig. 5. *Pelto-perla anna*, n. sp.—End of abdomen of ♂ in left lateral view.

Fig. 6. *Pelto-perla cornelia*, n. sp.—End of abdomen of ♀ in ventral view.

Fig. 7. *Pelto-perla dorothea*, n. sp.—End of abdomen of ♀ in ventral view.

Fig. 8. *Pelto-perla dorothea*, n. sp.—End of abdomen of ♂ in left lateral view.

Fig. 9. *Pelto-perla ada*, n. sp.—End of abdomen of ♀ in ventral view.

Fig. 10. *Pelto-perla brevis* Banks.—End of abdomen of ♀ in ventral view.

Fig. 11a. *Pelto-perla brevis* Banks.—End of abdomen of ♂ in left lateral view.

Fig. 11b. *Pelto-perla brevis* Banks.—Ninth sternite of ♂ showing median callosity.

Fig. 12. *Pelto-perla brevis* Banks.—Outline of prothorax.

Fig. 13. *Pelto-perla arcuata* Needham.—Outline of prothorax.

Fig. 14a. *Pelto-perla thyra*.—End of abdomen of male in left lateral view.

Fig. 14b. *Pelto-perla thyra*.—Extremity of supra-anal plate, viewed from behind.

Fig. 15. *Pelto-perla thyra*.—Outline of prothorax.

Fig. 16. *Pelto-perla ada*.—Outline of prothorax.

Fig. 17. *Pelto-perla dorothea*.—Outline of prothorax.

Fig. 18. *Pelto-perla maria*.—Outline of prothorax.

Fig. 19. *Pelto-perla anna*.—Outline of prothorax.

Fig. 20. *Pelto-perla cora*.—End of abdomen of female in ventral view.

Fig. 21. *Pelto-perla cora*.—Outline of prothorax.

Fig. 22. *Pelto-perla cornelia*.—Outline of prothorax.

NOTE ON AN INTERESTING CASE OF TWO GENERATIONS OF A PARASITE REARED FROM THE SAME INDIVIDUAL HOST.

BY P. H. TIMBERLAKE, U. S. DEPT. AGRICULTURE, BUREAU OF ENTOMOLOGY, CEREAL AND FORAGE INSECT INVESTIGATIONS.

In the course of investigations of *Dinocampus americanus* (Riley), a common Braconid parasite of many of the larger species of Coccinellids, conducted in relation to cereal and forage crop insects, several interesting features have developed, not the least important of which is the discovery that parasitism is not invariably fatal to the beetles.

On September 5th, 1914, a beetle of *Hippodamia convergens* in one of the writer's experiments was found giving issue to a parasite which in due course of time spun its cocoon beneath the host. The beetle, a large vigorous female behaved in the usual manner of parasitized specimens, clinging tenaciously to the cocoon and remaining in a comatose condition for several days. On the seventeenth of the same month it was found wandering about the vial rather feebly, but of its own volition, as if in search of food, having recovered to a large extent from its lethargy. The beetle consequently was fed with aphids and was seen to eat freely. Within a few days it largely recovered its strength, seemed to be perfectly healthy and ate freely whenever fed. On the eighth of October, however, it was found in a weak condition and died shortly afterward, having fallen a victim apparently to a common disease of Coccinellids, which in its manifestations is somewhat similar to the wilt disease of caterpillars. The beetle subsequently was subjected to a thorough examination and dissection. The wound on the dorsal side of the abdomen at the apex through which the parasite had escaped was found completely healed over by the deposition of black, chitinous matter. The ovaries were developed considerably more than they could have been when the parasite issued, although far from producing eggs, and in the abdominal cavity the molt skin of the first stage larva was found.

In the meantime out of a few beetles of the same species collected on September 22nd and 23rd at Salt Lake City, Utah, one

male on dissection was found to contain the remains of a first stage larva of the parasite. The remains, consisting of the chitinized parts of the head, were either a molt skin or less probably what was left of a larva that had died for some unaccountable reason long previously. Although it did not occur to the writer to examine the abdomen of the beetle for evidence of the wound through which the full-grown larva possibly had escaped, yet the evidence, if not complete, was in favor of the theory that the host under normal conditions in the field had recovered after becoming a victim of the parasite.

During the past season further observations to the same effect have been made. In a letter to the writer Mr. Harrison E. Smith cites the case of a beetle of *Coccinella 9-notata* collected at Agawam, Mass., which under his observations fully recovered from the effects of parasitism and lived at least six weeks after the parasite had issued from its body. In a long series of experiments with about twenty different hosts, the writer also found that beetles of *Olla abdominalis* in five out of nine cases observed fully recovered within a few days after the larva of the parasite had made its escape. Such beetles failed to become palsied and wandered away from the cocoon, even before the construction of the latter was fairly under way. One beetle, a female, was noted to be exceptionally active just after the parasite had issued and ran about the vial as if nothing had happened. This female having been mated in the meantime, began to deposit eggs after an interval of twenty-two days.

It occurred to the writer that it ought to be possible to rear a second generation of the parasite from these beetles, and the experiment was tried out, consequently, with entire success in two cases. The complete data of one of these experiments are as follows:

August 2nd—♂ *Olla abdominalis*, reared from stock collected at Brownsville, Texas (M. M. High).

August 5th—Beetle exposed to parasite, the fourth generation originally from *Hippodamia convergens*, collected in Humboldt Canyon, California (received from Harry S. Smith).

August 25th—Cocoon of parasite found, the beetle active.

August 30th—♀ *Dinocampus* issued from cocoon.

September 12th—Beetle re-exposed to the parasite that issued from it.

November 4th—Second cocoon found.

November 10th—Beetle found dead. Dissection gave proof of successive parasitism.

November 17th—♀ *Dinocampus* issued from second cocoon.

These observations show conclusively that this particular parasite does not injure the vital organs of the host in the least. In the great majority of cases, however, the fatty lymph tissues of the host are left in such a depleted condition that the beetle soon dies, and the wound through which the parasite escapes in itself probably would be fatal in most instances. It is only the exceptionally vigorous beetles which recover. The observations also illustrate an adaptation of parasite to host rarely seen in such perfection elsewhere. Many of the parasites of homopterous insects do not kill their hosts until the latter in part at least have fulfilled their reproductive functions, but here we find a condition still more favorable to host and parasite alike, in which the host ultimately is left uninjured and free to reproduce its kind.

A NEW GENUS AND SPECIES OF NITIDULINI, WITH
DESCRIPTIONS OF OTHER NEW SPECIES OF
COLEOPTERA FROM INDIANA
AND FLORIDA.

BY W. S. BLATCHLEY, INDIANAPOLIS, INDIANA.

Among the Coleoptera collected during the last two winters in Florida are a number of species which I am not able to identify from the literature extant. As I was making a trip to Cambridge, Philadelphia and Washington last August to study the types of certain Rhynchophora in the LeConte, Horn, and other Collections, I took some of these Florida species with me, and could find nothing similar to several of them in any of the collections. To Dr. E. A. Schwarz, of Washington, D. C., and Chas. W. Leng, of New York City, I am under obligations for aid in making the comparisons and for their opinions regarding the status of the species described below.

March, 1916

Family NITIDULIDÆ.

Quadrifrons, gen. nov.

Labrum small, its front edge broadly rounded, not emarginate. Front projecting abruptly from head, subquadrate, its sides parallel. Last joint of maxillary palpi oblong-cylindrical. Head without antennal grooves. Antennæ reaching middle of thorax, first joint robust, obconical, second oval, one-half length of third, which is slender and clavate; 4—8 short, as wide as long, closely united; club large, subglobose, 3-jointed, the sutures distinct, the two basal joints subequal, strongly transverse, the last joint obtusely conical, smaller but distinct. Eyes small, very prominent, coarsely granulated. Prosternal spine prolonged and convex between the coxæ, then abruptly bent downward; mesosternum not carinate. Front tibiæ with outer apical angle greatly prolonged in the form of a large triangular tooth, the outer sharp edge of the tibiæ behind this projection curved and minutely serrate, the inner apical angle with a short spine. Middle and hind tibiæ each armed at apex with two short, slender spines, their outer angles more or less produced, front tarsi feebly dilated, middle and hind ones slightly broadened; claws simple.

Related to *Perthalykra*, but the front more abrupt, labrum not bilobed, prosternum bent abruptly downward behind the front coxæ and structure of front tibiæ radically different.

Quadrifrons castaneus, sp. nov.

Oblong-oval, convex. Above dark reddish or chestnut-brown, rather thickly clothed with slender, prostrate golden-yellow hairs, those along the margins of thorax, elytra and legs longer and erect, forming a fringe; antennæ, legs and under surface somewhat paler reddish-brown. Head nearly three times as wide as front, finely and sparsely granulate. Thorax convex, more than twice as wide as long, sides broadly rounded, apex feebly and broadly emarginate, base truncate, hind angles rounded; disc minutely alutaceous, finely and sparsely granulate-punctate, each puncture bearing a prostrate yellow hair. Scutellum very large, semi-oval, its apex broadly rounded. Elytra oblong, convex, scarcely as wide as middle of thorax, one-third longer than wide, sides very feebly

curved to apical fifth, then broadly rounded into the subtruncate apex; disc not striate, sculptured and pubescent like the thorax. Pygidium rather widely exposed, finely and sparsely granulate-punctate. Abdomen finely and rather closely punctate. Length 3.2 mm.

Dunedin, Florida, rare; April 5. Taken from beneath a decaying woody fungus.

Family SILPHIDÆ.

Anodus dissimilis, sp. nov.

Oval, convex, robust. Dark reddish brown, shining, almost glabrous; club of antennæ and a faint cloud on elytra fuscous-brown. Antennæ 10-jointed, the seventh or basal joint of club not much more than half the width of eighth and subequal in width to tenth. Head finely and rather sparsely punctate, the punctures in front tending to coalesce and form minute transverse grooves. Thorax convex, less than twice as wide as long, sides broadly rounded, apex broadly but feebly emarginate, base truncate, hind angles rounded; disc very finely, shallowly and sparsely punctate. Scutellum large, triangular, its apex acute. Elytra oval, convex, scarcely wider than thorax at middle, one-fourth longer than wide conjointly, sides parallel to beyond middle, then broadly curved to the obtusely rounded apex; striæ rather fine, their punctures small, round, very close-set; intervals feebly convex, minutely and rather closely punctate. Under surface finely and sparsely punctate. Length 2.2—2.4 mm.

Dunedin, Fla., scarce; Oct. 31—Nov. 23. Swept from flowers of the hoary lupine, *Lupinus diffusus* Nutt. In *A. capitatus* Lec., the only other described species, the seventh joint of antennæ is as wide as the eighth and ninth, the thorax is nearly three times as wide as long, with arcuate base and coarsely punctured disc, and the striæ are crenately punctured. The margins of elytra in *dissimilis* are fringed with very short stiff hairs and the legs, especially the femora, bear numerous coarse, stiff, yellowish ones.

Family COCCINELLIDÆ.

Brachyacantha floridensis, sp. nov.

Narrowly oval, convex. Black, sparsely and finely punctate; head between the eyes, a large spot near each front angle of thorax,

and a humeral, basal and very large postmedian triangular spot on each elytron yellow; antennæ, palpi and legs yellow, the femora slightly clouded with fuscous. Elytra feebly and broadly curved from behind the humeri to apex. Length 2.5 mm.

Ocala, Florida; April 17. Allied to *B. quadripunctata* Melsh., but form distinctly narrower and more elongate-oval, punctures much sparser and colour of elytra and legs very different from that species or any of its varieties. The large yellow spot on each elytron is triangular, with its broad emarginate base extending from the margin near middle four-fifths the distance to suture, its sides gradually converging backwards to an obtusely rounded apex near the tip of each elytron. The elytra, in fact, are as much yellow as black, the black areas comprising a rather broad sutural stripe, a broad cross-bar on basal third, with a medium spur forward between the yellow basal and humeral spots, and a narrow apical bar. The larger yellow spot is narrowly connected along the margin and epipleura with the one on humerus.

Family SCARABÆIDÆ.

Onthophagus nigrescens, sp. nov.

Broadly oval. Above uniform black, strongly shining; beneath reddish brown, antennæ and palpi paler. Clypeus with margin strongly reflexed, elevated and feebly emarginate at middle, surface of clypeus very sparsely and finely punctate. Vertical carina obsolete at middle, elevated at each end into a long tapering horn which extends above the level of the thorax. Thorax with front median portion of disc strongly convex and rounded but without a sign of a process; surface finely and rather sparsely punctate, each puncture bearing a very short erect blackish seta. Elytral striæ fine; intervals feebly convex, not alutaceous, each with two or three rows of minute punctures, their setæ extremely short, almost invisible. Pygidium coarsely and rather closely punctate. Under surface finely and very sparsely punctate, the abdomen minutely alutaceous. Length 6 mm.

Dunedin, Florida; Nov. 1. One male from a decaying fleshy fungus. Allied to *O. striatulus* Beauv., but that species is piceous-bronzed, with clypeus subtruncate at middle, setæ of both thorax

and elytra much longer, whitish and inclined, and elytra intervals flat and alutaceous. A study of an extended series leads me to believe that *striatulus* is a distinct species and not a variety of *O. janus* Panz., as placed by Horn and retained in my Coleoptera of Indiana.

Family CHRYSOMELIDÆ.

Haltica vaccinia, sp. nov.

Oblong-oval, convex. Uniform dark coppery red, shining, the antennæ, except the basal joint, and the tarsi piceous. Eyes large, coarsely faceted. Thorax three-fourths wider than long, sides broadly rounded, disc very minutely and sparsely punctate, the basal impression narrow, deep, entire. Elytra one-third wider at base than thorax, umbones feebly developed, not limited within by an impression; disc finely, rather closely and evenly punctate, the intervals between the punctures minutely alutaceous. Abdomen finely granulate-punctate. Last ventral of male with a narrow, longitudinal median impression, more distinct near apex; of female with a rounded impression each side near base. Length 3—3.2 mm.

Twenty or more specimens swept from the flowers and foliage of a dwarf huckleberry, *Vaccinium* sp. ? near Dunedin, Florida; March 11 - Dec. 13. Smaller and more slender-bodied than *H. ignita* Ill., the thorax broader, punctuation of elytra denser and more even, umbones less prominent and colour uniform, the under-surface and legs except tarsi being of the same coppery-red hue as the upper surface.

Family RHYNCHITIDÆ.

Rhynchites perplexus, sp. nov.

Oblong, subconvex. Above bluish-black, feebly brassy; antennæ, tibiæ and tarsi piceous; under surface and femora black; pubescence very fine, sparse, prostrate. Beak slightly shorter than thorax, male; one-fourth longer, female; very slightly widened and sculptured with coarse, elongate punctures in front of antennæ; front bluish, strongly alutaceous, finely and sparsely punctate. Thorax subcylindrical, as wide at middle as long, slightly narrowed in front and near base, densely and rather finely punctate, the

punctures more or less confluent. Elytra at base one-half wider than thorax, sides subparallel for four-fifths their length, then broadly rounded to apex; disc feebly but distinctly depressed on basal third; striae punctures coarse, rounded, wider than intervals. Pygidium sculptured like front; side pieces of meso- and metasterna coarsely, rather closely punctate; abdomen finely, very sparsely punctate. Length 1.6—1.8 mm.

Crawford County, Indiana, June 24. Swept from low herbage. Okefinokee Swamp, Georgia, June; Leng collection. Massachusetts; LeConte collection. Easily distinguished from *R. aratus* Say by its colour, shorter beak of male and more feeble elytral depression. Resembles *R. cyanellus* Lec. but smaller, darker, beak much shorter and head much more finely punctured. The eyes of male are round and somewhat larger than the elliptical, more finely faceted ones of female.

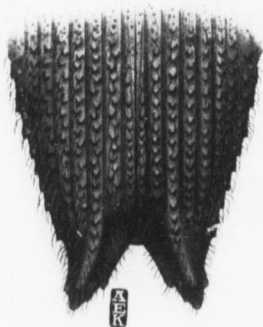
Rhynchites elusus, sp. nov.

Oblong-oval. Black, feebly tinged with bronze; antennae and legs piceous, pubescence gray, very fine and sparse. Beak of both sexes as long as head and thorax, distinctly widened and flattened near tip, much more finely sculptured than in *perplexus*, front bronzed, very finely alutaceous, minutely and very sparsely punctate. Thorax shorter and wider than in *perplexus*, widest at basal third, its disc finely, deeply and very densely punctate, the punctures not confluent. Elytra at base one-half wider than thorax. sides parallel for half their length, then broadly curved to the rounded apex; disc widely and shallowly depressed at basal third; striae punctures small, rounded, close-set. Abdomen alutaceous, finely and sparsely punctate. Length 1.8—2 mm.

Dunedin, Florida, March 25—April 13. Six specimens swept from huckleberry blossoms. The much longer and apically wider beak, more finely sculptured front and broader thorax and elytra separate this readily from both *aratus* and *perplexus*. It is probable that *elusius* and *perplexus* have been hitherto confused in collections with *aratus* Say. The latter is distinctly coppery in hue, with the sub-basal elytral depression much more distinct and the beak in both sexes as long as thorax.



A



B

PLATYPUS WILSONI, N.SP. (See p. 100.)

PLATYPUS WILSONI—A NEW SPECIES OF *PLATYPUS*
FROM BRITISH COLUMBIA (*PLATYPODIDÆ*,
COLEOPTERA) *

BY J. M. SWAINE,

In charge of Forest Insect Investigations, Entomological Branch, Ottawa.

The species of *Platypus* described herewith is very abundant and injurious on the southern half of the British Columbia coast. Although mentioned in literature and not unknown to collectors, it apparently has never been described. Its habits are those of a true ambrosia-beetle; the adults excavate a cylindrical tunnel from about six to fourteen inches in length through the bark and directly into the wood of large and small trunks, in small trunks usually curving around the heart. A characteristic fungus always found coating the walls, which are stained black thereby, serves as food for the larvæ, and to a lesser degree for the adults. Eggs, larvæ and adults are found free in the tunnels. The boring dust, ejected in abundance from the tunnel entrance and lodged in heaps in the bark crevices, is in the form of minute white splinters (Pl. VII, Fig. 1). It is readily distinguished from the meal-like boring-dust of *Gnathotrichus* frequently found in the same trunks.

It attacks all conifers of the British Columbia Coast, with the exception of *Thuja* and *Chamæcyparis*, but is most abundant in *Pseudotsuga*, *Tsuga*, and *Abies grandis*. The species is abundant on the coast as far north as Seymour Narrows and inland in the south to Agassiz.

Dying or badly weakened trees and freshly cut logs are usually selected for attack, but standing trees with considerable green foliage are not infrequently affected. A tree showing the piles of boring-dust of this species and of *Gnathotrichus* is invariably beyond hope of recovery. These piles of boring-dust are frequently seen on the blackened bases of trees injured by ground fire; in such cases the beetles enter through the fresh tissue exposed by cracks in the drying outer bark. The details of the life-history will be given elsewhere. The specific name is given in honour of our colleague, Mr. Tom Wilson, of Vancouver, B. C., who first collected the species in British Columbia.

*Contribution from the Entomological Branch, Department of Agriculture, Ottawa.
March, 1916

Platypus wilsoni n. sp. The female type: Length, 5.5 mm.; width, 1.3 mm., shining, with the pubescence inconspicuous above, except on the front and about the declivity.

The head has the whole front broadly and deeply excavated, densely granulate-punctate and clothed with long yellow hairs; the vertex coarsely punctured, the punctures shallow and elongate, and with a narrow, shining, median carina; the epistomal margin nearly straight, very broadly concave, with a small, inferior median lobe clothed above with orange setae. The antennal scape is stout, longer than the funicle, the pedicel subglobular, as long as the remaining three segments, the club densely pubescent and with sparsely scattered stouter bristles.

The pronotum is one-fifth longer than wide; the cephalic margin broadly evenly arcuate and finely margined; the sides subparallel, with a broad and deep emargination just behind the middle; the hind angles rounded; the caudal margin transversely bisinuate with the median prolongation rather small and acute; the disc irregularly depressed about the median line, with a median sub-oval area on the caudal half very finely and densely punctate, this densely punctured area divided on the middle line by a fine, black, slightly impressed line, and with the strongly convex caudal margin extending nearly to the caudal margin of the pronotum; the remainder of the pronotum finely punctured, more sparsely in front, more closely on the sides and behind, with coarser setose punctures close to the cephalic margin; the pubescence elsewhere minute and inconspicuous.

The scutellum is strongly depressed, very elongate and very sharply acuminate.

The elytra are elongate, slightly more than twice as long as wide, about as wide as the pronotum; with the sides parallel, slightly inflated behind the middle, gradually arcuately narrowed on the caudal fifth to the subtruncate apex; the disc gradually depressed behind on the apical fourth to the very short, nearly perpendicular declivity; the striae distinctly impressed, but disappearing near the apical declivity; the strial punctures close, rather faintly impressed, individually narrow and elongate; the interspaces convex, smooth, similar, almost unipunctate on the basal two-thirds, on the apical third with nearly uniseriate, granu-

late and setose punctures with small punctures intermixed, the granules coarser and acute on the sides; the third interspace strongly widened at the base, swollen and densely, finely granulate; the short abrupt declivity with a rounded prominence on each side above, finely, closely granulate and setose-punctate, without striations, moderately concave apically, with the caudal margin subtruncate, bisinuate, and the lateral angles rather strongly dentate.

The metasternum is smooth and shining, finely punctured, the pubescence slender, the median line deeply striate on the caudal two-thirds; the abdominal sternites are closely, finely, granulate-punctate and clothed with slender hairs, the last more densely granulate; the last three sternites with the cephalic and caudal margins somewhat elevated, the last sternite rather distinctly concave therefrom.

The *male* has the epistomal margin more deeply though very broadly emarginate dorsally with the inferior lobe more prominent; the front similar though less deeply concave and with somewhat shorter hairs; the pronotum similar, lacking the densely punctured median area, but with a median black line in the same position and very distinct; the elytra with the sides parallel for three-fourths the length then strongly arcuately narrowed to the individually strongly produced apices, the lateral margin concave at the base of the prolongation; the apical prolongations each slightly longer than wide, emarginate at the apex, with the outer angle much longer than the inner, blunt and obtusely carinate above from a continuation of the united 2nd and 3rd interspaces, the carina ending in a third blunt point on the dorsal apical margin of the prolongation; with a smaller tooth between the dorsal and outer teeth and three serrations between the dorsal and inner teeth; the suture, viewed from the side, straight on the basal two-thirds, and gradually depressed on the caudal third to the apices, without an abrupt declivity; the striae punctures notably coarser than in the female; the interspaces somewhat more convex; the second less strongly widened at the base and more finely granulate; the interspaces minutely, uniseriately punctured on the disc, but not striate; the punctures coarser, more numerous and finely granulate at the base of the 1st and 3rd; on the depressed caudal third all the inter-

spaces more strongly but similarly convex, except the 8th, carinate and closely, uniseriately, coarsely granulate, with stout reddish, uniseriate hairs; the 2nd and 3rd united at the base of the apical prolongation to form its dorsal carina, the 8th more strongly carinate on the apical third, the 9th granulate throughout its length, sparsely and more feebly on the middle third, rather coarsely and irregularly at the base.

The metasternum has the middle line sulcate on the caudal half; the abdominal sternites are closely, moderately granulate-punctate, more coarsely than the metasternum and more coarsely than in the female, and with distinctly longer hairs.

The type, a female, is from *Tsuga heterophylla*, taken at Campbell River, B. C. It is in the collection of the Entomological Branch, Department of Agriculture, Ottawa.

PLATE VI.

A. *Platypus wilsoni*, ♀. Greatly enlarged. Slightly modified from Entomological Bulletin No. 7, Dept. of Agriculture, Canada.

B. *Platypus wilsoni*, ♂. Apices of the elytra. Greatly enlarged—(Original).

PLATE VII.

1, Boring dust of *Platypus wilsoni*; 2, Maxilla; 3, Labium; 4, Maxillary Palp, greatly enlarged; 5, Antenna. All enlarged. (Original).

DESCRIPTION OF ELEVEN NEW SPECIES OF
CHALCID FLIES.

BY A. A. GIRAULT, WASHINGTON, D. C.

***Neomphaloidella ceroplastæ*, n. sp.**

Female—Length 1.00 mm.

Differs from *Tetrastichus periplanetae* Crawford in being darker, the scape is partly metallic, there is no lateral carina on the propodeum, the latter is not distinctly scaly, there are punctures along the lateral margin of the scutum.

Greenish black, the wings hyaline, the venation pale yellow, the knees, tibiae and tarsi (except the last joint) distal half of scape and the pedicel, except the proximal half above, golden yellow. Funicle joints subequal, each nearly twice longer than wide, slightly longer than the pedicel; club 1 as long as funicle



PLATYPUS WILSONI, N.SP. (See p. 100.)

3, half the length of the club, the third joint with a convex base and a distinct terminal nipple. Scape a little compressed. Mandibles tridentate, the second two teeth weakly separated, the third truncate, but not large. A line of delicate punctures across the pronotum. Stigmal vein of moderate length.

The male is about the same, but the propodeum and flagellum not seen.

Described from one male and seven females reared from *Ceroplastes galeatus* Newstead, Kampala, Uganda, Africa (C. C. Gowdey).

Types—Catalogue No. 19914, U.S.N.M., three females on tags, one male and two females head on a slide.

***Neomphaloidella pulchriventris*, n. sp.**

Female—Length 1.20 mm.

Dark metallic purple, the wings hyaline, the legs, antennae and abdomen lemon yellow, with the following exceptions: Distal joint of club (washed with purple), proximo-dorsal half of pedicel, bases of coxæ, middle femora (except ends), a cinctus just below middle knee, lateral margin of abdomen, the acute distal fifth (or somewhat more) of the abdomen and two faint cross-stripes on abdomen (both interrupted along the meson) between the centre and the distal purple. The marginal stripe of abdomen is broken or partly so just where it joins the distal purple and there is a marginal dot at middle of the abdomen. Second two ring-joints very short. Funicle 1 nearly thrice longer than wide, a little longer than 3, which is longer than any club joint or the pedicel. Club with a distinct nipple. Mandibles tridentate. Venation yellow, the stigmal vein long. Fore wings broad. Propodeum with delicate median and lateral carinae, the former flat. Abdomen conic-ovate. Sculpture usual.

Described from one female captured by sweeping in the open forest, October 10, 1915, at Glendale, Prince George County, Maryland.

Type—Catalogue No. 19915, U.S.N.M., the above specimen on a tag, the head on a slide.

A second female, same place, October 24, 1915.

Gonatocerus partifuscipennis, n. sp.

Female—Length 0.85 mm.

Black, opaque, the first two pairs of knees and the four proximal tarsal joints, reddish brown; fore wings with the distal third distinctly infuscated, the venation dark. Thorax scaly, the parapsidal furrows shallow, the scutellum simple, the propodeum with a very widely separated pair of median carinae. Fore tibiae with about five small teeth dorsad, the last near apex. Funicles 1-4 subequal, each a half longer than wide, shorter than the pedicel, narrower than the others; 5 and 7 longest, each twice longer than wide; 6 and 8 subequal, somewhat longer than 4. Scape compressed. Marginal fringes of the fore wing not long, about a fifth of the greatest wing width, the discal cilia very fine. Strigil present. Caudal wings acuminate, bearing a pair of discal cilia along the caudal margin and about three long lines cephalo-distad, the caudal marginal cilia longer than the marginal cilia of the fore wing. Caudal tibial spur single.

Described from one female captured by sweeping in open forest, Glendale, Maryland, October 11, 1915.

Type—Catalogue No. 19916, U.S.N.M., the above specimen on a slide.

Phænodiscus partifuscipennis, n. sp.

Head lenticular, the distinct scrobes short, weakly joined above. Marginal vein thrice longer than wide, subequal to the postmarginal, the curved stigmal longer. Similar to *æneus* Dalman (compared with German specimens in the U.S.N.M.), but the fore wing, though similarly infuscated, bears also a very large hyaline space between near base (where the wing is longitudinally infuscated caudad) and two-thirds the way out to the hairless line; otherwise as in *æneus*. Scutum punctate, the punctures sparser on the scutellum.

The male has the wings hyaline, the antennae yellowish, the scape and pedicel dorsad purplish; funicle 1 five times longer than wide, longest. Pedicel short, club not seen, otherwise like the female except tips of tibiae (most of first tibiae) yellowish. The mandibles in both species are obtusely, equally tridentate.

From one male, two females labelled "Italy, State Insectary, California. Ex. *Saissetia hemispharica*."

Types—Catalogue No. 19917, U.S.N.M., a pair on tags and

a slide bearing the male and female heads and wings and the same of female *æneus*.

Sympiesomorphelleus trisulcus, n. sp.

Female—Length 2.50 mm.

Agrees with the description of *Diglyphus maculipennis* Ashmead, but purplish, the scutellum is very slightly rippled and has the median groove only along proximal two-thirds, the infuscation of the fore wing is lighter and more suffused, the flagellum is light yellowish, while the legs and scape are white. Head with scattered pin-punctures. Abdomen honey yellow, except most of segment 2 of the abdomen dorsad, which is washed more or less deeply with purple and occupies about a third or more of the surface. Propodeum tricarinate and with a distinct cross-carina about the middle. Mandibles about 10-dentate. Funicle 1 nearly thrice longer than wide, 4 somewhat longer than wide, longer than the pedicel. Club 2 only about half the length of 1.

Described from one female, minutien-mounted, in the U.S.N.M. labelled "*Diglyphus albipes* Ashmead. Male type, 1500 feet, St. Vincent, West Indies, H. S. Smith."

Type—Catalogue No. 19918, U.S.N.M., the above specimen plus a slide bearing the head and a hind tibia.

Neomphaloidella nebraskensis, n. sp.

Female—Length 1.50 mm.

Black-brown, the wings hyaline, the venation white, the first two pairs of tibiae, the tarsi, the knees broadly and tip of caudal tibiae yellowish white. Postscutellum, lateral margins of scutum very narrowly and the mesopleuracic sutures yellowish. Propodeum with a narrow median carina, no lateral carina. Punctures along lateral margin of scutum very obscure. Of the usual fine sculpture. Funicle 1 two and a half times longer than wide, 2 and 3 each nearly twice longer than wide; club with a terminal nipple, its first joint slightly shorter than funicle 3. Pedicel elongate, a little longer than funicle 3. Mandibles tridentate.

Described from one female on a tag in the U.S.N.M., labelled "Lincoln, Neb., Webster, No. 2142. G. I. Reeves."

Type—Catalogue No. 19919, U.S.N.M., the above specimen plus a slide with the head.

(To be continued.)

REPORT OF THE DOMINION ENTOMOLOGIST.

In the Report of the Dominion Entomologist for the year ending March 31st, 1914, which has just been published, an account is given of the activities of the Entomological Branch of the Dominion Department of Agriculture, in the matter of controlling insect pests throughout Canada, and all who are interested in this subject will be repaid by a perusal of this record of a year's work. The Department now maintains nine field laboratories in different parts of the Dominion, at which investigations on various insect pests are carried on. This line of work constitutes the chief aspect of the work of the Branch. A large amount of work is necessitated by the administration of the Insect and Pests Regulations of the Destructive Insect and Pest Act, involving the inspection and fumigation of trees and plants entering Canada. Perhaps one of the most interesting of the activities of the Branch is the work carried on against the Brown-tail Moth in Eastern Canada, particularly the importation and establishment of the parasites of this insect and the Gipsy Moth. A map is given, showing the places in Canada where the parasites of the Brown-tail and Gipsy Moths have been distributed by the Department. Other branches of work covered by the Report are investigations on insects affecting cereals and other field crops, including an account of the notorious Army-worm outbreak of 1913; insects affecting fruit crops, as the result of which investigation work of great practical value has ensued; insects affecting forest and shade trees in which an account of the investigations of Stanley Park, Vancouver, which has been so seriously affected by forest insects is given; insects affecting domestic animals and man, and insects affecting garden and greenhouse. The Report is a record of marked progress in a branch of the work of the Department of Agriculture which not only affects agriculture, but also forestry and public Health. Copies of this Report may be had free on application to the Publications Branch, Department of Agriculture, Ottawa, and requests for the Report may be mailed free.—[Press notice from the Ottawa Department of Agriculture.

NOTES AND QUERIES.

NOTES ON HIBERNATING LADYBIRD BEETLES.

With the exception of frequent specimens of ladybird beetles passing the winter in houses, the writer has only occasionally found hibernating forms. In consequence of this, the discovery of a large number of the species *Adalia bipunctata* Linn., in their winter quarters, has proven more than usually interesting. The

removal of a sheet of bark, from a dead White Pine, disclosed over a hundred beetles of this species. They were congregated in several groups that averaged approximately a dozen specimens. The debris produced by the boring of bark beetles furnished the material among which they had found shelter. As less than a couple of square feet of the tree was stripped, there is no doubt that many more were hibernating beneath the bark on the remainder of the tree.

It is safe to assume that several factors were operative in causing the collecting, at one place, of such a large number of beetles of the same species. Either the situation chosen by them may have presented ideal conditions for hibernation and thus proved attractive to many specimens, or this species may be gregarious in its winter habits. Also the proximity of High Park would ensure, in the neighborhood, a luxuriant growth of various plants furnishing suitable feeding grounds for aphids during the summer, a circumstance that would react favourably on the production of the ladybirds.

On November 20th, the date upon which the observation was made, the beetles had not become entirely dormant, but, when disturbed, showed slight signs of activity.

A. COSENS, Toronto, Ont.

Hepialus thule at rest.—I had occasion, last July, to keep a ♂ *H. thule* alive for a couple of days, and noticed that, in clinging to the sides of the box or to branches, the first two pairs of legs only are used. The hind pair, which bear the great tufts of scent distributing hairs, are drawn up alongside of the body. This is shown in the reduced sized photo of the moth accompanying Mr. Swaine's article in *Can. Ent.* XLI, 337-343, pl. 10, fig. M (1909), but the position is always head up.

I do not recollect seeing any reference in our literature to this habit.

A. F. WINN, Westmount, Que.

A New Enemy of Poplars and Willows in New Jersey.—During the past few summers, a small greenish-blue Chrysomelid was observed feeding in considerable numbers on poplars and willows chiefly in nurseries at Arlington, Elizabeth, Irvington, and several other northern New Jersey points. Very little attention was paid to it, inasmuch as it was assumed to be a native species. It turned out,

however, to be *Plagiodera versicolora* Laicharting, which is an old name for the common *P. armoricæ* of Europe. From its activity in New Jersey, it can easily do considerable damage, feeding as it does, in both larval and adult stages, but, of course, can undoubtedly be kept in check by arsenical sprays.

HARRY B. WEISS, New Brunswick, N. J.

Bat Fleas.—The Hon. N. Charles Rothschild has very kindly sent me word that the bat-fleas of which I gave an account in the Annual Report of the Ent. Soc. of Ont. for 1909, belong to the species: "*Ischnopsyllus insignis* Rothschild. Nov. Zool., Vol. X, p. 319, No. 4, pl. IX, figs. 8-12, 1903."

I am much pleased to receive this authoritative identification of the insects.

THOMAS W. FYLES.

Ottawa, January 27th, 1916.

Apropos of the late Prof. Webster's note in the Can. Entom. Vol. XLVII, p. 406, I can report an assembling of *Anosia plexippus* which seemed to me remarkable on account of both the earliness of the date and the situation.

In connection with an investigation of the introduction of the San José Scale into Ontario, I called on the 16th day of August, 1899, upon a farmer who, the neighbours said, was the first man to observe it in the Niagara district. His farm was on the Lake Ontario shore (south side) a few miles west of the mouth of the Niagara River. A grove across his property cut off the view of the lake. In conversation, he mentioned the fact that this grove was then swarming with red butterflies. I went back through it and found that he had not exaggerated, for, verily, there was a multitude of "monarchs" there "that no man could number."

London, Ont., Dec. 12, 1915.

JOHN DEARNES.

NELSON'S "EMBRYOLOGY OF THE HONEY BEE."

THE EMBRYOLOGY OF THE HONEY BEE. By J. A. Nelson, Ph.D. 282, p.p., 95 + XV. figures. Princeton University Press. Price \$2 net. 1915.

In the short preface that he has written for this book, Dr. E. F. Phillips explains that in it "is presented to the beekeeping public, as well as to those whose interests are more scientific, the

most thorough account of the complex development of the bee egg yet published, and to those interested in bees no apology for investigations of this kind is needed. It is of interest to the bee enthusiast, for, while possibly he may not fully appreciate all the details discussed, he will assuredly want to take such facts as his training permits." With all of which we most heartily agree. As a class, beekeepers are the greatest of enthusiasts, but it was well that Dr Phillips exercised his usual caution and used the qualification "as his training permits," for we can imagine the untrained bee enthusiast in a commendable endeavour trying to master the terminology of the cytologist and embryologist, to unravel the description of mitotic phenomena and to decide for himself, for there is no room for indecision in beekeeping, as to the origin of the mesenteron. With a profound conviction of the marvellous nature of the processes that go on during those seventy-six hours required for the development of the egg, a deep admiration for the author who has so skilfully studied and described those changes and pride in the possession of such a work, he will lay it down and slip away to his apiary to see whether any of his colonies need requeening.

Dr. Nelson's monograph constitutes a very valuable contribution to our knowledge of insect embryology, a branch of our science which has received all too little attention on this continent. It is a useful work mainly for two reasons. First, the author has investigated, with the aid of improved technique and modern methods of research, a problem previously studied in considerable detail by such workers as Bütschli (1870), Kowalevski (1871), and Grassi (1884), upon whose results we have necessarily had to rely for our knowledge of the embryology of this insect. Secondly, the author has not confined himself to a description of the results of his own careful work, but he has brought together in a desirable form the main results of other workers on insect embryology upon which subject, accordingly, the volume constitutes almost a complete review, and on that account will be of great value to students and others desiring such information.

The author describes in sequence the embryological changes: Cleavage, formation and completion of the blastoderm, the formation of the germ layers, and the amnion. After a general account

of the development of the embryo the development of the various organs is described: The nervous and tracheal systems, the oenocytes, muscles, fat-body, circulatory and genital systems and alimentary canal. A useful summary is given at the end of the book; in this connection we think the value of the book would have been enhanced by the inclusion of a summary at the conclusion of each chapter.

On the whole, Dr. Nelson confirms the observations of the previous investigators who have studied the development of the bee egg, and his work does not afford any striking differences or discoveries. The account of the cleavage of the egg agrees in the essential details with the earlier work. In regard to the vexed question of the origin of the mesenteron, the importance of which has always been emphasised on account of its bearing of the broad theory of the germ layers, the results of this study are held to lend little support to the views of those who regard the mesenteron of insects as arising from the ectoderm of the stomodæum or proctodæum, and to harmonize still less with the theory of the origin of the mesenteron from cells remaining in the yolk. The author considers a final decision between these two rival interpretations premature. Certainly the honey bee is too highly a specialized member of a specialized order upon which to base generalizations. It is found that the anterior and posterior mesenteron rudiments are formed from the blastoderm of the ventral plate by an inward movement of its cells. The book is characterized by a desire on the part of the author to review the conclusions of previous investigators of the embryology of the honey bee and of other insects, to present the results of his own study and to leave the detailed discussions of rival interpretations to those who prefer the atmosphere of debate, and in a work of this character and purpose we think such an attitude is perhaps desirable.

The numerous excellent illustrations, on which the author is to be heartily congratulated, increase the value of a book which will be very useful to students of insect embryology, and to those beekeepers who may be qualified by their training or mental courage to appreciate what is undoubtedly the best account we have of the development of the egg of the honey bee.

C. GORDON HEWITT.

Mailed March 14, 1916.